
Sino-U.S. Agricultural Education: Operation and Management of Professional Family Farms in the USA and China

Corvallis, Oregon, USA
October 2017

中美农业教育:美国和中国专业家庭农场的经营与管理
美国俄勒冈州, 科瓦利斯市
2017年10月

Sino-U.S. Agricultural Education: Operation and Management of Professional Family Farms in the USA and China

Corvallis, Oregon, USA
October 2017

中美农业教育：美国和中国专业家庭农场的经营与管理
美国俄勒冈州，科瓦利斯市
2017年10月

Editor 编辑

Dr. Sam Angima, Assistant Dean for Outreach and Engagement
Oregon State University College of Agricultural Sciences
延伸与参与 (Outreach and Engagement) 助理院长
俄勒冈州立大学农业科学学院

Acknowledgements 致谢

Oregon State University 美国-俄勒冈州立大学

Mr. Dave King, Dr. Scott Reed, Dr. Nick Andrews, Ms. Jennifer Alexander, Ms. Gretchen Cuevas, and Dr. Garry Stephenson

China Central Agricultural Broadcasting and Television School (CABTS)

中国-中央农业广播电视学校

李方红 Ms. Li Fanghong and 萬蕾 Ms. Wan Lei

SR 1098

© 2017 Oregon State University

ISBN 978-1-931979-30-6

Contents 内容

Preface.....	v	
前言	vi	
Increasing Stakeholder Communication and Engagement		
Through the Culinary Breeding Network	1-5	
通过烹饪育种网络以加强利益相关方的沟通和参与.....	6-10	
Two Online Decision Tools: Organic Nutrient Management		
and Crop Scheduling in Oregon.....	11-18	
两项在线决策工具: 俄勒冈州的有机营养管理和农作物调度	19-26	
Motivations and Obstacles in Transitioning to Certified Organic Farming		
for Farmers in the United States	27-35	
美国农民为过渡到有机农业认证的动力和障碍.....	36-45	
The Dry Farming Collaborative.....		46-48
干旱农业的合作.....	49-51	
Assessing the Educational Needs of Small-Acreage Farmers		
in the Southern Willamette Valley Region	52-54	
评估威拉米特山谷南部地区小面积农民的教育需求.....	55-57	
A Survey of Small Farmers to Assess Interest in a Food Hub		
in Oregon's Mid-Willamette Valley	58-66	
评估俄勒冈州威拉米特山谷中部小农户对食物中转站的兴趣调查.....	67-75	
Livestock Handling: How Little Changes Can Have Great Rewards.....		76-81
家畜处理:少改变能有大收益	82-87	
Using Women Farmer Networks as a Tool for Extension Work.....		88-93
使用妇女农民网络为推广教育工作.....	94-98	
The Issues, Practices and Thoughts on the Cultivation of		
Modern Professional Farmers	99-105	
新型职业农民培育的问题、实践与思考.....	106-111	
Research on Cultivation of Young Farmers' Entrepreneurship—		
Practice and Policy Revelation in Chongqing	112-118	
青年农场主创业能力培育研究—重庆实践及政策启示.....	119-124	
Discussion of Agricultural Supply Side Structural Reform.....		125-131
农业供给侧结构改革刍议.....	132-136	

“1+X·Heaven&Earth&People” Mode for Professional Peasants’ Cultivation in BaoJi City	137-143
宝鸡市职业农民培育 “1+X· 天地人”模式.....	144-149
A Brief Discussion on Cultivation Pattern of Field School for Apple Industry on New Professional Farmers	150-152
浅谈 “苹果田间大学” 新型职业农民培育模式.....	153-156
Research and Countermeasures on New Type of Professional Farmer Training	157-160
新型职业农民培育工作研究与对策.....	161-163
The Development of Family Farms and the Nurturing of Family Farmers	164-168
中国家庭农场发展与农场主培养.....	169-173
Exploration of a Pilot Program for Farmer Online Learning.....	174-184
农民在线学习试点探索.....	185-192
Practice & Probe of University-Based Agricultural Extension	193-199
大学农业推广模式的实践与探索.....	200-204
Role and Opportunity of Agricultural Colleges and Universities in the Cultivation of New Professional Farmers.....	205-210
新型职业农民培育中农业院校的角色与作为.....	211-214
Research on Marketing Strategies of China Small Ecological Farms	215-221
中国小型生态农场营销策略研究.....	222-228
The Study of Agricultural Extension Program Based on Universities in County Area.....	229-235
以高校为依托的县区级新型农业合作推广模式的研究 ——以宿州市埇桥区皖北综合试验站为例.....	236-240
Study on the Innovation and Reform of Grass-roots Agricultural Technology Extension System--A Case of Linquan County in China	241-251
我国农村基层农技推广体系改革和建设的实践与思考 ——以安徽省阜阳市临泉县为例.....	252-255
Characteristics and Influencing Factors of Soil Respiration.....	256-264
土壤呼吸特征及影响因素.....	265-274

Preface

For more than 100 years, Oregon State University (OSU) Extension Service has strived to empower communities to understand the cause of their challenges and collectively find local solutions using locally available resources to address those issues. This is especially true for the people who own and operate small-scale farms, who rely heavily on community-based resources and markets to thrive. As world economies change, farmers need to adapt and move away from subsistence farming methods to operate as actual farm business entities that take into account biological, physical, financial, marketing, and family aspects of maintaining and growing a business.

In China, the Central Agricultural Broadcast and Television School (CABTS) is a unit of the Chinese Ministry of Agriculture that is responsible for farmer training through its system of more than 48,000 learning centers. CABTS has empowered farmers with tools to enhance farmers' outputs using radio, television, and network media in an integrated manner. These methods have provided convenient and close-to-home learning opportunities to a large number of farmers, even in far-to-reach areas, thus strengthening the farmers' knowledge base and skills for producing food and fiber.

Ideas for international partnerships and collaboration started in 2008 when both CABTS and the American Distance Education Consortium (ADEC) member universities developed a collaborative relationship to exchange and empower learning activities including online education. From 2014, CABTS and OSU developed a collaborative agreement on training professional small farmers able to transform agriculture to feed the growing world population. The purpose of this collaboration was also to expand the development capability of CABTS instructors in online and blended learning, jointly develop bilingual learning modules, explore opportunities for U.S./China farmer exchange, and explore possibilities for a Sino/U.S. farmer training institute.

In October 2017, the concept of farmer exchange and Sino/U.S. farmer training became a reality when CABTS and OSU co-hosted an international conference: *Sino-U.S. Agricultural Education: Operation and Management of Professional Family Farms in the USA and China*. Joining the coalition for this conference was the newly formed University-level Strategic Partnership between AAU-CSU (Anhui Agricultural University and Colorado State University) that represents a new dimension for China-U.S. university collaborations aimed at expanding Extension capacity as well as programs and training for both U.S. and Chinese Extension services. At the conference, a series of papers was presented focusing on tools farmers need to become successful business managers. The diversity of experiences and expertise presented in these papers represents the bigger needs of our farmers including innovation, training, research, farm inputs, supplies, needs assessments, climate change and other issues affecting both livestock and crop production aspects. These papers are written in a format and style that identifies the needs, what is being done about the needs, and the impacts of the research or extension efforts in terms of enhancing farm business successes.

Our hope is that these papers be shared widely by Extension educators and farmers to help benefit more farming families in both countries.

Dr. Sam Angima, Assistant Dean for Outreach and Engagement
Oregon State University College of Agricultural Sciences
October 2017

前言

100多年来,俄勒冈州立大学(OSU)推广服务机构一直致力于让社区了解他们所面对挑战的原因,并集体利用当地可用资源来寻找就地解决这些问题的方案。对于拥有和经营小型农场的人们尤其如此,这些农场严重依赖社区资源和市场来茁壮成长。随着世界经济变化的变化,农民需要适应和摆脱自给自足的农业方式,进一步当作农业商业实体来运作,需要考虑到生物,物理,财务,营销和家庭各方面来做实际业务发展。

在中国,中央农业广播电视学院(CABTS)是中国农业部的一个单位,通过其48,000多个学习中心的系统负责农民培训。农民专业技术委员会授权农民综合运用广播,电视和网络媒体提高农民的生产能力。这些方法为广大农民提供了方便和就近的学习机会,即使是在边远的地区也能受惠,从而加强了农民在生产食品和纤维方面的基础知识和技能。

国际合作与协作的理念始于2008年,当时CABTS和美国远程教育联盟(ADEC)成员大学开展了合作关系,开始以交流和互助开展包括在线教育的各类学习活动。从2014年起,CABTS和OSU制定了一个关于培训的合作协议,来使专业小农户转变去适应并世界人口日益增长的需求。此次合作的目的是扩大CABTS教师在线和混合式学习的发展能力,共同开发双语学习模块,探索美国/中国农民交流的机会,探索建立两国农民培训机构的可能性。

中美两国农民交流与农民培训的概念将在2017年10月成为事实。CABTS和OSU共同主办了一次国际会议:中美农业教育:美国和中国专业家庭农场的经营管理。加入本次会议联盟是新成立的AAU-CSU(安徽农业大学和科罗拉多州立大学),这是大学之间的战略伙伴关系,代表了中美两国合作的新局面。大学合作旨在增进扩展能力,以及推广两国间推广教育服务的计划和培训。在会议上,提出了一系列论文,重点是提供给农民所需要的工具,让他们成为成功的企业经理人才。这些文件中提供的经验和专业知识是多样性的,反映了我们农民的广大需求,包括创新,培训,研究,农业投入,供应,需求评估,气候变化以及影响畜牧和作物生产方面的等等问题。这些论文是从确定需求的方式来编写的,在解决需求方面正在做什么实际行动,以及在推广教育的研究或推广服务工作对提高农场业务的影响。

我们希望这些文件得到推广教育工作者和农民的广泛支持,以帮助两国更多的农民家庭受益。

Dr. Sam Angima

延伸与参与(Outreach and Engagement)助理院长

俄勒冈州立大学农业科学学院

2017年10月

Increasing Stakeholder Communication and Engagement through the Culinary Breeding Network

Lane Selman and James R. Myers, Department of Horticulture, Oregon State University

Abstract

Currently many seed companies do not regularly engage with or consider the needs and preferences of organic farmers and their fresh-market customers (chefs, farmers market consumers, Community Supported Agriculture (CSA) members, retailers and wholesalers) during the plant breeding process. Organic farmers need cultivars adapted to local conditions and organic production methods. Additionally, their fresh-market customers demand vegetables of superior flavor, texture, cooking quality, and nutritional value and have an appreciation for uniqueness, quality, and novelty.

The Culinary Breeding Network incorporates chefs, farmers, and other end users into the plant breeding process to provide breeders with deeper insight into preferred traits while also increasing awareness and understanding of organic plant breeding to a broader audience. Engaging with chefs through sensory evaluations to evaluate cultivars and breeding populations sets this work apart from standard sensory panels. In addition to a high degree of discrimination in taste and flavors, chefs may imagine novel applications of the material and may identify cultivars and uses that are outside of the culinary norm. Other impacts resulting from soliciting end-user input into breeding projects include creating connection and increasing communication between plant breeders with the fresh-market community and identifying consumer preferences that can guide breeding objectives and cultivar development.

Introduction

Often, it is not a high priority for seed companies to engage with or prioritize the unique needs and preferences of organic farmers and their customers during the plant breeding process. To ensure success, organic farmers need cultivars bred under organic conditions to select for specific traits including weed competitiveness, disease resistance, and stress tolerance. Additionally, consumers expect superior flavor, texture, appearance, and culinary quality from fresh produce. This is especially true when the produce is organically grown and sold through fresh markets [1]. Public breeders select breeding lines and evaluate commercially available cultivars to identify high performing germplasm. They typically evaluate yield, appearance, pest resistance, and sometimes quality variables such as brix (percent soluble solids) and specific gravity. But typically, end users are not engaged in the evaluation process and sensory qualities (flavor, texture, culinary quality) are either not evaluated [2] or only evaluated at the very end of the process. We formed the Culinary Breeding Network (CBN) to address this gap between breeders and end users by bringing together plant breeders, seed growers, farmers, chefs, produce buyers, and other end users to discuss and identify preferences and traits of culinary excellence in vegetables and grains.

Activities

The Northern Organic Vegetable Improvement Collaborative (NOVIC) is a collaborative project funded by the United States Department of Agriculture (USDA) National Institute of Food and Agriculture Organic Research and Extension Initiative. Collaborators include Oregon State

University, University of Wisconsin, Cornell University, Organic Seed Alliance, USDA-Agricultural Research Service and more than 30 organic farmers. The project's goal is to improve cultivars of six vegetable crops for organic production. During the 2010 season, NOVIC farmers in Oregon created a regional project goal to identify an open-pollinated, early maturing, high-yielding sweet red pepper cultivar with high sensory quality to substitute for a dependable hybrid for which it was increasingly difficult to source seed. Nine hybrid and open-pollinated sweet pepper cultivars were trialed in 2010 and 2011 with evaluation of important field traits including plant architecture, lodging susceptibility, leaf canopy, pest tolerance, sunscald damage, and yield.

In addition to field performance under organic conditions, flavor is a high priority for organic growers. Organic customers demand superior flavor, texture, cooking quality, and nutritional value and have an appreciation for uniqueness, quality, and novelty. With a goal of incorporating more opinions into the standard simple taste test, participating farmers' customers were invited to perform a more formal sensory analysis. Evaluators included farmers, chefs, and farmers market management that rated nine pepper cultivars—prepared raw, sautéed and roasted—using a hedonic scale to rate preferences for flavor and texture. Unexpected feedback unrelated to flavor or texture came during conversation following the evaluation. Chefs stated that preferred traits like rounded shoulders and straight walls that made for easier kitchen processing with less waste would be a strong consideration when making the decision of which pepper cultivar to purchase. We subsequently prioritized facilitation of these conversations and interactions to further understand the traits plant breeders should be selecting for during the breeding process.

The Variety Showcase is an annual CBN event with a goal to increase communication and collaboration to develop more relevant and desirable cultivars for all parties. Attendees have the opportunity to taste commercially available cultivars, provide feedback on breeding populations (Figure 1), and exchange ideas and perspectives.

The Variety Showcase event has been held annually since 2014 in Portland, Oregon. The 2016 event brought together over 300 stakeholders, journalists, and others. The evening event featured 22 stations; each included a plant breeder and chef (Figure 2). Variety Tasting stations (Figure 3) included side-by-side comparisons of commercially available cultivars of the same species. Breeding Population stations (Figure 4) exhibited diversity within a population and provided an opportunity to evaluate in-development breeding lines with the breeder present for discussion. At all stations, a highlighted cultivar bred or maintained by the breeder was incorporated into a dish by the chef. In some cases, chefs created unusual and novel cuisine from these cultivars. For example, one chef made an orange sherbet using non-pungent habanero peppers that highlighted the tropical, fruity flavor of this pepper species, an aroma and flavor normally masked by the extreme pungency found in most cultivars.

A mixture of public and private plant breeders—including farmer-breeders improving cultivars for their own use—and non-profits striving to educate farmers and the public on the importance of organic breeding are invited to participate in the event. Participating public breeders have included those from Oregon State University, Washington State University, Cornell University, University of Wisconsin, and USDA-ARS. Private breeders, seed companies, and non-profits have included Wild Garden Seed, Adaptive Seeds, Uprising Seeds, EarthWork Seeds, Ayers

Creek Farm, The Field's Edge Research Farm, Gales Meadow Farm, Full Table Farm, Experimental Farm Network, and Organic Seed Alliance.

Results and Impact

Attendees have been exposed to more than 150 commercially available cultivars and 135 breeding lines of vegetables and grains during the three events. Attendance has more than tripled from 2014 to 2016. Seed companies report significant increases in sales due to exposure from the Variety Showcase events. Post-event surveys revealed substantial impact on attendees (Table 1). For the statements on knowledge sharing in person or via social media, respondents estimated that they would share information with more than 1,100 individuals in person and more than 110,000 using social media.

Table 1. Type of outcome or impact and percentage of individuals affected by attendance of a Variety Showcase event as revealed in a post-event survey conducted during the 2016 event

Outcome/Impact	%
Met someone who plays a role in the food system they did not previously know	89
Plan to share their knowledge gained with others	98
Will share knowledge with others in person	90
Will share knowledge through social media	43
Will have their work impacted positively by knowledge gained	95
Predicted direct financial impact	8
Expanded their networks	56
Changed buying practices	33
Used the event to inform their decision-making	69

Incorporating chefs, farmers, produce buyers, and other stakeholders into the plant breeding process gives breeders deeper insight into preferred traits while also increasing awareness and understanding of organic plant breeding to a broader audience. Creating a venue to facilitate an interactive exchange of specific needs increased understanding of what consumers are looking for in fresh market produce for breeders and, for all other participants, a greater understanding of the important role breeders play in the food we eat. Engaging with chefs and produce buyers through qualitative sensory evaluations like the Variety Showcase to assess cultivars and breeding lines sets this work apart from standard quantitative sensory panels.

A significant amount of regional and national press has resulted, including:

- Food and Wine Magazine
(<https://issuu.com/billdonahue2/docs/page65>)
- The Atlantic
(<https://www.theatlantic.com/science/archive/2015/11/vegetable-breeders-working-with-chefs/415125/>)
- Civil Eats
(<http://civileats.com/2015/02/13/a-better-tomato-a-better-tomorrow/>)
- Edible Portland
(edibleportland.com/a-better-tomato-a-better-tomorrow/)

- Edible Manhattan
(<http://www.ediblemanhattan.com/eat/chefs-plant-breeding-flavor/>)
- The Oregonian
(http://www.oregonlive.com/food/2016/10/building_a_better_vegetable_ho.html)

Use of social media has resulted in significant outreach of project goals and activities. The CBN Instagram has over 7,500 followers, and the Facebook group includes over 900 members. Articles, photos, upcoming events, and more information can be found on the Culinary Breeding Network website (<http://www.culinarybreedingnetwork.com/>).



Figure 1. Variation in phenotypes among mild habanero breeding lines



Figure 2. Breeder Frank Morton, Wild Garden Seed and chef Nora Antene, Tusk with ‘Macedonian Lanceleaf’ parsley and apple granita on buttermilk mousse



Figure 3. Variety tasting station for beets evaluated both raw and roasted



Figure 4. Breeding population station for carrots featuring collaborative breeding by Phil Simon of USDA-ARS and Organic Seed Alliance

References

- [1] Bonti-Ankomah, S. & Yiridoe, E.K. 2006. Organic and conventional food: A literature review of the economics of consumer perceptions and preferences. Final report. http://www.organicagcentre.ca/researchdatabase/res_food_consumer.asp
- [2] Sanchez, E.S., Butzler, T.M., Stivers, L.J., Elkner, T.E., Bogash, S.M., Oesterling, R.E., & Orzolek, M.D. 2012. Pennsylvania statewide winter squash evaluation project. HortTechnology, 22(8), 826-837.

通过烹饪育种网络以加强利益相关方的沟通和参与

Lane Selman and James R. Myers
俄勒冈州立大学园艺系

Increasing Stakeholder Communication and Engagement through the Culinary Breeding Network

Lane Selman and James R. Myers, Department of Horticulture, Oregon State University

简介

目前,许多种子公司在植物育种过程中不经常参与或考虑有机农民及其新鲜市场客户(厨师,农民市场消费者,社区支持农业(CSA)成员,零售商和批发商)的需求和偏好。有机农民需要适应当地条件和有机生产方法的品种。此外,新鲜市场的客户会要求蔬菜必须具有优越的味道,质感,烹饪质量和营养价值,并且赞赏蔬菜独特性的品质和新颖性。

烹饪育种网络将厨师,农民和其他用户纳入植物育种过程,为育种者提供更深入的了解其优选性状,同时也提高对有机植物育种的认识和了解。通过感官评估与厨师合作来评估品种和育种群体,如此便可将这项工作与一般以感官筛选方式区分开来。除了对味道有高度的挑剔之外,厨师也可以由此想象出材料新颖的应用前景,并且可以识别那些不符合常规烹饪的品种和用途。其他影响包括徵求用户提供意见,并且投入到育种项目中所产生的连接,并增加植物育种者与新鲜市场社区之间的沟通,也确定可以指引育种目标和品种发育来满足消费者的喜爱。

介绍

通常,种子公司在植物育种过程中不会优先考虑有机农民及其客户的独特需求和轻重次序。为了确保成功,有机农民需要在有机条件下种植品种,以选择具有特殊性状,包括杂草竞争力,抗病性和胁迫耐受性。此外,消费者期望来自新鲜农产品的优质风味,质地,外观和烹饪质量。特别是当产品通过新鲜市场销售有机农产品[1]。公众育种者选择在商场上售卖的育种品种来鉴定高效种质资源。它们通常评估产量,外观,抗害虫性,有时也是质量变数,如白利糖度(可溶性固体百分比)和比重。但通常情况下,终端用户不参与评估过程,对于感官品质(风味,质地,烹饪质量)不予评估[2],或仅在过程结束时进行评估。通过将植物育种者,种子种植者,农民,厨师,生产买家和其他最终用户聚集在一起,来探讨育种者和最终用户之间的差距,以确定蔬菜和谷物优良品种的偏好与特征。

活动

北方有机蔬菜改良合作协会(NOVIC)是由美国农业部(USDA)国家食品农业有机研究和推广教育计划研究所资助的合作项目。合作者包括俄勒冈州立大学,威斯康星大学,康奈尔大学,有机种子联盟,美国农业研究总局以及30多名有机农民。该项目的目标是提高六种蔬菜农作物的有机生产品种。在2010年的季节中,俄勒冈州的NOVIC农民创建了一个区域项目目标,以确定具有高感官质量的开放授粉的早熟,高产甜椒红辣椒品种,以代替越来越难以取得的种子。在2010年和2011年,对九种混合和开放授粉的甜椒品种进行了试验,对重要的田间特征进行了评估,包括植物结构,房舍易感性,叶栅,耐害虫性,阳光照射损伤和生产力。

在有机条件下,除了农场的绩效表现,产品风味是有机种植者心中的重中之重。有机客户需要优越的味道,品质,烹饪质量和营养价值,并且欣赏独特性,质量和新颖性。为了将更多意见纳入简单的标准口味测试,农民客户被邀请参与进行更为正式的感官分析。评估人员包括农民,厨师和农民市场管理团队,评估了九个胡椒品种准备原料,炒和烤使用享受接受度来评价风味和质地的爱好。在评估之后的对话期间,意外地收到与风味或质地无关的反馈信息。厨师指出,在作出决定购买哪个胡椒品种时,优先考虑的是像圆肩和直条形状,使厨房加工更容易,更少浪费。随后,我们优先考虑这些对话的重要性,来进一步了解植物育种者在育种过程中应选择的特征。

品种展示会是 CBN 一年一度举办的活动,其目标是增加沟通和协调合作,为各方开创更相关和最理想的品种。参加者有机会品尝商业品种,提供繁殖种群的反馈(图 1),交换意见和观点。

自 2014 年起品种展示活动在俄勒冈州波特兰市举行。2016 年的活动聚集了 300 多位利益相关者,记者和其他人士。晚上活动有 22 展示站;每站都包括有植物育种者和厨师(图 2)。品种品鉴站(图 3)包括同一物种的市售品种的并列比较。育种分类站(图 4)显示了一个品种的多样性,并给育种者讨论正在发展中育种系列提供了一个评估的机会。在所有展示站点,有时候厨师会由繁殖者挑选一些突出的品种并入菜肴中。在某些情况下,厨师能够从这些品种中创造出不寻常和新奇的美食。例如,一位厨师使用非辛辣的辣椒制作了一个橙子果子露,突显了这种种类热带水果的香味,通常这些芳香味道会被大多数极端刺激辛辣味所掩盖的。

公家和私人植物育种者(包括农民种植者为自用而改良栽培的品种)和非营利组织,同心协力致力于教育农民和公众有关有机育种的重要性和鼓励参与这些活动。参加公众培育的人员包括俄勒冈州立大学,华盛顿州立大学,康奈尔大学,威斯康星大学和美国农业部-ARS。私人种植者,种子公司和非营利组织包括野生花园种子,自生适应种子,新兴种子,地球植物种子,艾尔斯溪农场,野外边远研究农场,盖尔斯草地农场,全桌农场,实验农场网络和有机种子联盟。

成果和影响

在三场活动中,参加者已经接触了超过 150 种商业品种和 135 种蔬菜和谷物种植系列。从 2014 年到 2016 年,出席人数已经增加了三倍。种子报告说,由于“品种展示”活动的推广和传播,致销售额大幅增加。活动后调查显示对参加者的影响很大(表 1)。对于亲自表达或通过社交媒体知识共享的声明,受访者估计他们将与 1,100 多个人分享信息,使用社交媒体分享则会超过 11,000 人。

表 1. 在 2016 年活动期间进行的事后调查中所显示的品种展示事件的影响类型或影响和受影响人数的百分比

Outcome/Impact 结果/影响	%
Met someone who plays a role in the food system they did not previously know 遇到在他们以前不知道有对食物系统中发挥作用的人	89
Plan to share their knowledge gained with others 计划与他人分享他们所获得的知识	98
Will share knowledge with others in person 将亲自与他人分享知识	90
Will share knowledge through social media 将通过社交媒体分享知识	43
Will have their work impacted positively by knowledge gained 所获得的知识将对他们的工作产生积极影响	95
Predicted direct financial impact 预测直接财务影响	8
Expanded their networks 扩展他们的网络	56
Changed buying practices 改变了购买习惯	33
Used the event to inform their decision-making 用参加活动的知识影响他们的决策	69

将厨师, 农民, 买家和其他利益相关者容纳入植物育种的过程中, 使育种者能够更深入地了解优选性状况, 同时也提高对有机植物育种的认识和了解。创建一个促进特定需求的交互式交流的平台, 增加了育种者对消费者正在寻找的新鲜农产品市场的须求, 对所有其他参与者来说, 更好地了解育种者在食物中所担任的重要作用。与厨师合作, 通过定性感官评估(如品种展示会活动)来评鉴品种和育种品类, 从而将这项工作与一般性的标准定量感官选评方式区分开来。

造就了大量的区域性和全国性的刊物报导, 其中包括:

- 食品与葡萄酒杂志 (<https://issuu.com/billdonahue2/docs/page65>)
- 大西洋 (<https://www.theatlantic.com/science/archive/2015/11/vegetable-breeders-working-with-chefs/415125/>)
- 民用 (<http://civileats.com/2015/02/13/a-better-tomato-a-better-tomorrow/>)
- 可食用波特兰 (<http://foodportland.com/a-better-tomato-a-better-tomorrow/>)
- 可食用曼哈顿 (<http://www.ediblemanhattan.com/eat/chefs-plant-breeding-flavor/>)
- 俄勒冈州 (http://www.oregonlive.com/food/2016/10/building_a_better_vegetable_ho.html)

社交媒体的使用已经大大推广了项目的目标和活动。CBN 社交平台(Instagram)拥有超过 7,500 名追随者, 脸书(Facebook) 群组也拥有超过 900 名成员。文章, 照片, 即将到来的活动以及更多信息可以在烹饪网络网站(<http://www.culinarybreedingnetwork.com/>)上找到。



Figure 1. Variation in phenotypes among mild habanero breeding lines
图 1. 轻度哈巴诺病育种系中表型的变异



Figure 2. Breeder Frank Morton, Wild Garden Seed and chef Nora Antene, Tusk with ‘Macedonian Lanceleaf’ parsley and apple granita on buttermilk mousse
图 2. 养殖者弗兰克·莫顿 (Frank Morton), 野花园种子和厨师诺拉·安东 (Nora Antene), 培育马其顿斯拉夫香菜和苹果酪乳慕斯



Figure 3. Variety tasting station for beets evaluated both raw and roasted

图 3. 品尝甜品的品尝台, 均经过原材料和焙烤处理



Figure 4. Breeding population station for carrots featuring collaborative breeding by Phil Simon of USDA-ARS and Organic Seed Alliance

图 4. 由 USDA-ARS 和有机种子联盟的 Phil Simon 合作育种的胡萝卜种群

参考 References

- [1] Bonti-Ankomah, S. & Yiridoe, E.K. 2006. Organic and conventional food: A literature review of the economics of consumer perceptions and preferences. Final report.
http://www.organicagcentre.ca/researchdatabase/res_food_consumer.asp
- [2] Sanchez, E.S., Butzler, T.M., Stivers, L.J., Elkner, T.E., Bogash, S.M., Oesterling, R.E., & Orzolek, M.D. 2012. Pennsylvania statewide winter squash evaluation project. HortTechnology, 22(8), 826-837.

Two Online Decision Tools: Organic Nutrient Management and Crop Scheduling in Oregon

Nick Andrews, Len B. Coop, Aaron L. Heinrich, James R. Myers, Heidi Noordijk,
Ronald E. Peachey, Heather Stoven, and Dan M. Sullivan
Oregon State University Extension Service

Abstract

Farmers using organic and sustainable production methods regularly ask for crop- and site-specific information to manage their crops. In recent decades, automatic weather stations, online crop and pest modeling websites, and organic and sustainable nutrient management recommendations have created opportunities to improve the accuracy of crop management information available to growers. Here we describe two new online tools developed by Oregon State University Extension that use different types of readily available information combined with computer models to support crop and field-specific management decisions on farms.

The Organic Fertilizer and Cover Crop Calculator (<http://smallfarms.oregonstate.edu/calculator>) supports on-farm cover cropping and nutrient management decisions. Croptime (<http://smallfarms.oregonstate.edu/croptime>) improves crop scheduling on farms and helps farmers prevent weed seed dispersal. Cooperating farmers, advisors, and seed company staff helped guide development of these tools to improve their value and ease of use. Interest in and early adoption of these online tools are strong.

Background

Market demand for certified organic food continues to show double-digit annual growth most years [16]. Organic products were available in nearly 75% of conventional grocery stores and nearly 20,000 natural food stores in 2012. Organic food sales were estimated at \$28.4 billion per year, over 4% of total U.S. food sales. Fruit and vegetables accounted for 43% of organic food sales [15].

Farmers in Oregon frequently ask for highly specific nutrient management and crop scheduling advice. Common questions include: “How much organic fertilizer do I need?”, “How much nitrogen will this legume cover crop provide for my vegetable crop?”, “How long will this variety take to mature on my farm?”, and “How can I avoid gluts and gaps in production during the season?”. Reliable answers to these sorts of questions require adaptation of research-based information to conditions on that farm.

Organic Fertilizer and Cover Crop Calculator

Farmers using legume cover crops and/or organic fertilizers, and the agricultural professionals supporting their work, needed easier ways to make site-specific decisions on their farms [2]. Our ongoing goals with this Calculator are to help users predict nitrogen (N) mineralization from cover crops and organic fertilizers, identify organic fertilizers that meet but do not exceed crop nutrient requirements, and help farmers compare the cost and nutrient value of cover crops, compost, and organic or synthetic fertilizers.

Croptime

Farmers aim to match their vegetable production and harvest schedules with market demands. Well-planned production schedules can increase farm income, reduce waste, and help plan for labor needs. This scheduling challenge is important for direct-market and wholesale farmers at all scales of production. The most readily available information predicting time to maturity is in seed catalogs, which typically use days-to-maturity or broad time ranges. Phenology models using degree-days to predict development are much more accurate than number of days or time of year [6]. The Croptime team is verifying degree-days to maturity for 50 varieties of 15 different vegetable crops and three weed species in Oregon. We are also developing an online crop management tool to support crop scheduling and weed management decisions.

Activities and methods

Organic Fertilizer and Cover Crop Calculator

This tool is based on work conducted from 2002-2012 [2]. Gale et al. [4] demonstrated that total N content of livestock manures, compost and specialty organic fertilizers, used in tandem with a mineralization model, could predict N release with reasonable accuracy in the Willamette Valley, Oregon.

When downloading the spreadsheet, users get a pop-up registration questionnaire which provides information that allows us to estimate economic impacts from this work (see below). Users download the spreadsheet on to their computer and can use it indefinitely at no cost. It requires that they enter fertilizer application rate, fresh cover crop biomass, dry matter content, total percent N for cover crops, and total N and guaranteed nutrients analysis of other nutrients in fertilizers. Total N concentrations are used as an indicator of C:N ratio because this information is provided on fertilizer labels, and differences in N content of cover crops and organic fertilizers (2%-16%) change the C:N ratio more than C content (near 40%). The Calculator uses linear regression equations with two time steps (28 and 70 days) to predict N mineralization from organic fertilizers [4]. For cover crops in the Willamette Valley, we verified Vigil and Kissel's 1991 equation [13, 17].

Croptime

Collaborators prioritized 15 locally produced vegetable crops that could benefit from more accurate harvest date predictions (spinach, carrot, parsnip, lettuce, broccoli, cauliflower, cabbage, kale, cucumber, summer squash, winter squash, snap beans, sweet corn, pepper, and tomato). They also identified popular cultivars and important weed species.

We have verified threshold temperatures for broccoli, cucumber, and sweet pepper, and degree-days to maturity for 14 cultivars of these crops. We hope to verify threshold temperatures for 12 additional crops and degree-days to maturity of an additional 35 varieties by early 2018. Croptime also includes three new weed models that predict time from dicotyledon stage to early seed development.

We are verifying threshold temperatures [3] by identifying the lowest coefficient of variation from at least eight data sets (observation of rate of development of one variety at one planting

date and one location). Degree-days to maturity and other growth stages are determined from the means of at least four data sets for each cultivar.

We refined the pest management interface on uspest.org to support crop-scheduling decisions. New functions include a Google maps interface to identify local weather stations, four “start dates” (or planting dates) for each model run, long term forecast options, and daily day-length calculations using latitude.

General decision tools

We realized early on that interested users of these decision-tools include farmers, Extension advisors, researchers, conservationists, seed and fertilizer sales staff, instructors, students, and gardeners. We made efforts to enhance usability and usefulness of both decision tools to these potential users. Peers and interested farmers informally reviewed the Organic Fertilizer and Cover Crop Calculator, and we incorporated their feedback into the final spreadsheet. In 2012, we introduced a 1000-square-foot Calculator to complement the original acre version.

Croptime was more formally tested using cognitive walk-throughs [14]. Two seed company representatives, a farmer, and a graduate student volunteered to test a beta version of the website. Andrews and Noordijk facilitated the walk-throughs and Coop observed. We asked testers to perform the same tasks using the Croptime website, and noted difficulties. Andrews, Coop, and Noordijk prioritized usability improvements that were implemented by Coop.

Outputs and results

The Calculator and Croptime support different types of decisions on farms and require different information from growers (Table 1).

Table 1. Decisions supported and information required by the Organic Fertilizer and Cover Crop Calculator and Croptime

Tool	Decisions supported	Data entered by users
Organic Fertilizer and Cover Crop Calculator	Cover crop and fertilizer N-release, nutrient content and cost of fertilizer programs and cover crops.	Fertilizer cost and analysis, cover crop biomass, dry matter and N analysis, cover crop management costs.
Croptime	Vegetable crop harvest dates, risk of germinable seed set.	Select local weather station, enter planting and weed emergence dates.

Organic Fertilizer and Cover Crop Calculator

The 28-day and 70-day predictions of plant-available nitrogen (PAN) release from organic fertilizers are based on mineralization rates verified by Gale et al. [4] (Figure 1, fertilizer PAN). PAN release from cover crops in western Oregon was well correlated with mineralization predictions from Vigil and Kissel’s 1991 equation [17], so we incorporated the VK equation into the online Calculator for use with cover crops (Figure 1 cover crop PAN). In the Calculator, PAN provided by compost during the year of application is predicted using a step equation (Figure 1, compost PAN).

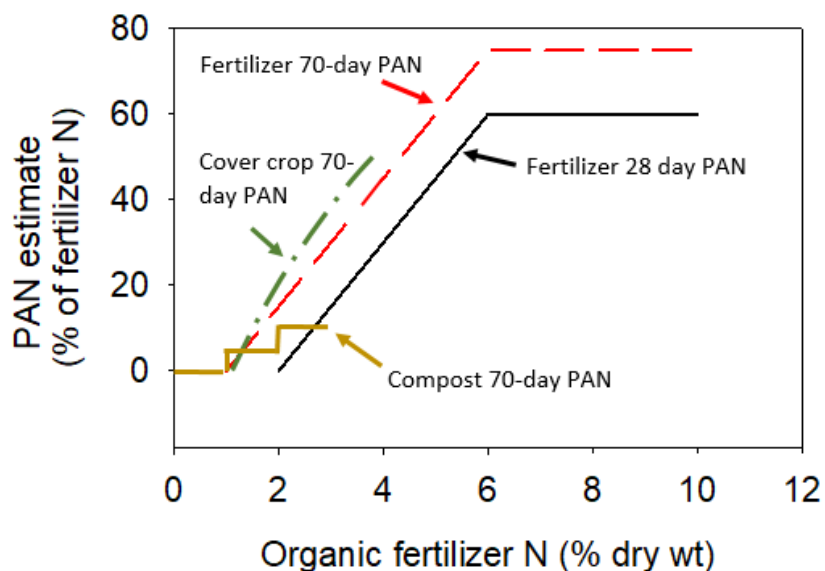


Figure 1. Plant-available nitrogen (PAN) estimates from organic fertilizers, cover crops and compost in western Oregon, as used in the OSU Organic Fertilizer and Cover Crop Calculator. X-axis shows total %N in soil amendments, Y-axis shows % of total PAN that becomes plant-available within 28-70 days. 28 day PAN is estimated for farmers interested in rapid N release from organic fertilizers. We chose to predict PAN release at 70-days because this coincides with the end of high N uptake for most vegetable crops.

Other nutrients supplied by fertilizers are calculated using the application rate, and guaranteed analyses on the fertilizer label. The cost of fertilizers and cover crops are calculated using methods described by Seavert et al. [10]. The linked spreadsheets allow users to compare the costs of fertilizers, compost, and cover crops by individual plant nutrient and overall nutrient management program. The Calculator website includes an online quick guide and records sheets to help growers sample cover crops correctly and record required information. It also hosts PNW Extension publication 636 [11] that describes cover crop sampling and research findings in more detail.

Croptime

The Croptime user interface was enhanced with a Google maps tool to help users quickly find local weather stations. Options for up to four start dates were developed, allowing growers to more easily schedule succession plantings. The site uses local weather forecasts to predict temperatures five days into the future. Coop developed long-term forecast options including 30-year historical averages, 10-year historical averages, last year's weather, the previous year's data, and long-term temperature forecasts based on climate models (NMME). An algorithm that calculates day-length at each weather station using latitude is also now available. Noordijk and Andrews [9] adapted the BBCH monograph [7] to describe vegetable growth-stages in the Croptime Growth Stage Guide. We used this information to identify vegetable growth stages during model development, and it is available online for potential collaborators.

Croptime currently hosts 15 broccoli, cucumber, and sweet pepper models (Table 2). It also predicts germinable seed set for redroot pigweed (*Amaranthus retroflexus*), hairy nightshade (*Solanum physalifolium*), and lambsquarter (*Chenopodium album*) (Table 3). By early 2018 we hope to have 50 vegetable variety models online.

Table 2. Thresholds and degree-days to maturity for some vegetables in Oregon

All models calculate degree-days using single sine with a horizontal cutoff.

Crop	Cultivar (seeding ¹)	Thresholds (lower/upper °F)	Harvest (degree-days)	Accuracy (% CV)	Accuracy (± days)
Broccoli	Arcadia (TP)	32/70	2281	3.2	2.5
Broccoli	Emerald Pride (TP)	32/70	2151	8.8	6.4
Broccoli	Green Magic (TP)	32/70	2103	5.7	4.1
Broccoli	Imperial (TP)	32/70	2383	8.2	4.6
Cucumber	Marketmore 76 (DS)	50/90	1211	2.8	1.1
Cucumber	Marketmore 76 (TP)	50/90	805	4.7	1.9
Cucumber	Cobra (DS)	50/90	964	5.4	2.5
Cucumber	Dasher II (DS)	50/90	1060	5.4	1.8
Cucumber	Extreme - pickling (DS)	50/90	946	3.3	1.2
Cucumber	Supremo - pickling (DS)	50/90	981	3.7	0.8
Cucumber	Zapata - pickling (DS)	50/90	984	5.1	2.7
Sweet pepper ²	Bell King (TP)	52/100	1447/1998 ³	1.9	5.4
Sweet pepper	Gatherer's Gold (TP)	52/100	1212/1692	3.4	3.3
Sweet pepper	King Arthur (TP)	52/100	1321/1767	3.9	11.7
Sweet pepper	Stocky Red Roaster (TP)	52/100	1211/1682	3.1	3.0

¹ TP = transplant, DS = direct-seed

² Sweet pepper development rate is similar on bare ground and under black plastic

³ green harvest / ripe harvest

Table 3. Thresholds and degree-days for some weeds in Oregon from dicotyledon stage to first germinable seed

Lower and Upper 95% Confidence Intervals are shown to illustrate relative risk of germinable seed. All models are single sine with a horizontal cutoff.

Species	Common name	Thresholds (lower/upper °F)	Dicot-seed, Lower 95% CI (DDs)	Dicot-seed Upper 95%CI (DDs)	Accuracy (% CV)
<i>Solanum physalifolium</i>	Hairy nightshade	40/95	1668	1954	11.4
<i>Chenopodium album</i>	Lambsquarter	42/95	1360	1564	9.4
<i>Amaranthus retroflexus</i>	Redroot pigweed	46/89	1004	1152	9.3

The Croptime website includes a demonstration video, background information for users, and additional detailed information for potential research collaborators. Model parameters and research methods are documented on the Croptime website.

Impacts and future work

Organic Fertilizer and Cover Crop Calculator

Since 2010, the Calculator has been introduced to farmers, other agricultural professionals, and students at more than 80 workshops and conferences reaching more than 3,000 people. In four years (2008-2012), more than 2,400 people registered to use the Calculator, from more than 40 countries.

- 18% were from Oregon, 10% from Washington and 6% from California.
- 39% were agricultural professionals, 36% were farmers, 17% were undergraduate students, and 7% were gardeners.
- Over 160,000 acres were managed by people registered to use the calculator. If 25% of the registered users save \$50/acre/year on reduced fertilizer costs or increased yields, estimated economic impact of the calculator is approximately \$2 million/year.

Educators in Oregon, Washington, North Carolina, and other states use the calculator to teach students nutrient management concepts, while conservationists in Oregon and California have used it to develop nutrient management programs under the Organic Environmental Quality Incentives Program.

Future work and collaboration between universities will improve online nutrient management tools. The University of Georgia [5] recently developed a Cover Crop Calculator that uses additional criteria to predict N release. In addition to cover crop biomass, dry matter, and N content, the UGA Calculator uses carbohydrates, cellulose, lignin, temperature, and tillage practices to predict PAN release. The University of Hawaii (Wang, K.-H. personal communication) is also working on a Cover Crop Calculator for tropical climates.

Croptime

Well-timed harvests enable growers to meet demand for consistent supplies of produce. Good timing also helps farmers schedule labor when they need it. Weed models may help growers predict when weeds are likely to develop germinable seed and avoid weed seed dispersal.

Since 2014, Croptime has been introduced to farmers, other agricultural professionals, and students at 13 workshops and conferences reaching more than 750 people.

- Croptime workshops were rated 4.5/5, 4.9/6 and 5.2/6 at three outreach events in late 2015 and early 2016 with total attendance of 219.
- More than 80% of responding participants said they planned to use Croptime in their work. If 50% of workshop participants start using Croptime, we will have about 375 new Croptime users from workshops already presented. Individual model runs are tracked online and can be used in the future to document adoption rates.

Growers and other agricultural professionals at workshops and during needs assessment interviews expressed interest in degree-day models predicting cover crop biomass and N accumulation, PAN release from soil organic matter, winter vegetable harvest dates, evapotranspiration and irrigation needs, more vegetable cultivars and weed species, and other relevant pest models (Andrews, unpublished data).

Acknowledgements

Research and extension work was funded by USDA Western Sustainable Agriculture Research and Extension projects W09-329 (Organic Fertilizer and Cover Crop Calculator) and SW12-037 (Croptime), and the Clackamas County Extension Innovation grant program. This work was also supported through a partnership with Oregon Tilth, Inc. Donations from Stutzman Environmental Products, Inc., Wilbur-Ellis, and Bridgewell Resources supported the work, and many Willamette Valley vegetable growers hosted on-farm trials. Donna Bosworth Andrews taught us to conduct cognitive walkthroughs to evaluate Croptime usability.

References

- [1] Andrews, N., Sullivan, D.M., Julian, J.W., & Pool, K.E. 2010. OSU Organic Fertilizer and Cover Crop Calculator. <http://smallfarms.oregonstate.edu/calculator>
- [2] Andrews, N., Sullivan, D.M., Julian, J.W., & Pool, K.E. 2011. Development and use of the OSU Organic Fertilizer and Cover Crop Calculator. Western Nutrient Management Conference, 9:61-66.
http://smallfarms.oregonstate.edu/sites/default/files/WNMC11_Andrews_p61.pdf
- [3] Arnold, C.Y. 1959. The determination and significance of the base temperature in a linear heat unit system. Proc. Amer. Soc. Hort. Sci., 74:430-445.
- [4] Gale, E.S., Sullivan, D.M., Cogger, C.G., Bary, A.I., Hemphill, D.D., & Myhre, E.A. 2006. Estimating plant-available nitrogen release from manures, composts, and specialty products, Journal of Environmental Quality, 35:2321-2332.
- [5] Gaskin, J.W., Cabrera, M., & Kissel, D. 2016. Nitrogen availability calculator.
<http://aesi.ces.uga.edu/mineralization/>
- [6] McMaster, G.S. & Wilhelm, W.W. 1997. Growing degree-days: One equation, two interpretations. Agricultural and Forest Meteorology, 87:291-300.
- [7] Meier, U. ed. 2001. Growth stages of mono- and dicotyledonous plants. BBCH Monograph. German Federal Biological Research Centre for Agriculture and Forestry, 158 pp.
- [8] NMME. US National Multi-Model Ensemble.
http://www.cpc.ncep.noaa.gov/products/ctb/nmme/NMME_mainpage_description.pdf
- [9] Noordijk, H. & Andrews, N. 2015. Croptime growth stage guide.
http://smallfarms.oregonstate.edu/sites/default/files/croptime_growth_stage_guide_2016-04-28.pdf
- [10] Seavert, C., Andrews, N., Bubl, C., McReynolds, R., & Freeborn, J. 2007. Enterprise Budget: Radishes, Organic, Fresh Market, Willamette Valley Region. OSU Extension Publication EM 8929. <http://arec.oregonstate.edu/oaeb/files/pdf/EM8929.pdf>
- [11] Sullivan, D.M. & Andrews, N. 2012. Estimating plant-available nitrogen release from cover crops. Pacific Northwest Extension Publication 636.
<https://catalog.extension.oregonstate.edu/pnw636>
- [12] Sullivan, D.M. & Andrews, N. 2017. Proceedings of the International Conference: Agriculture for Life, Life for Agriculture. University of Agronomic Sciences and Veterinary Medicine of Bucharest, Romania.
- [13] Sullivan, D.M., Datta, R., Andrews, N., & Pool, K.E. 2011. Predicting plant-available nitrogen release from cover crop residues, Western Nutrient Management Conference, 9:55-60. http://smallfarms.oregonstate.edu/sites/default/files/WNMC11_Sullivan_p55.pdf
- [14] Travis, D., Userfocus Ltd. 2017. The four questions to ask in a cognitive walkthrough.
<http://www.userfocus.co.uk/articles/cogwalk.html>

- [15] United States Department of Agriculture Economic Research Service. Organic market overview. <https://www.ers.usda.gov/topics/natural-resources-environment/organic-agriculture/organic-market-overview/>
- [16] United States Department of Agriculture Agricultural Marketing Service. National Organic Program. <https://www.ams.usda.gov/rules-regulations/organic>
- [17] Vigil, M.F. & Kissel, D.E. 1991. Equations for estimating the amount of nitrogen mineralized from crop residues. *Soil Sci. Soc. Am. J.*, 55:757-761.

两项在线决策工具： 俄勒冈州的有机营养管理和农作物调度

Nick Andrews, Len B. Coop, Aaron L. Heinrich, James R. Myers, Heidi Noordijk,
Ronald E. Peachey, Heather Stoven, and Dan M. Sullivan
俄勒冈州立大学推广服务

Two Online Decision Tools: Organic Nutrient Management and Crop Scheduling in Oregon

Nick Andrews, Len B. Coop, Aaron L. Heinrich, James R. Myers, Heidi Noordijk,
Ronald E. Peachey, Heather Stoven, and Dan M. Sullivan
Oregon State University Extension Service

简介

农民在使用有机和可持续生产方式时,经常要求有关农作物特定的地点信息来做作业管理。近几十年来,经由自动气象站,网络农作物和虫害模式网站以及有机和可持续营养管理的建议,为种植者的作物管理信息提高了准确性和创造新机会。在这里,我们描述了由俄勒冈州立大学推广教程所开发的两种新的在线工具,它们使用不同类型的现有信息与计算机模型结合,来支援农场作业和田间特定的管理决策。

有机肥料和覆盖作物计算器 (<http://smallfarms.oregonstate.edu/calculator>) 支持农场覆盖和营养管理决策。作物时机 (<http://smallfarms.oregonstate.edu/croptime>) 改善农场作业调度,并帮助农民防止杂草种子扩散。参与合作农民,顾问和种子公司的的工作人员帮助指导这些工具的开发,以提高其价值和易用性。有兴趣早期采用这些在线工具的意愿是很强烈的。

背景

经过认证的有机食品的市场需求在多数年份持续显示两位数的年增长率[16]。在2012年有近75%的常规杂货店售卖有机产品,在近20,000个天然食品商店可购得。有机食品销售额估计为每年284亿美元,超过美国食品销售总额的4%。水果和蔬菜占有机食品销售的43%[15]。

俄勒冈州的农民经常要求高度具体农作物的养分管理和调度建议。常见的问题包括:“我需要多少有机肥料?”,“这种豆科覆盖作物对我的蔬菜作物能提供多少氮?”,“这个品种在我的农场多久才会成熟?”和“如何才能避免在季节中避免生产多寡的差距?”对这些问题的可靠回答需要研究并参考适应于该农场的信息和条件。

有机肥料和覆盖作物计算器

使用豆类覆盖作物和/或有机肥料的农民以及支持他们工作的农业专业人员,需要更简单的方法来针对其农场进行具体地点来做决定[2]。我们用计算器长远的目标是帮助用户预测覆盖作物和有机肥料的氮矿化,确定满足但不超过作物营养需求的有机肥料,并帮助农民比较覆盖作物,堆肥的成本和营养价值,来选配有机或合成肥料。

作物时机(Croptime)

农民的目标是将蔬菜生产和收获时间表与市场需求相匹配。制定良好的生产计划可以增加农场收入,减少浪费,并帮助规划劳动力需求。这个安排和挑战对于所有生产规模的直销市场和批发农民都很重要。种子目录是提供最容易获得预测达到成熟期时间的信息,通常包括从使用日期到成熟度或广泛的时间范围。使用季候模型度来预测发展比用天数或时间来衡量更为准确[6]。作物时机团队正在验证俄勒冈州 15 种不同蔬菜农作物和 3 种杂草种类的 50 个品种的成熟度。我们还正在开发一种在线作物管理工具,以支持农作物调度和杂草管理决策。

活动和方法

有机肥料和覆盖作物计算器

这个工具是基于 2002-2012 年的工作成果[2]。Gale 等人[4]说明,与矿化模型一起使用的家畜粪便,堆肥和特种有机肥料的氮总含量可以在俄勒冈州威拉米特山谷地区,能合理预测氮释放量的准确度。

下载电子表格时,用户可以获得一个弹出式注册问卷,其中提供的信息可以让我们估算这项工作的经济影响(见下文)。用户将电子表格下载到他们的计算机上,并可以无限期地使用它。要求他们输入肥料施用量,新鲜覆盖作物生物量,干物质含量,覆盖作物总氮含量,总氮以及肥料中其他营养物质的保证营养成分分析。总氮浓度用作 C:N 比值的指标,因为这个信息是在肥料标签上有所提供的,覆盖作物和有机肥料的 N 含量差异(2%-16%)将 C:N 比值大于 C 含量(近 40%)。计算器采用线性回归及两个步骤(28 和 70 天)的方程来预测有机肥料的矿化[4]。对于俄勒冈州威拉米特山谷地区的覆盖作物,我们验证了 Vigil 和 Kissel 1991 年的方程式[13, 17]。

作物时机(Croptime)

合作者优先考虑 15 种本地生产的蔬菜作物,可以从更精确的收获期预测(菠菜,胡萝卜,欧洲风味菜,莴苣,西兰花,花椰菜,卷心菜,羽衣甘蓝,黄瓜,夏季南瓜,冬季南瓜,豌豆,甜玉米,胡椒和番茄)。他们还确定了大众品种和重要的杂草种类。

我们已经验证了西兰花,黄瓜和甜椒的临界温度,以及 14 个这些作物品种的成熟度。我们希望在 2018 年初前验证另外 12 种作物的临界温度和另外 35 种品种的成熟度。作物时机(Croptime)还包括三个新的杂草模型,用来预测从双子叶植物期到早期种子发育的时间。

我们通过从至少八个数据集中确定最低变异系数(观察一个种植日和一个位置的一个品种的发育速率)来验证阈值温度[3]。从成熟度到其他成长期的日期是根据每个品种至少四个数据集的方法来确定的。

我们改进了 uspest.org 上的病虫害管理界面,以支持作物调度决策。新功能包括用于识别本地气象站的谷歌(Google)地图界面,每个模型运行的四个“开始日期”(或施种日期),长期预测选项以及使用纬度做的每天日长计算。

一般决策工具

我们早期意识到, 对这些决策工具感兴趣的用户包括农民, 推广顾问, 研究人员, 保护主义者, 种子和化肥销售人员, 导师, 学生和园丁。我们努力提高这两个决策工具对这些潜在用户的可用性和实用性。同行和感兴趣的农民非正式地审查了有机肥料和覆盖作物计算器, 并将其反馈意见纳入到最终的电子表格中。在 2012 年, 我们推出了一个 1000 平方英尺的计算器来补充原来的英亩版本。

作物时机(Croptime)使用认知巡视来更正式地进行测试[14]。两名种子代表, 一名农民和一名研究生自愿测试该网站的试用版。安德鲁斯和诺德维克 (Doordijk) 促进了漫画和 Coop 巡视观察。我们要求测试人员使用 Croptime 网站方式来执行相同的任务, 并记录所遇到的困难。安德鲁斯, Coop 和 Noordijk 优先考虑 Coop 实施的可用性来改进。

输出和结果

“计算器”和“作物时机”支持不同类型的农场决策, 并要求种植者提供不同的信息(表 1)。

表 1. 有机肥料和覆盖作物“计算器”和“收割时机”所需的决定和信息

Tool 工具	Decisions supported 支持做决定	Data entered by users 用户输入的数据
Organic Fertilizer and Cover Crop Calculator 有机肥料和覆盖作物计算器	Cover crop and fertilizer N-release, nutrient content and cost of fertilizer programs and cover crops. 覆盖作物和肥料氮素释放, 营养成分和肥料方案和覆盖作物的成本	Fertilizer cost and analysis, cover crop biomass, dry matter and N analysis, cover crop management costs. 肥料成本和分析, 覆盖作物生物量, 干物质和氮分析, 涵盖作物管理成本
Croptime 作物时机	Vegetable crop harvest dates, risk of germinable seed set. 蔬菜收获日期, 发芽种子的风险	Select local weather station, enter planting and weed emergence dates. 选择当地气象站, 输入种植和杂草出苗日期

有机肥料和覆盖作物计算器

Gale 等人将来自有机肥料的植物可利用氮(PAN)释放的 28 天和 70 天, 来预测验证的矿化率。[4] (图 1, 化肥 PAN)。俄勒冈州西部覆盖作物的 PAN 释放与 Vigil 和 Kissel 1991 年方程式[17]的矿化预测有很好的相关性, 因此我们将 VK 方程并入在覆盖作物中使用的在线计算器(图 1 覆盖作物 PAN)。在计算器中, 使用步骤方程(图 1, 堆肥 PAN)预测一年期间堆肥所提供的 PAN。

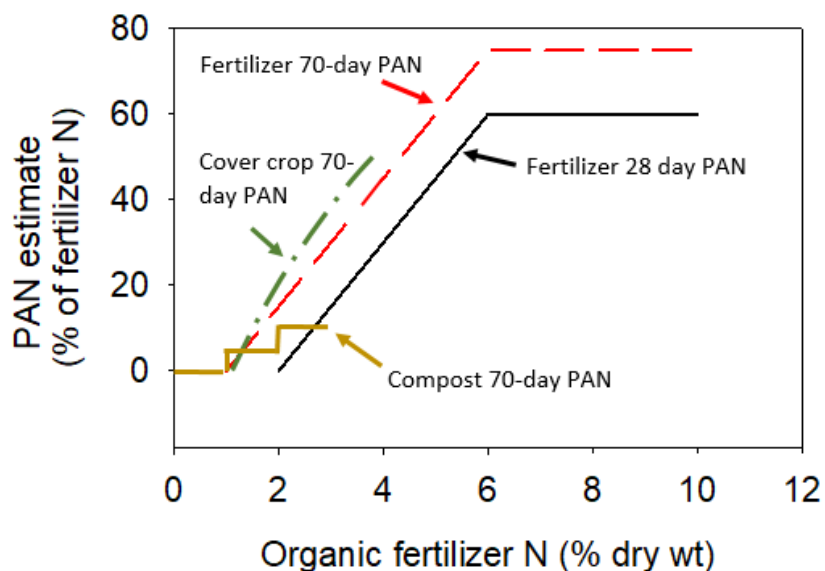


图 1. 俄克森西部西部有机肥料和覆盖作物计算器中使用的有机肥料, 覆盖作物和堆肥的植物可利用氮(PAN)估计值。

X 轴显示土壤修复中的总 N%, Y 轴显示在 28-70 天内植物可获得的总 PAN 的百分比。28 天的 PAN 估计是对有机肥快速释放 N 的农民。我们选择在 70 天预测 PAN 释放, 因为这与大多数蔬菜作物的高氮吸收结束相吻合。

由肥料供应的其他营养物质可使用施肥量来计算, 并对肥料标签进行有保证的分析。可以使用 Seavert 等人所描述的方法来计算化肥和覆盖作物的成本。[10]。相关的电子表格允许用户通过个别植物营养和总体营养管理计划来比较化肥, 堆肥和覆盖作物的成本。计算器网站包括一个在线快速指南和记录表, 以帮助种植者正确覆盖作物并记录所需的信息。它还主持 PNW 扩展 636 刊物[11], 更加详细地描述了覆盖作物取样和研究结果。

作物时机 (Crowthime)

作物时机用户界面已通过谷歌地图工具进行了改进, 以帮助用户快速找到当地的气象站。也开发新的选项容许达四个不同日期来启动, 允许种植者更轻松地安排连续性种植。该网站使用当地天气预报来预测未来五天的气候。Coop 开发了长期预测选项, 包括 30 年来历年的平均值, 10 年平均值, 去年的天气, 前一年的数据以及长期气候预测及气温预报的模式 (NMME) 现在也可使用纬度来计算每个气象站的日长。Noordijk 和 Andrews[9]采用了 BBCH 专利[7]来描述“秋季成长阶段指南”中的蔬菜的生长过程和阶段。我们使用这些信息来确定模型开发期间蔬菜生长的阶段, 并且可以提供给将来有兴趣合作的在线夥伴。

“作物时机”目前拥有 15 个西兰花, 黄瓜和甜椒模型 (表 2)。它还预测了可发芽种子组, 包括; 芸苔 (*Amaranthus retroflexus*), 毛茛 (Solanum physalifolium) 和藜 (*Chenopodium album*) (表 3)。到 2018 年年初, 我们希望能在网上含有 50 种蔬菜种类。

表 2. 俄勒冈州一些蔬菜的阈值和成熟度
所有模型使用具有水平截止值的单个正弦值计算度数。

Crop 作物	Cultivar (seeding ¹) 栽培种 (种子 ¹)	Thresholds (lower/upper °F) 阈值/(下/上 °F)	Harvest (degree-days) 收成(度-日)	Accuracy (% CV) 准确性(%CV)	Accuracy (± days) 准确性(±天)
Broccoli 西兰花	Arcadia (TP)	32/70	2281	3.2	2.5
Broccoli 西兰花	Emerald Pride (TP)	32/70	2151	8.8	6.4
Broccoli 西兰花	Green Magic (TP)	32/70	2103	5.7	4.1
Broccoli 西兰花	Imperial (TP)	32/70	2383	8.2	4.6
Cucumber 黄瓜	Marketmore 76 (DS)	50/90	1211	2.8	1.1
Cucumber 黄瓜	Marketmore 76 (TP)	50/90	805	4.7	1.9
Cucumber 黄瓜	Cobra (DS)	50/90	964	5.4	2.5
Cucumber 黄瓜	Dasher II (DS)	50/90	1060	5.4	1.8
Cucumber 黄瓜	Extreme - pickling (DS)	50/90	946	3.3	1.2
Cucumber 黄瓜	Supremo - pickling (DS)	50/90	981	3.7	0.8
Cucumber 黄瓜	Zapata - pickling (DS)	50/90	984	5.1	2.7
Sweet pepper ² 甜椒 ²	Bell King (TP)	52/100	1447/1998 ³	1.9	5.4
Sweet pepper 甜椒	Gatherer's Gold (TP)	52/100	1212/1692	3.4	3.3
Sweet pepper 甜椒	King Arthur (TP)	52/100	1321/1767	3.9	11.7
Sweet pepper 甜椒	Stocky Red Roaster (TP)	52/100	1211/1682	3.1	3.0

¹ TP=移植, DS=直接种子 (TP=transplant, DS=direct-seed)

² 甜椒发育率在裸地和黑色塑料上相似(Sweet pepper development rate is similar on bare ground and under black plastic)

³ 绿色收成/成熟收成 (green harvest / ripe harvest)

表 3. 俄勒冈州从双子叶植物阶段到第一个可发芽种子的一些杂草的阈值和度数

下部和上部 95%置信区间显示可以说明可发芽种子的相对风险。所有型号均为水平截止值的单正弦波。

Species 种类	Common name 通用名	Thresholds (lower/upper °F) 阈值/(下/上 °F)	Dicot-seed, Lower 95% CI (DDs) 双子叶植物, 下	Dicot-seed Upper 95%CI (DDs) 双子叶植物, 上	Accuracy (% CV) 准确性(%CV)
<i>Solanum physalifolium</i>	Hairy nightshade	40/95	1668	1954	11.4
<i>Chenopodium album</i>	Lambsquarter	42/95	1360	1564	9.4
<i>Amaranthus retroflexus</i>	Redroot pigweed	46/89	1004	1152	9.3

作物时机(Croptime)网站包括演示视频, 用户背景信息, 以及潜在研究合作者的其他详细资料。Croptime 网站上并记录了模型参数和研究方法。

影响和未来工作

有机肥料和覆盖作物计算器

自 2010 年以来, 有机肥料和覆盖作物计算器已经向农民介绍, 共举办了 80 多个研讨会和会议给其他农业专业人员和学生, 触及到 3000 多人。在 (2008-2012 年) 四年期间, 有超过二千四百人来自四十多个国家注册了使用这个计算器。

- 18%来自俄勒冈州, 10%来自华盛顿州, 6%来自加利福尼亚州。
- 39%农业专业人员, 36%农民, 17%本科生, 7%园丁。
- 注册计算器的人管理了超过 16 万英亩农地。如果 25%的注册用户能够每年每亩节省 50 美元, 用于减低化肥成本或增加产量的同时, 那么使用计算器估计能产生约为每年 200 万美元的经济效应。

俄勒冈州, 华盛顿州, 北卡罗来纳州和其他州的教育工作者使用计算器来指导学生营养管理概念, 而俄勒冈州和加利福尼亚州的保护主义者则利用其在有机环境质量奖励计划下开发营养管理计划。

将来大学之间的合作将改善在线营养管理工具。佐治亚大学(UGA)[5]最近开发了一种覆盖作物计算器, 它使用额外的标准来预测 N 释放。除了覆盖作物生物量, 干物质和氮含量外, UGA 计算器还使用碳水化合物, 纤维素, 木质素, 温度和耕作方法预测 PAN 释放。夏威夷大学(Wang, K.H.个人通讯)也在为热带气候的覆盖作物开发一个计算器。

作物时机 (Croptime)

正确的收成时间使种植者能够满足固定性的农产品需求。良好时机的掌握也可以帮助农民在需要时安排劳工。杂草模型可能有助于种植者预测杂草有可能发芽的种子, 避免杂草种子的散播。

自 2014 年以来, Croptime 已经向农民, 其他农业专业人员和学生介绍了 13 个研讨会和 750 多人的会议。

- 在 2015 年下半年和 2016 年初的三次外联活动中, 秋季工作坊的评分为 4.5/5, 4.9/6 和 5.2/6, 总参加人数为 219 人。
- 超过 80% 的受访者表示计划在其工作中使用 Croptime。如果 50% 的研讨会参与者开始使用 Croptime, 我们将有大约 375 名来自已经参加过研讨会的 Croptime 用户。个别使用者可以在线上找到使用资料, 在将来可用于记录用户的采用率。

种植者和其他农业专业人员在研讨会和需求评估访谈中表达了对预测覆盖作物生物量和氮积累量的日变化模型的兴趣, PAN 从土壤有机质释放, 冬季蔬菜收获日期, 蒸散量和灌溉需要, 更多的蔬菜品种和杂草类型, 以及其他有害生物模型(安德鲁斯, 未发表的数据)。

致谢

资助研究和推广工作是经由美国农业部西部可持续农业研究和推广项目 W09-329 (有机肥料和覆盖作物计算器) 和 SW12-037(Croptime) 以及 Clackamas 县推广创新补助计划。这项工作也通过与俄勒冈州 Tilt 公司的合作得到支持。Stutzman 环境产品公司, Wilbur-Ellis 和 Bridgewell Resources 的捐款支持了这项工作, 许多威拉米特山谷(Willamette Valley)蔬菜种植者主办了农场试验。Donna Bosworth Andrews 教导我们进行认知演练来评估作物时机 (Croptime) 的可用性。

参考 References

- [1] Andrews, N., Sullivan, D.M., Julian, J.W., & Pool, K.E. 2010. OSU Organic Fertilizer and Cover Crop Calculator. <http://smallfarms.oregonstate.edu/calculator>
- [2] Andrews, N., Sullivan, D.M., Julian, J.W., & Pool, K.E. 2011. Development and use of the OSU Organic Fertilizer and Cover Crop Calculator. Western Nutrient Management Conference, 9:61-66. http://smallfarms.oregonstate.edu/sites/default/files/WNMC11_Andrews_p61.pdf
- [3] Arnold, C.Y. 1959. The determination and significance of the base temperature in a linear heat unit system. Proc. Amer. Soc. Hort. Sci., 74:430-445.
- [4] Gale, E.S., Sullivan, D.M., Cogger, C.G., Bary, A.I., Hemphill, D.D., & Myhre, E.A. 2006. Estimating plant-available nitrogen release from manures, composts, and specialty products, Journal of Environmental Quality, 35:2321-2332.
- [5] Gaskin, J.W., Cabrera, M., & Kissel, D. 2016. Nitrogen availability calculator. <http://aesl.ces.uga.edu/mineralization/>
- [6] McMaster, G.S. & Wilhelm, W.W. 1997. Growing degree-days: One equation, two interpretations. Agricultural and Forest Meteorology, 87:291-300.
- [7] Meier, U. ed. 2001. Growth stages of mono- and dicotyledonous plants. BBCH Monograph. German Federal Biological Research Centre for Agriculture and Forestry, 158 pp.
- [8] NMME. US National Multi-Model Ensemble. http://www.cpc.ncep.noaa.gov/products/ctb/nmme/NMME_mainpage_description.pdf
- [9] Noordijk, H. & Andrews, N. 2015. Croptime growth stage guide. http://smallfarms.oregonstate.edu/sites/default/files/croptime_growth_stage_guide_2016-04-28.pdf
- [10] Seavert, C., Andrews, N., Bubl, C., McReynolds, R., & Freeborn, J. 2007. Enterprise Budget: Radishes, Organic, Fresh Market, Willamette Valley Region. OSU Extension Publication EM 8929. <http://arec.oregonstate.edu/oaeb/files/pdf/EM8929.pdf>
- [11] Sullivan, D.M. & Andrews, N. 2012. Estimating plant-available nitrogen release from cover crops. Pacific Northwest Extension Publication 636. <https://catalog.extension.oregonstate.edu/pnw636>
- [12] Sullivan, D.M. & Andrews, N. 2017. Proceedings of the International Conference: Agriculture for Life, Life for Agriculture. University of Agronomic Sciences and Veterinary Medicine of Bucharest, Romania.
- [13] Sullivan, D.M., Datta, R., Andrews, N., & Pool, K.E. 2011. Predicting plant-available nitrogen release from cover crop residues, Western Nutrient Management Conference, 9:55-60. http://smallfarms.oregonstate.edu/sites/default/files/WNMC11_Sullivan_p55.pdf
- [14] Travis, D., Userfocus Ltd. 2017. The four questions to ask in a cognitive walkthrough. <http://www.userfocus.co.uk/articles/cogwalk.html>
- [15] United States Department of Agriculture Economic Research Service. Organic market overview. <https://www.ers.usda.gov/topics/natural-resources-environment/organic-agriculture/organic-market-overview/>
- [16] United States Department of Agriculture Agricultural Marketing Service. National Organic Program. <https://www.ams.usda.gov/rules-regulations/organic>
- [17] Vigil, M.F. & Kissel, D.E. 1991. Equations for estimating the amount of nitrogen mineralized from crop residues. Soil Sci. Soc. Am. J., 55:757-761.

Motivations and Obstacles in Transitioning to Certified Organic Farming for Farmers in the United States

Garry Stephenson and Lauren Gwin, Center for Small Farms & Community Food Systems,
Oregon State University
Chris Schreiner and Sarah Brown, Oregon Tilth, Incorporated

Abstract

For more than 10 years, demand for certified organic products has increased in the U.S. and globally. This marketplace demand creates an opportunity for farmers who choose to transition their farms to certified organic production, but U.S. farmers are not responding quickly to this demand. This paper presents the results of a national survey of farmers regarding the transition to organic certification, specifically: what motivates farmers to transition, what obstacles they face in doing so, and what resources and support are most helpful during the transition process.

Introduction

Consumer demand for certified organic food and other farm products has increased in the U.S., reflected by an 11% sales growth in 2015 [12]. However, U.S. organic farm production is lagging behind that demand [4, 10]. Organic food manufacturers and other buyers have reported difficulty sourcing enough certified organic food ingredients domestically.

In response, the organic industry, nonprofit organizations, universities, and public agencies are working to grow supply by easing the process of transitioning from conventional to organic farming. A concentrated effort is being made to support farmers who choose to transition farms and acreage to certified organic [2, 15]. For example, the U.S. Department of Agriculture (USDA) provides financial and technical assistance to organic farmers to support conservation on their land [18].

In this report, we present the results of a national survey of farmers regarding the transition to organic certification. The specific objectives of this research were to identify what motivates farmers to transition, what obstacles they face in doing so, and what resources and support are most helpful during the transition process. This research is useful for a wide range of non-governmental organizations, public agencies, and businesses working with farmers, the broader organic sector, and on policy development to increase domestic production of organic products.

Methods

We surveyed a national population of farmers and ranchers who (a) had participated in a USDA program entitled the Environmental Quality Improvement Program Organic Initiative (EQIP-OI) between 2010 and 2015 and (b) were specifically focusing on organic transition in that program. The list included 1,829 individuals, each representing one farm.

The survey was constructed after reviewing other survey-based research about farmer motivations related to certified organic farming, barriers to transition to organic farming systems, and other aspects of organic farming from the last decade [1, 6, 8, 16, 17].

The survey was administered by Oregon Tilth, both online and by mail. Survey methods followed the standard protocols of Dillman and Smyth [3] with guidance from the Oregon State University Survey Research Center (OSU-SRC). The OSU-SRC collected and organized the data. Six hundred and fifteen (615) farmers completed the questionnaire, for an adjusted response rate¹ of 34.2%. The OSU Center for Small Farms & Community Food Systems analyzed the data using IBM SPSS software.

Respondents first answered four demographic questions: number of years farming, number of acres in production, type of cropping system, and status of organic certification (100% certified, partly certified (“split”), currently in transition, no longer pursuing transition, or exempt from certification). We then asked a series of questions to learn what motivated them to transition to organic certification, what were the obstacles in transitioning, what resources were helpful, and what additional support is needed.²

Results and Discussion

Characteristics of respondents

Respondents and their operations represent a wide range of farm sizes, crop types, farming experience, age, and status of organic certification (Table 1). Approximately 60% of the respondents had farms under 25 acres, 55% of total respondents had vegetable operations, 55% of farmers had less than 10 years experience, and 30% of respondents were currently transitioning to organic.³

Wide range of farming experience including newer farmers and more experienced farmers. More than half (55.5%) of respondents had been farming fewer than 10 years and were considered Beginning Farmers and Ranchers (BFRs) by the USDA. However, 27% had more than 20 years of experience.

Wide range of ages. The farmers were fairly evenly distributed in age. Most were middle-aged, with nearly 60% between 46 and 65. More than 25% were under 45 years old.

Smaller farms but larger also. Although most respondents farmed on a smaller scale, we also heard from mid-scale and large-scale farmers. The majority of respondents (60.5%) farmed fewer than 25 acres; more than 20% farmed more than 100 acres.⁴

¹ Using the American Association for Public Opinion (AAPOR) response rate calculator.

² The questionnaire also included a section specific to respondents’ experience with the NRCS EQIP-OI program. Analysis and reporting of those results will occur separately.

³ Without similar demographic data for the 1,829 farms, we cannot say whether our sample is more or less representative of that population, which itself overlaps with but is not the same as the certified organic farmers typically surveyed by USDA and the Organic Farming Research Foundation.

⁴ There is a payment limit for EQIP-OI financial assistance that is lower than standard EQIP. The effect of this on the sample regarding farm size is not known.

Mostly vegetables but a wide array of other crops. More than half of the farms (54.7%) primarily produced vegetables. Another 13.3% produced fruits or nuts. Nearly one-third of the farms (32.0%) produced extensive crops including grains and legumes (12.6%), livestock (16.0%), and dairy (3.4%).⁵

Table 1. Demographics of Respondents

Category		%
Experience	0 to less than 5 years	24.6
	5 to less than 10 years	30.9
	10 to less than 20 years	17.6
	20 years or more	26.9
Age	18 to 35 years	11.5
	36 to 45 years	15.4
	46 to 55 years	25.1
	56 to 65 years	33.6
	66 to 75 years	13.3
	76 or older	1.2
Farm Size	0 to 25 acres	60.5
	26 to 100 acres	18.4
	101 to 500 acres	15.6
	501 to 1,000 acres	3.1
	More than 1,000 acres	2.4
Crops	Vegetables	54.7
	Fruits/Nuts	13.3
	Grain/Legumes	12.6
	Livestock	16.0
	Dairy	3.4
Certification	100% Certified Organic	26.8
	Transitioning	30.2
	Split (Certified Organic/Non-Organic)	11.2
	Not Pursuing Organic Farming	16.4
	Exempt from Certification	15.3

⁵ The survey asked which cropping system “best describes” their production. The online version allowed only one answer. The paper version asked for one answer, but of 614 responses to the question, 166 indicated multiple crops; 35 indicated “other.”

Motivations, Obstacles, Resources, and Support

Motivations

We asked respondents what initially motivated them to transition to organic farming and provided a list of possible motivations including “values-based” and “market/profit” motivations (Table 2).

Table 2. Respondents’ Motivations to Transition to Organic Farming

Motivation	% Yes
Values-based	
Fits my and/or my family’s values	91.3
Concerns about environment	86.7
Potential enhancement of farm sustainability	86.5
Concerns about human health	86.3
Market/Profit	
Access the expanding market for organics	61.6
Potential increase in profit	60.8
Specific market opportunity or contract from a buyer	32.7

Six of the seven motivations were selected by at least 60% of all respondents. The farmer/farm family’s values were the most frequently cited motivation at over 90%, followed closely by concerns about the environment, enhancement of farm sustainability, and concerns about human health. Access to the expanding market and increased profit were less cited but still notable, and having a specific market opportunity or contract was the least cited. The high ranking of values-based motivations is not surprising considering the sample is made up of farmers who self-selected to participate in the EQIP-OI and therefore had a potentially higher level of interest in organic or sustainable farming than the general farm population.

Obstacles

Respondents were given a list of potential obstacles to organic transition—related to costs, production, and marketing—and were asked whether each was a major obstacle, a minor obstacle, or not an obstacle. We categorized each obstacle as being major, minor, or not an obstacle based on the highest response percent of 40% or more (although in two instances we allowed 39.6%). When the response in all categories was below 40%, we identified the obstacle as having “no clear trend.”

Farmers identified two major obstacles: weed management and the cost of organic certification (Table 3). Among the seven minor obstacles, the top three were the learning process, recordkeeping requirements of organic certification, and the cost of organic inputs. Four non-obstacles were identified: planning crop rotations, reduced yields, finding buyers for organic products, and access to technical expertise. This finding for reduced yields is interesting because “yield drag” has long been thought to be a significant challenge for organic producers and organic agriculture broadly [13, 14], yet only 17% of respondents said it was a major obstacle, while 83% said it was a minor or non-existent obstacle (Table 3).

Five obstacles had no clear trend as to their importance to growers. For instance, although the cost of labor was considered a major obstacle for over 35% of farmers, nearly as many (33.5%) considered it not an obstacle and less than 30% considered it a minor obstacle. In these instances, there is no clear consensus, but it does not diminish the obstacle's importance.

Table 3. Obstacles to Organic Transition

Obstacle	%		
	Major	Minor	Not an obstacle
Major Obstacle			
Weed management	52.9	30.7	16.4
Cost of organic certification	43.2	37.5	19.3
Minor Obstacle			
Learning process	16.7	47.1	36.2
Recordkeeping requirements of organic certification	40.0	43.6	16.4
Cost of organic inputs	32.7	42.6	24.7
Managing soil fertility	23.9	42.1	34.0
Availability of organic inputs (seed, fertilizer, etc.)	19.5	40.6	39.9
Obtaining organic price premiums	30.3	39.6	30.1
Obtaining organic price information	22.1	39.6	38.3
No Clear Trend			
Availability of organic processing facilities	38.2	25.4	36.4
Cost of labor	36.6	29.8	33.5
Pest or disease control	35.7	38.9	25.4
Availability of labor	28.7	38.0	33.3
Obtaining adequate prices during transition	26.1	36.2	37.6
Not an Obstacle			
Planning crop rotations	8.4	39.4	52.2
Reduced yields	16.7	32.2	51.1
Finding buyers/market for my organic products	19.7	31.3	48.9
Access to knowledgeable technical expertise on organic production	19.6	39.1	41.3
Note: Shaded cells highlight data that indicates major obstacles, minor obstacles, no clear trend, and not an obstacle.			

Resources

Respondents were given a list of 10 different resources and asked to choose up to five that would be (or would have been) most beneficial during transition. Table 4 ranks these resources in order of how many respondents selected them, with 1 being the top choice and 10 the lowest. Three of the top five resources are production-oriented; two of the five are market-oriented.

Table 4. Organic Transition Resource Rankings

Resource	Rank
The group's top five	
Information on organic pest, disease, and weed management	1
Information on soil health management for organic farms	2
Information on organic markets (trends, opportunities, pricing)	3
Information on effective organic crop rotations for your region	4
Market development for organic products	5
Less important	
Information on organic crop varieties	6
Financial planning tools for transitioning to organic	7
Advance contracts from buyers during transition	8
Certified transition label	9
Organic and/or transition crop enterprise budget templates	10

Support

Once we know what topics are most important to transitioning farmers, we also have to learn how they prefer to receive the information and guidance. Respondents were asked to choose their top two of five types of support. High contact support was preferred, with mentoring from experienced organic farmers most valued and one-on-one technical assistance ranked second (Table 5). In person workshops—still high contact—were ranked third, and books and other printed materials and online courses and webinars ranked lower.

It would not be accurate, however, to conclude that only high-contact support will work. To simplify our questionnaire, we offered farmers five typical methods of receiving information important to organic transition. We did not contextualize these methods of support in terms of expense, distance, and other delivery constraints. We believe forms of education and problem-solving through printed and online resources will continue to be important tools for farmers transitioning to organic certification.

Table 5. Support Rankings

Type of Support	Rank
Mentoring from experienced organic farmers	1
One-on-one technical assistance during transition	2
In person workshops or short courses	3
Books or other printed materials	4
Online courses or webinars	5

Recommendations

Guided by the survey findings, we recommend the following specific strategies to support the success of farmers who choose organic.

Adopt a values-based approach to appeal to a wider audience of farmers

We recommend working with farmers to evaluate the opportunities and choice of transitioning to organic agriculture by understanding the values of each farmer. Farmers are motivated toward or away from organic farming by their personal beliefs and experience. It is important to be sensitive to local context and concerns.

Provide individualized, in-person support

All respondents prefer high-contact approaches of support during transition. The top two methods of support are mentoring from experienced organic farmers and one-on-one technical assistance. The stated preference for one-on-one technical assistance demonstrates an opportunity to provide farmer education and transition support services through focused partnerships with existing farm and land-based agencies.

Develop more effective weed and other pest management strategies

While access to knowledgeable technical expertise in organic production is not lacking, a significant gap exists wherein all farmer categories report weed management as a major obstacle and rank information on weed, pest, and disease as the primary resource needed during transition.

There is a need to better capture and understand why this gap exists. Are the existing tools and strategies too costly, too complex, and/or not appropriate to scale? Are farmers reluctant to invest in equipment or unwilling to dedicate the space and time to holistic weed and pest management strategies? Unlike non-organic farming, organic systems often depend on sustained, multi-season, multi-year approaches through which positive results are accrued and compounded through time.

In this sense, effective outreach and support on weed and pest management in organic systems should include long-term trials and on-farm demonstration. The value of these is enhanced through participatory projects in which farmers are engaged in both design and implementation.

Develop more regional handling infrastructure

More than 63% of all respondents identified availability of organic processing facilities as an obstacle to transition, with more than 38% identifying it as a major obstacle. Proximity and

access to all the necessary infrastructure links in the organic supply chain can make the difference between profitability and economic default. This emphasizes the need for increased investment in regional infrastructure for processing, storage, and distribution of organic crops, livestock products, and value-added goods.

Support certification cost-share assistance

Survey results clearly demonstrate the importance of certification cost-share programs. Over 80% of all respondents identified the cost of certification as an obstacle to transition, with more than 43% identifying this as a major obstacle. With the majority of respondents being smaller scale (over 60% farm less than 25 acres), the USDA's organic certification cost-share program is a key to smaller farms' ability to access and afford organic certification. The USDA's recent announcement to expand the scope of certification cost-share assistance to include transitional certification and state organic program fees will further help to overcome this commonly cited obstacle.

Conclusion

Farmers in our study echo long-standing concerns about costs, recordkeeping, on-farm production challenges, infrastructure, and profitable markets. This study provides an analysis and perspective valuable in formulating research, outreach and policy to address those concerns.

At the same time, while a national study provides a broad view of motivations and obstacles related to organic transition, our findings may not reflect priorities everywhere. For example, some obstacles that were rated lower in this national survey may be larger issues when examined by region or locality. Finally, this survey only included farmers. A holistic strategy to support transitioning farmers should consider and engage other actors within the supply chain, including storage, manufacturing, distribution, and more. Our results make it clear that there is plenty of work to be done by a wide variety of organizations and agencies working in the organic sector that have specializations in crop research, farmer education, infrastructure development, market development, and policy development.

References

- [1] Cranfield, J., Henson, S., & Holliday, J. 2010. The motives, benefits, and problems of conversion to organic production. *Agriculture and Human Values*, 27, 291-306.
- [2] DiGiacomo, G. & King, R.P. 2015. Making the transition to organic: Ten farm profiles. Sustainable Agriculture Research and Education Program (SARE). <http://hdl.handle.net/11299/181352>
- [3] Dillman, D. & Smyth, J. 2014. Internet, phone, mail, and mixed-mode surveys: The tailored design method (4th ed.). Hoboken, NJ: Wiley.
- [4] Greene, C. 2013. Growth patterns in the U.S. organic industry. USDA Economic Research Service: Amber Waves. <http://www.ers.usda.gov/amber-waves/2013/october/growth-patterns-in-the-us-organicindustry/>
- [5] Jerkins, D. & Ory, J. 2016. 2016 National organic research agenda. Santa Cruz, CA: Organic Farming Research Foundation. http://ofrf.org/sites/ofrf.org/files/staff/NORA_2016_final9_28.pdf
- [6] Johnston, S. 2010. Assessing farmer interest in transition to organic production and barriers to expansion of organic production in New York State. New York State Department of

Agriculture and Markets.

http://www.agriculture.ny.gov/ap/organic/docs/Abstract_Assessing_Farmer_Barriers.pdf

- [7] Kirkpatrick, J. 2013. Retired farmer - An Elusive Concept. Choices magazine.
<http://www.choicesmagazine.org/choices-magazine/theme-articles/transitions-in-agriculture/retired-farmer--an-elusive-concept>
- [8] Lau, M., Hanagriff, R., Constance, D., York, M., VanDelist, B., & Higgins, L.M. 2010. Discerning differences among producer groups and organic adoption barriers in Texas. Journal of Food Distribution Research, 40(2):124-164.
- [9] Lloyd, D. 2016. Farmer perspectives on the transition to organic agriculture: An Oregon study of farmer motivations and barriers. Oregon State University: Master's Thesis.
<http://hdl.handle.net/1957/60003>
- [10] McBride, W. & Greene, C. 2015. Despite profit potential, organic field crop acreage remains. USDA Economic Research Service: Amber Waves.
<http://www.ers.usda.gov/amberwaves/2015/november/despite-profit-potential-organic-field-crop-acreage-remains-low/>
- [11] Murray, T. & Enelow, N. 2016. Investing in organic production: Economics of transition (Webinar). Oregon Tilth, Sept. 7. <https://tilth.org/resources/investing-organic-production-economics-transition/>
- [12] Organic Trade Association. 2016. U.S. organic sales post new record of \$43.3 billion in 2015. <https://www.ota.com/news/press-releases/19031#sthash.7UCqAHt.dpuf>
- [13] Reganold, J.P. & Wachter, J.M. 2016. Organic agriculture in the twenty-first century. Nature Plants, 2:15221. doi:10.1038/nplants.2015.221
- [14] Kniss, A.R., Savage, S.D., and Jabbour, R. 2016. Commercial crop yields reveal strengths and weaknesses for organic Agriculture in the United States. PLoS ONE 11(8):e0161673. doi:10.1371/journal.pone.0161673
- [15] Stephenson, G., Gwin, L., Garrett, A., and Powell, M. 2012. Enhancing organic agriculture in Oregon: Research, education, and policy (Publication EM 9050). Oregon State University Extension Service, Corvallis, OR.
- [16] Stofferahn, C.W. 2009. Personal, farm and value orientations in conversion to organic farming. Journal of Sustainable Agriculture, 33(8):862-884.
- [17] Strohlic, R. & Sierra, L. 2007. Conventional, mixed and “deregistered” organic farmers: Entry barriers and reasons for exiting organic production in California. Davis, CA: California Institute for Rural Studies.
- [18] USDA Natural Resource Conservation Service (NRCS). (n.d.) EQIP Organic Initiative. https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/programs/?cid=nrcs143_008224
- [19] USDA National Agricultural Statistics Survey (NASS). (n.d.). 2014 and 2015 Organic Certifier Data.
https://www.nass.usda.gov/Surveys/Guide_to_NASS_Surveys/Organic_Production/Organic_Certifiers/2016/USDA_Accredited_Certifying_Agent_Certified_Organic_Data_2014_2015.pdf
- [20] USDA-NASS. 2012. 2012 Census highlights.
https://www.agcensus.usda.gov/Publications/2012/Online_Resources/Highlights/Beginning_Farmers/
- [21] USDA-NASS. 2014. Census of agriculture: 2014 organic survey.
https://www.agcensus.usda.gov/Publications/2012/Online_Resources/Organics/

美国农民为过渡到有机农业认证的动力和障碍

Garry Stephenson and Lauren Gwin, 俄勒冈州立大学小农场和社区食品系统中心
Chris Schreiner and Sarah Brown, 俄勒冈州 Tilth 公司

Motivations and Obstacles in Transitioning to Certified Organic Farming for Farmers in the United States

Garry Stephenson and Lauren Gwin, Center for Small Farms & Community Food Systems, Oregon State University
Chris Schreiner and Sarah Brown, Oregon Tilth, Incorporated

简介

十多年来, 美国 and 全球对有机认证产品的需求有所增加。这个市场需求为选择将其农场转为经过认证有机生产的农民创造了机会, 但美国农民对这一需求并没有很快的反应过来。本文介绍了关于农民向有机认证过渡的全国调查结果, 具体来说: 什么动力促使农民过渡(转型), 和他们面临的障碍, 以及在过渡过程中那些是最有帮助的资源和支持。

介绍

美国消费者对认证有机食品和其他农产品的需求有所增加, 在 2015 年销售额增长 11% 中反映出来[12]。然而, 美国有机农场的生产仍是供不应求[4, 10]。有机食品制造商和其他买家在国内未能采购足够认证的有机食品的原料成分。

作为回应, 有机工业界, 非营利组织, 大学和公共机构正在通过简化过渡的过程, 努力增加供给从传统农业向有机农业的转型。正在集中力量支持选择过渡农场和种植面积的农民进行有机认证[2, 15]。例如, 美国农业部(USDA)向有机农民提供财政和技术援助, 以支持他们在土地上的保护[18]。

在本报告中, 我们将介绍关于向有机认证过渡的全国农民调查结果。这项研究的具体目标是确定什么促使农民过渡, 他们面临的障碍, 以及在过渡过程中那些资源和支持最有帮助。这项研究对于广泛的非政府组织, 公共机构和与农民合作的企业, 令有机部制定政策全面来增加国内有机产品的研究。

方法

我们调查了全国农民人口和牧民, (1) 他们在 2010 年至 2015 年间参加了美国农业部题为“有机环境质量改善计划倡议”(EQIP-OI) 的计划, (2) 专门针对该计划中的有机过渡。被访者名单包括 1,829 个人, 每人代表一个农场。

该调查是构建在审查了关于认证有机农业的农民动力, 过渡到有机农业系统会遇到的障碍加上过去十年在其他方面对有机农业相关的调查性研究[1, 6, 8, 16, 17]。

该调查是由俄勒冈州 Tilth 公司以在线和邮寄方式来管理。调查方法是遵循 Dillman 和 Smyth[3] 的标准方案, 依据俄勒冈州立大学调查研究中心(OSU-SRC) 的指导而进行的。OSU-SRC 负责收集和整理数据。六百一十五名农民完成了问卷调查, 调整后答复率为 34.2%。OSU 小农场和社区食品系统中心是使用 IBM SPSS 软件来分析数据。

受访者首先回答了四个有关人口分布的问题:农耕年数,生产数量,种植系统类型和有机认证状况(100%认证与部分认证“拆分”),包括有;目前正在转型,不再追求转型,或豁免认证)。然后,我们问了一系列问题,了解什么促动力使他们过渡到有机认证,转型中有哪些障碍,以及哪些资源需求帮助,还要什么额外的支持。

成果与讨论

受访者的特点

受访者及其经营范围甚为广泛,农场面积和作物种类,农耕经验,年龄和有机认证现状(表1)。约有60%的受访者拥有不足25英亩的农场,55%的受访者有蔬菜经营,55%的农民有不到10年的经验,30%的受访者目前正在向有机农业转型。

广泛的农业经验,包括新农民和更有经验的农民。超过一半(55.5%)的受访者农民的农耕经验都在10年以内,这被美国农业部认定为“新手农民和牧场主”(BFR)。然而,27%则具有20多年的工作经验。

广泛的年龄。农民年龄相对均匀分布。大多数是中年人,46岁到65岁之间接近60%,超过25%在45岁以下。

大小农场兼具。虽然大多数受访者的规模较小,但我们也从中等规模和大规模的农民那里听到回音。大多数受访者(60.5%)养殖不到25亩;超过20%的养殖场超过100英亩。

大多为蔬菜但含有繁多其他作物种类。一半以上的农场(54.7%)主要生产蔬菜。另有13.3%生产水果或坚果。近三分之一的农场(32.0%)生产了大量农作物,包括谷物和豆类(12.6%),牲畜(16.0%)和奶制品(3.4%)。

Table 1. Demographics of Respondents

表 1. 受访者的人口统计

Category		%
Experience 经验	0 to less than 5 years (0 至少于 5 年)	24.6
	5 to less than 10 years (5 到不到 10 年)	30.9
	10 to less than 20 years (10 至少于 20 年)	17.6
	20 years or more (20 年以上)	26.9
Age 年龄	18 to 35 years (18 至 35 岁)	11.5
	36 to 45 years (36 至 45 岁)	15.4
	46 to 55 years (46 至 55 岁)	25.1
	56 to 65 years (56 至 65 岁)	33.6
	66 to 75 years (66 至 75 岁)	13.3
Farm Size 农场面积	0 to 25 acres (0 至 25 英亩)	60.5
	26 to 100 acres (26 至 100 英亩)	18.4
	101 to 500 acres (101 到 500 英亩)	15.6
	501 to 1,000 acres (501 到 1000 英亩)	3.1
	More than 1,000 acres (超过 1000 亩)	2.4
Crops 作物	Vegetables 蔬菜	54.7
	Fruits/Nuts 水果/坚果	13.3
	Grain/Legumes 谷物/豆类	12.6
	Livestock 家畜	16.0
	Dairy 乳制品	3.4
Certification 认证	100% Certified Organic (100% 有机认证)	26.8
	Transitioning 转变	30.2
	Split (Certified Organic/Non-Organic) 区分裂(有机/无机认证)	11.2
	Not Pursuing Organic Farming (不追求有机农业)	16.4
	Exempt from Certification (豁免认证)	15.3

动力, 障碍, 资源和支援

动力

我们问受访者最初促使他们转向有机农业, 并提供了可能的动力和动机, 包括“以价值为基础”和“市场/利润”的动机(表 2)。

表 2. 受访者转型到有机农业的动机

Motivation 动力	% Yes 肯定
Values-based 以价值为基础	
Fits my and/or my family's values (适合我和/或我家人的价值观)	91.3
Concerns about environment (对环境的关注)	86.7
Potential enhancement of farm sustainability (潜在提高农场可持续性)	86.5
Concerns about human health (对人体健康的忧虑)	86.3
Market/Profit 市场/利润	
Access the expanding market for organics (进入不断扩大的有机物市场)	61.6
Potential increase in profit (潜在利润的增加)	60.8
Specific market opportunity or contract from a buyer (特别市场机会或买家合同)	32.7

至少有 60% 的受访者选择了七项动机中的六项。超过 90% 选择了农民/农场家庭的价值观为最常主要的动机, 其次是对环境的担忧, 农场可持续性的提高和对人类健康的担忧。进入不断扩大的市场和增加利润的情况较少被关注, 但仍然值得关注, 并且具有特定的市场机会或合同约定是最少被提及的。参与 EQIP-OI 的农民组织均为由自主选择, 因此在有机或可持续农业方面比一般农场会具有更高的兴趣, 所以尊重价值观的动机享有高排名并不奇怪。

障碍

受访者面对列出了与成本, 生产和营销相关的有机过渡的潜在障碍, 并被询问每个人那些是否是主要障碍, 次要障碍, 不是障碍。根据 40% 以上的最高响应百分比, 我们将每个障碍分类为主要的, 次要的或不是障碍(尽管在两种特殊情况下, 我们允许纳入 39.6%)。各类反应低于 40% 时, 我们将障碍确定为“没有明显的趋势”。

农民确认了两个主要障碍: 杂草管理和有机认证成本(表 3)。在七个小障碍中, 前三名是有机认证的学习过程, 记录保存和投入要求有机的成本。确认了四个非障碍物: 规划作物轮替, 低产量, 寻找有机产品的买家以及获得专业技术。由于“低收成拖累”长期以来一直被认为是有机农业和有机农业面临的重大挑战[13, 14], 但只有 17% 的受访者表示这是一个重要障碍, 而 83% 说这是一个轻微或不存在的障碍(表 3)。

五个障碍对于种植者的重要性没有明确的趋势。例如,虽然超过 35%的农民认为劳动力成本被是主要障碍,但几乎有 33.5%的农民认为这不是障碍,而不到 30%的农民认为这是一个小障碍。在这些情况下,没有明确的共识,但并没有减少障碍的重要性。

表 3. 有机过渡的障碍

Obstacle 障碍	%		
	Major 主要	Minor 次要	Not an obstacle 不是障碍
Major Obstacle 主要障碍			
Weed management 杂草管理	52.9	30.7	16.4
Cost of organic certification 有机认证成本	43.2	37.5	19.3
Minor Obstacle 次要障碍			
Learning process 学习过程	16.7	47.1	36.2
Recordkeeping requirements of organic certification 有机认证记录要求	40.0	43.6	16.4
Cost of organic inputs 有机投入成本	32.7	42.6	24.7
Managing soil fertility 土壤管理	23.9	42.1	34.0
Availability of organic inputs (seed, fertilizer, etc.) 有机投入物 (种子, 肥料等)	19.5	40.6	39.9
Obtaining organic price premiums 获得有机价格溢价	30.3	39.6	30.1
Obtaining organic price information 获取有机价格信息	22.1	39.6	38.3
No Clear Trend 没有清晰的趋势			
Availability of organic processing facilities 有机加工设施的可能性	38.2	25.4	36.4
Cost of labor 劳动成本	36.6	29.8	33.5
Pest or disease control 害虫或疾病控制	35.7	38.9	25.4
Availability of labor 劳动力的可用性	28.7	38.0	33.3
Obtaining adequate prices during transition 在过渡期间获得足够的价格	26.1	36.2	37.6

Not an Obstacle 不是障碍			
Planning crop rotations 规划作物轮作	8.4	39.4	52.2
Reduced yields 降低产量	16.7	32.2	51.1
Finding buyers/market for my organic products 寻找我的有机产品的买家/市场	19.7	31.3	48.9
Access to knowledgeable technical expertise on organic production 获得有机生产技术专长	19.6	39.1	41.3
Note: Shaded cells highlight data that indicates major obstacles, minor obstacles, no clear trend, and not an obstacle. 注意: 阴影单元格突出显示主要障碍物, 轻微障碍物, 明显趋势, 而不是障碍物的数据。			

资源

受访者获得了 10 个不同资源的清单, 并要求选择最多 5 个在过渡期间(或将来)是最有利的。表 4 按照有多少受访者选择这些资源, 其中 1 个是首选, 10 个是最低的。五大资源中的三个是生产导向型; 五个中的两个是市场导向的。

表 4. 有机过渡资源排名

Resource 资源	Rank 排名
The group's top five	
Information on organic pest, disease, and weed management 关于有机害虫, 疾病和杂草管理的信息	1
Information on soil health management for organic farms 有机农场土壤健康管理信息	2
Information on organic markets (trends, opportunities, pricing) 有机市场信息 (趋势, 机会, 定价)	3
Information on effective organic crop rotations for your region 有关你的所在地区有机作物轮作的信息	4
Market development for organic products 有机产品市场开发	5
Less important 不太重要	
Information on organic crop varieties 有机作物品种信息	6
Financial planning tools for transitioning to organic 用于过渡到有机的财务规划工具	7
Advance contracts from buyers during transition 过渡期间买家提前签订合同	8
Certified transition label 认证转换标签	9
Organic and/or transition crop enterprise budget templates 有机和/或过渡作物企业预算模板	10

支持

一旦我们知道什么主题对农民过渡最为重要, 我们也必须知道他们喜欢怎样接受信息和指导。受访者被要求选择五种类型支持中的前两名。高度密切接触的支援是首选, 有经验的有机农民来指导最受重视, 一对一技术援助排名第二(表 5)。个人研讨会-密切仍然很高, 排名第三, 书籍和其他印刷材料, 在线课程和网络研讨会排名较低。

不过, 只有高度密切接触的支持才能奏效是不准确的。为了简化问卷调查, 我们向农民提供了五种典型有关接收有机过渡重要信息的方法。我们没有在费用, 距离和其他交付限制方面对这些支持方式进行语境化。我们认为通过印刷和在线资源形式的教育和解决问题方法, 仍将是农民向有机认证过渡的重要手段。

Table 5. Support Rankings

表 5. 支持排名

Type of Support 支持类型	Rank 排名
Mentoring from experienced organic farmers 有经验有机农民给予的指导	1
One-on-one technical assistance during transition 过渡期间的一对一技术援助	2
In person workshops or short courses 个人讲习班或短期课程	3
Books or other printed materials 书籍或其他印刷品	4
Online courses or webinars 在线课程或网路研讨会	5

建议

在调查结果指导下, 我们建议采取以下具体策略, 支持农民成功的选择有机。

采取以价值为基础的方法来吸引更广泛的农民

我们建议与农民合作, 通过了解每个农民的价值观来评估向有机农业过渡的机会和选择。农民通过个人的信仰和经验会积极地看待应该开展或远离有机农业。对当地的情况密切关注是非常重要的。

提供个人面对面支持

所有受访者都喜欢在过渡期间采取高度接触的支持方式。前两种支持方式是有经验的有机农民给予指导和一对一的技术支援。因为在一对一技术援助有明显的偏好, 说明了通过现有农场和陆上机构的合作伙伴关系, 是提供农民教育和过渡支持服务的良好时机。

制定更有效的杂草和其他有害生物管理策略

尽管在获得有机生产方面知识渊博的技术专长并不困难, 但所有农民种类将杂草管理作为主要障碍, 将杂草病虫害和疾病等级信息作为转型期需要的主要资源, 这两方面存在很明显差距。

需要更好地捕捉和理解为什么有这种差距存在。现有的工具和策略是否太昂贵, 太复杂, 和/或不适合需求? 农民不愿意投资设备, 还是不愿意把精力和时间用于整体的杂草和病虫害的管理? 与非有机农业不同, 有机系统往往依赖于持续, 多季节, 多年的付出, 只有通过这些积极的方法随着时间的推移会达到正面的效果。

从这个意义上讲, 有效的支持有关杂草和病虫害管理应包括长期有机体系试验和农场示范。可以通过农民从事设计和实施的参与, 会提高了这些项目的价值。

开发更多区域处理基础设施

超过 63% 的受访者认为有机加工设施的可用性是过渡的障碍, 超过 38% 认定为主要障碍。对于有机供应链中所有必要的基础设施, 所在地点的远近和是否使用方便可以影响最终盈亏。这样突显了需要加强对有机农作物, 畜产品和增值产品加工, 储存和分配区域的基础设施投资。

支持认证成本分担的协助

调查结果清楚地表明认证成本分摊计划的重要性。超过 80% 的受访者将认证成本有碍有机转型的过渡, 超过 43% 的受访者将此认定为主要障碍。由于大多数受访者规模较小(超过 60% 的农场不足 25 英亩), 美国农业部的有机认证成本分摊计划是小农场进入和提供有机认证能力的关键。美国农业部最近宣布扩大认证成本分担的援助范围, 包括过渡性认证和各州有机计划费用, 这些措施将进一步有助于克服这些常见的障碍。

结论

我们的研究有更多的工作要落实, 因为调查结果证实了农民对有机成本, 记录保存, 生产挑战, 基础设施和市场开发, 相关政策等, 都有长期的担忧。

同时, 虽然国家研究提供了有机过渡的动机和障碍的广泛观点, 但我们的研究结果可能不会反映出各地的优先事项。例如, 这个国家调查中被评为较低的障碍可能是由区域或地区进行审查时的较大问题。最后, 这次调查只包括农民。支持转型农民的整体战略应考虑并吸引供应链中的其他行为者, 包括储存, 制造, 分销等。

我们的结果清楚地表明, 在有机部门从事农作物研究, 农民教育, 基础设施发展, 市场开发和政策制定方面的各类机构和机构都有很多工作要做。

参考 References

- [1] Cranfield, J., Henson, S., & Holliday, J. 2010. The motives, benefits, and problems of conversion to organic production. *Agriculture and Human Values*, 27, 291-306.
- [2] DiGiacomo, G. & King, R.P. 2015. Making the transition to organic: Ten farm profiles. Sustainable Agriculture Research and Education Program (SARE). <http://hdl.handle.net/11299/181352>
- [3] Dillman, D. & Smyth, J. 2014. Internet, phone, mail, and mixed-mode surveys: The tailored design method (4th ed.). Hoboken, NJ: Wiley.
- [4] Greene, C. 2013. Growth patterns in the U.S. organic industry. USDA Economic Research Service: Amber Waves. <http://www.ers.usda.gov/amber-waves/2013/october/growth-patterns-in-the-us-organicindustry/>
- [5] Jerkins, D. & Ory, J. 2016. 2016 National organic research agenda. Santa Cruz, CA: Organic Farming Research Foundation. http://ofrf.org/sites/ofrf.org/files/staff/NORA_2016_final9_28.pdf
- [6] Johnston, S. 2010. Assessing farmer interest in transition to organic production and barriers to expansion of organic production in New York State. New York State Department of Agriculture and Markets. http://www.agriculture.ny.gov/ap/organic/docs/Abstract_Assessing_Farmer_Barriers.pdf
- [7] Kirkpatrick, J. 2013. Retired farmer - An Elusive Concept. *Choices magazine*. <http://www.choicesmagazine.org/choices-magazine/theme-articles/transitions-in-agriculture/retired-farmer--an-elusive-concept>
- [8] Lau, M., Hanagriff, R., Constance, D., York, M., VanDelist, B., & Higgins, L.M. 2010. Discerning differences among producer groups and organic adoption barriers in Texas. *Journal of Food Distribution Research*, 40(2):124-164.
- [9] Lloyd, D. 2016. Farmer perspectives on the transition to organic agriculture: An Oregon study of farmer motivations and barriers. Oregon State University: Master's Thesis. <http://hdl.handle.net/1957/60003>
- [10] McBride, W. & Greene, C. 2015. Despite profit potential, organic field crop acreage remains. USDA Economic Research Service: Amber Waves. <http://www.ers.usda.gov/amberwaves/2015/november/despite-profit-potential-organic-field-crop-acreage-remains-low/>
- [11] Murray, T. & Enelow, N. 2016. Investing in organic production: Economics of transition (Webinar). Oregon Tilth, Sept. 7. <https://tilth.org/resources/investing-organic-production-economics-transition/>
- [12] Organic Trade Association. 2016. U.S. organic sales post new record of \$43.3 billion in 2015. <https://www.ota.com/news/press-releases/19031#sthash.7UCqaHEt.dpuf>
- [13] Reganold, J.P. & Wachter, J.M. 2016. Organic agriculture in the twenty-first century. *Nature Plants*, 2:15221. doi:10.1038/nplants.2015.221
- [14] Kniss, A.R., Savage, S.D., and Jabbour, R. 2016. Commercial crop yields reveal strengths and weaknesses for organic Agriculture in the United States. *PLoS ONE* 11(8):e0161673. doi:10.1371/journal.pone.0161673
- [15] Stephenson, G., Gwin, L., Garrett, A., and Powell, M. 2012. Enhancing organic agriculture in Oregon: Research, education, and policy (Publication EM 9050). Oregon State University Extension Service, Corvallis, OR.
- [16] Stofferahn, C.W. 2009. Personal, farm and value orientations in conversion to organic farming. *Journal of Sustainable Agriculture*, 33(8):862-884.
- [17] Strohlic, R. & Sierra, L. 2007. Conventional, mixed and “deregistered” organic farmers: Entry barriers and reasons for exiting organic production in California. Davis, CA: California Institute for Rural Studies.
- [18] USDA Natural Resource Conservation Service (NRCS). (n.d.) EQIP Organic Initiative. https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/programs/?cid=nrcs143_008224
- [19] USDA National Agricultural Statistics Survey (NASS). (n.d.). 2014 and 2015 Organic Certifier Data. https://www.nass.usda.gov/Surveys/Guide_to_NASS_Surveys/Organic_Production/Organic_Certifiers/2016/USDA_Accredited_Certifying_Agent_Certified_Organic_Data_2014_2015.pdf
- [20] USDA-NASS. 2012. 2012 Census highlights. https://www.agcensus.usda.gov/Publications/2012/Online_Resources/Highlights/Beginning_Farmers/
- [21] USDA-NASS. 2014. Census of agriculture: 2014 organic survey. https://www.agcensus.usda.gov/Publications/2012/Online_Resources/Organics/

The Dry Farming Collaborative

Amy Garrett, Assistant Professor (Practice), Oregon State University Extension Service

Abstract

A large proportion of the world's population is currently experiencing water stress from climate change [1, 2]. In addition, many new farmers in the Western United States have trouble finding land with unrestricted irrigation rights [3]. It is becoming critical for the viability of farms, and the security of our food system, to increase our knowledge and awareness of drought mitigation tools and strategies for growing with little or no irrigation [4]. Dry farming refers to crop production during a dry season, using the residual moisture in the soil from the rainy season, usually in a region that receives 20 inches or more of annual rainfall. "Dry" farmers work to conserve soil moisture during long dry periods primarily through a system of enhancing soil health by adding organic matter; planting drought-resistant varieties; and retaining moisture for summer crop growth with various management practices including increased plant spacing, careful and early soil preparation and planting in the spring, and shallow tillage to manage weeds and create "dirt mulch" [5]. These are among the strategies that can be used to adapt to climate change in our region. The dry farming project began in 2013 with case studies of farms in Western Oregon [6, 7] and Northern California that dry-farm a variety of fruit and vegetable crops. This led to demonstrations and various education and outreach events, and has evolved into a participatory climate adaptation research project. Many innovative, forward-thinking growers all over the maritime Pacific Northwest and beyond are joining the Dry Farming Collaborative to increase knowledge and awareness of dry farming management practices with a hands-on participatory approach and co-create the future of how we manage and steward water in our agricultural systems. This approach could serve as a template for how Extension (a nonpartisan government program) can work with producers and other organizations to address reduced water availability for agriculture.

Introduction

A large proportion of the world's population is currently experiencing water stress including farmers in the Western United States [1, 2]. In addition, many new farmers in the Western United States have trouble finding land with unrestricted irrigation rights [3]. It is becoming critical for the viability of farms, and the security of our food system, to increase our knowledge and awareness of drought mitigation tools and strategies for growing with little or no irrigation [4].

Activities

The dry farming project began in 2013 with case studies of farms in Western Oregon [6, 7] and Northern California that dry-farm a variety of fruit and vegetable crops. Dry farming demonstrations were then established in 2015, 2016, and 2017 [8] with support from the National Institute for Food and Agriculture's Beginning Farmer and Rancher Development Program to show what these practices look like on the ground. In 2016-2017, the "Growing Resilience: Water Management Workshop Series" (funded in part by Western SARE [9]), was organized to increase our knowledge and awareness of how Oregon growers are being affected by drought, expand our toolbox of drought mitigation tools and strategies, and educate agricultural producers and professionals about management practices and strategies for farming with little or no

irrigation. The Dry Farming Collaborative (DFC) was initiated in 2016 to facilitate farmer-to-farmer information sharing as growers started to experiment and establish their own dry farming trials [10]. The DFC is a group of farmers, Extension educators, plant breeders, and agricultural professionals partnering to increase knowledge and awareness of dry farming management practices with a hands-on participatory approach.

Outputs

In 2016, twenty Oregon growers in the DFC conducted exploratory trials involving site selection and crop varietal choice (tomatoes, potatoes, squash, melon, dry beans). Throughout the growing season, they took notes on crop varietal performance and took pictures and videos, many of which were shared on the DFC Facebook page. An email list was also created to help facilitate communication within the group and coordinate field trials [10, 11]. Seeds and starts, many of which have had a history of being dry farmed, were distributed to trial hosts along with “grower input forms” to record information about their site (soil type), crops (varieties, planting date, planting density), and results (harvest dates, yield). In addition, five-foot soil cores were pulled at eight of these dry farming sites. Soil type, texture, water-holding characteristics, and productivity ratings were used to help explain the tomato yield results. Field days were held in August at several sites, and participants took part in sensory evaluations with side-by-side tastings of dry farmed and irrigated melons and tomatoes. More than 60 stakeholders attended the first DFC winter meeting in December 2016 to share and learn about results from 2016 dry farm trials, and plan for 2017.

Impacts

Since its initiation in the spring of 2016, the DFC has grown significantly. The email list (for internal communication) currently has more than 100 subscribers, and the Facebook group has more than 300 members from throughout the maritime Pacific Northwest and beyond. Thirty growers from Western Oregon and Washington signed up to host trials in 2017.

The Oregon State University Extension Service Small Farms Program received funding to continue supporting the DFC from the United States Department of Agriculture Northwest Climate Hub starting in Fall 2017. This project, “Dry Farming Collaborative participatory research and decision-making tools, information sharing platforms, and resource development” has the following objectives:

- Understand the impact of dry farming innovations in summer water-limited scenarios induced by climate change on Northwestern agriculture.
- Conduct and facilitate on-farm field trials involving OSU Extension and DFC growers in Oregon and Washington. Facilitate farmer-to-farmer information sharing within DFC and with climate scientists with multiple communication channels and events.
- Provide resources and tools to facilitate coproduction of scientific knowledge and decision support.
- Initiate “Dry Farming in the maritime Pacific Northwest U.S.” Extension publication series with decision-making tools and resources for growers new to dry farming as well as case study reports with 2017 DFC trial results.
- Develop a guide on how to put together participatory climate adaptation research projects for others in our region and beyond.

- Develop dry farming page on the OSU Small Farms website to be a resource hub for dry farming in the Northwestern United States as well as scientifically-based information on climate adaptation and mitigation tools.

By design, the inclusivity of this participatory climate adaptation research project has broadened our reach and is growing into a movement in our region. Each member of the DFC brings expertise and innovations, which accelerate collective learning. Many growers are experimenting with different techniques, hosting dry farmed variety trials, and growing some of the same crop varieties across sites (corn, dry beans, winter squash, zucchini, tomatoes, potatoes, and melon).

As DFC and consumer interest continue to grow, resources are needed to assist growers new to dry farming in site assessment, soil preparation, planting, and crop varietal selection. OSU Extension publications on these topics are being developed and will be informed by DFC trial results. There is also a strong need to streamline data collection, quality, and analysis, which will help facilitate integration with existing resources from Extension, agencies, and academic organizations. The tools and resources developed for this project could be used and modified for participatory research projects in our region and beyond.

References

- [1] Van Horne, B., Strobel, M., & Hardegree, S. 2012. Climate risks in the Northwest. USDA Regional Climate Hubs: Managing your risk in a changing climate. [Online]. https://www.usda.gov/oce/climate_change/hubs/NorthwestFactSheet.pdf
- [2] Vörösmarty, C., Green, P., Salisbury, J., & Lammers, R. 2000. Global water resources: Vulnerability from climate change and population growth. *Science*, 289, 284-288.
- [3] Greenberg, K., Shute, L.L., & Simpson, C. 2016. Conservation generation: How young farmers and ranchers are essential to tackling water scarcity in the arid west.
- [4] Wheeler, T. & von Braun, J. 2013. Climate change impacts on global food security. *Science*, 341, 508-513.
- [5] Runsten, D. & Mamen, K. 2014. Dry farming. California Agricultural Water Stewardship Initiative.
- [6] Garrett, A. 2013. Dry farming vegetables: One farmer's approach to building soil, conserving water, and producing great tasting tomatoes. *Oregon Small Farm News*, 8(3).
- [7] Garrett, A. 2014. Common misconceptions and key points about dry farming: Case study of dry farmer with more than 40 years of experience. *Oregon Small Farm News*, 9(3).
- [8] Garrett, A. 2015. Dry farming demonstration. *Oregon Small Farm News*, 10(3).
- [9] Garrett, A. 2016. Growing resilience: Water management workshop series. [Online]. <http://smallfarms.oregonstate.edu/wmws>
- [10] Garrett, A., Noordijk, H., & Kristal, D. 2016. The dry farming collaborative: Growing without irrigation in the maritime Pacific Northwest. In *Proceedings of the 5th National Small Farm Conference*, pp. 221-224.
- [11] Desclaux, D. et al., 2012. Centralized or decentralized breeding: The potential of participatory approaches for low-input and organic agriculture. In *Organic crop breeding*, pp. 99-123. Wiley-Blackwell, Hoboken, NJ.
- [12] Tritz, J. 2014. Participatory research: A tool for Extension educators. *Journal of Extension*, 52(4).

干旱农业的合作

Amy Garrett, Assistant Professor (Practice), Oregon State University Extension Service
美国俄勒冈州立大学扩展服务助理教授(实践)

The Dry Farming Collaborative

Amy Garrett, Assistant Professor (Practice), Oregon State University Extension Service

简介

目前世界上很大一部分人口正在遭受气候变化而带来缺水的压力[1, 2]。此外, 美国西部的许多新农民无法找到不受灌溉限制的土地[3]。对于农场的可行性和粮食系统的安全性, 我们要增加对于干旱措施的知识 and 意识, 来面对几乎无法灌溉的情况[4]。干旱农业是指在干旱季节生产农作物, 利用雨季土壤中的残留水分, 通常发生在每年可获得 20 英寸或更多年降雨量的地区。“干旱”农民主要通过增加土壤健康的机制, 在长期干旱期间努力保护土壤水分; 种植抗旱品种; 并通过各种管理措施, 包括增加植物间距, 在春季仔细和早期的土壤准备和种植, 以及浅耕地管理杂草和创造“土壤覆盖物”, 保持夏季农作物生长的水分[5]。这些战略是可以用来应对我们地区气候变化。干旱农业项目于 2013 年开始, 西部俄勒冈州[6, 7]和北加州的农场进行了个案研究, 干农场种植了各种水果和蔬菜农作物。这引导致和各种教育示范和外联活动, 并已发展成为参与性的气候适应研究项目。许多前瞻性的种植者正在加入干农合作, 在美国西北海岸区有了许多创新, 通过动手参与的方式提高干农业管理实践的知识和意识, 共同创造如何管理和未来农业系统中的用水。这种方法可以作为推广教程(一个不分党派的政府计划)与生产者和其他组织合作解决农业用水可用性的模式。

介绍

目前世界上很大一部分人口正在遭受缺水的压力, 包括美国西部的农民[1, 2]。此外, 美国西部的许多新农民无法找到不受灌溉限制的土地[3]。对于农场的可行性和粮食系统的安全性, 我们要增加对于干旱措施的知识 and 意识, 来面对几乎无法灌溉的情况[4]。

活动

干旱农业项目于 2013 年开始, 西部俄勒冈州[6, 7]和北加州的农场进行了个案研究, 干农场种植了各种水果和蔬菜作物。然后在 2015, 2016 和 2017 年建立了干农业示范活动[8], 得到了国家粮食和农业农民研究所和牧场开发计划的支持, 以显示这些做法的实在性。在 2016-2017 年期间, 组织了“增长弹性: 用水管理研讨会系列”(由西方 SARE[9]部分资助), 以增强俄勒冈种植者如何对受到干旱影响的了解和意识, 扩大处理干旱工具箱和相应策略, 并且教育农业生产者和专业人员有关少量或无灌溉的农业管理做法和策略。干旱农业合作(DFC)启动于 2016 年, 以促进农民相互间的信息共享, 因为种植者正开始试验和建立自己的干旱耕作试验[10]。DFC 是一批农民, 推广教育工作者, 植物育种者和农业专业人士, 通过实际参与的方式, 来提高干农业管理实践的知识和意识。

成效

2016 年, DFC 的 20 名俄勒冈州种植者进行了选址和作物品种选择(西红柿, 土豆, 南瓜, 甜瓜, 干豆)的试验。在整个生长季节中, 他们记录了作物品种的表现, 并拍摄了照片和视频, 其中许多在 DFC 脸书(Facebook)页面上分享。还创建了一个电子邮件列表, 以帮助促进组内的沟通和协调试验现场[10, 11]。许多已经有干燥的农场历史的种子, 被分发到试验主和“种植者输入表”, 用来记录关于地点(土壤类型), 作物(品种, 种植日期, 种植密度)信息, 和结果(收成日期, 产量)。此外, 在八块这些干旱农田中抽出五英尺土壤。使用土壤类型, 质地, 保水特性和生产力等级, 来帮助解释番茄产量的成果。并在八月份在几个地方举行田间劳作活动, 参与者并进行了干旱, 灌溉的瓜类和西红柿的并排品尝, 给了品尝后感官评估。60 多位利益相关者参加了 2016 年 12 月举行的第一届 DFC 冬季会议, 分享并了解 2016 年干农试验的成果, 也对 2017 年提供规划。

影响

自从 2016 年春天开始以来, DFC 已经显着成长。电子邮件列表(用于内部通信)目前拥有 100 多个订阅者, 脸书(Facebook)群组拥有来自整个海西北海岸及以外地区的 300 多名成员。西俄勒冈州和华盛顿州的三十名种植者在 2017 年签署了试种承诺。

俄勒冈州立大学推广服务小农场计划从 2017 年秋季开始, 从美国农业部西北气候中心获得资金, 继续支持 DFC。该项目“干农合作参与式研究和决策工具, 信息共享平台, 资源开发”具有以下目标:

- 了解干旱农业创新对因西北农业气候变化所引起的夏季限水影响。
- OSU 推广教育和 DFC 种植者参与了在俄勒冈州和华盛顿州进行的农场实地考察。促进 DFC 内农民相互间的信息共享, 以及与多个气候科学家有多种沟通渠道和活动。
- 提供资源和工具, 促进共同制作科学知识和支持决策。
- 启动“美国西北海岸干旱农业”推广教程刊物系列, 为新农牧业种植者提供资源和做出决策, 以及 2017 年 DFC 试验结果的案例研究报告。
- 制定有关如何将参与性气候适应研究项目纳入本地及其他地区的指南。
- 在 OSU 小面积农场网站上开发旱作页面, 成为美国西北部干旱农业的资源枢纽, 以及提供气候适应和减缓的科学信息。

按照设计, 这个参与式气候适应研究项目的包容性扩大了我们的影响力, 并且正在成为我们地区的动力。DFC 的每个成员都会带来专业知识和创新, 加速集体学习。许多种植者正在尝试不同的技术, 主持干旱种植试验, 并在各个不同地点(玉米, 干豆, 冬季南瓜, 西葫芦, 西红柿, 土豆和甜瓜)种植一些相同的农作物品种。

随着 DFC 和消费者对于干旱耕作的兴趣继续增长, 需要资源来协助种植者做现场评估, 土壤准备, 种植和作物品种选择。OSU 推广教育出版物正在开发关于这些主题, 并将纳入通过 DFC 的试验结果。这有助于促进推广教育和学术机构的现有资源的整合, 还需要精简数据收集和质量分析。为本项目开发的工具和资源, 可以用于区域以外的合作参与性研究项目。

参考 References

- [1] Van Horne, B., Strobel, M., & Hardegree, S. 2012. Climate risks in the Northwest. USDA Regional Climate Hubs: Managing your risk in a changing climate. [Online].
https://www.usda.gov/oce/climate_change/hubs/NorthwestFactSheet.pdf
- [2] Vörösmarty, C., Green, P., Salisbury, J., & Lammers, R. 2000. Global water resources: Vulnerability from climate change and population growth. *Science*, 289, 284-288.
- [3] Greenberg, K., Shute, L.L., & Simpson, C. 2016. Conservation generation: How young farmers and ranchers are essential to tackling water scarcity in the arid west.
- [4] Wheeler, T. & von Braun, J. 2013. Climate change impacts on global food security. *Science*, 341, 508-513.
- [5] Runsten, D. & Mamen, K. 2014. Dry farming. California Agricultural Water Stewardship Initiative.
- [6] Garrett, A. 2013. Dry farming vegetables: One farmer's approach to building soil, conserving water, and producing great tasting tomatoes. *Oregon Small Farm News*, 8(3).
- [7] Garrett, A. 2014. Common misconceptions and key points about dry farming: Case study of dry farmer with more than 40 years of experience. *Oregon Small Farm News*, 9(3).
- [8] Garrett, A. 2015. Dry farming demonstration. *Oregon Small Farm News*, 10(3).
- [9] Garrett, A. 2016. Growing resilience: Water management workshop series. [Online].
<http://smallfarms.oregonstate.edu/wmws>
- [10] Garrett, A., Noordijk, H., & Kristal, D. 2016. The dry farming collaborative: Growing without irrigation in the maritime Pacific Northwest. In *Proceedings of the 5th National Small Farm Conference*, pp. 221-224.
- [11] Desclaux, D. et al., 2012. Centralized or decentralized breeding: The potential of participatory approaches for low-input and organic agriculture. In *Organic crop breeding*, pp. 99-123. Wiley-Blackwell, Hoboken, NJ.
- [12] Tritz, J. 2014. Participatory research: A tool for Extension educators. *Journal of Extension*, 52(4).

Assessing the Educational Needs of Small-Acreage Farmers in the Southern Willamette Valley Region

Melissa Fery, Associate Professor (Practice) and Amy Garrett, Assistant Professor (Practice)
Oregon State University Extension Service

Abstract

A needs assessment was implemented for small farm programming in the southern Willamette Valley to identify relevant topics to focus faculty effort on for the next five years. Oregon State University Extension Service small farm faculty led the effort, which included identifying and using existing data and assessments, interviewing key community partners, convening an advisory focus group, and conducting a survey questionnaire for small-acreage farmers and landowners in Benton, Linn, and Lane counties in Oregon.

Introduction

In Extension, needs assessment should be a part of program planning and evaluation [1]. A needs assessment to identify and plan relevant educational programming is recognized as a guide for time allocation and decision making. Over the last decade, segmented populations of small farm clientele have been surveyed to determine topics of interest and convenient program timing. Two Extension faculty serving small farms, ready to address changing needs in their current programming, desired a high-quality, comprehensive assessment to prioritize or redirect existing programs as potential new opportunities are identified. The intention of the needs assessment was to provide qualitative and quantitative data to guide the development of meaningful programs that would provide small farms clientele (small-scale farm businesses, landowners, and homestead farmers) information and resources to aid them in achieving their goals.

The objectives of the project were to:

- Learn the needs of small-acreage farmers and landowners in Oregon's southern Willamette Valley region.
- Use information gathered from the needs assessment process to continue and/or develop new and relevant educational programming.
- Share the process and findings with other Extension faculty, community partners, and stakeholders.

Activities and/or methods

The first step was to review existing assessment and survey data that corresponded with the objectives of this project and summarize pertinent findings. Assessments that were reviewed and summarized included the 2007 and 2012 USDA Census of Agriculture for demographic data, *Enhancing Organic Agriculture in Oregon* Extension publication (2012), and four Oregon Food Bank Community Food Assessments featuring challenges and opportunities for area farmers. The Oregon State University (OSU) Extension Service Lane County Community Needs Assessment (2012), Willamette Women's Farm Network Survey (2012), and thesis titled *Farmer Perspectives on Success and Challenges: A Study of Small Farms in Oregon's Willamette Valley* (2014) contained valuable insights to develop general programmatic themes. In addition, Friends of Family Farmers, a nonprofit organization, hosted 18 listening sessions with farmers and ranchers throughout Oregon, identifying five priorities for policy action. Finally, a local

newspaper printed a series of farmer interviews in 2016 that gave anecdotal quotes of challenges that face small farms.

Next, interviews were completed with 12 key community partner organizations and agencies engaged in providing support, delivering programs, or offering networking options for small farms in the region. In conversation, qualitative data was collected as each partner answered three questions:

1. What work is your organization currently working on related to small farms?
2. Have you identified any specific educational needs or gaps for small farms in the southern Willamette Valley region?
3. What role, if any, do you see OSU Extension filling based on the needs identified in your work with the small farm community?

Extension faculty are often called upon to share expertise and develop programs that are outside of their plan of work, are outside an individual's expertise, or are addressed by other organizations. Thus, an important part of the needs assessment process was to identify what was already being done so that programmatic efforts and initiatives are not duplicated. Learning programs for home gardeners, enrolled college students, and on-farm internships as well as small business development support are readily available throughout the area.

Combined, the review of existing data and interviews gave a sense of what the existing conditions are in the region and provided an idea of the potential program emphasis. The review of existing programs gave the Extension faculty a sense of where not to allocate resources. All of the information was compiled into an assessment document and presented to the regional small farm advisory committee, a focus group that would provide review and comment. The committee also provided suggestions for questions for the upcoming survey. To maximize efficiency in trying to best serve small farm clientele amongst our partners, effort was made to reach out to several colleagues and new faculty serving the same audience (forestry Extension, livestock and forage Extension, USDA NW Climate Hub) and allow them to create a block of questions that participants had the option to respond to if there was interest.

Finally, a survey questionnaire was developed, piloted, and disseminated to farmers, ranchers, and landowners in the region. The survey was administered using a web-based program (Qualtrics, Provo, UT), and accepted responses from February 23, 2017, to May 31, 2017—approximately three months. During this time, notices about the survey were distributed via social media, electronic and printed newsletters, direct emails, press releases, flyers and handouts. Significant efforts were taken to reach those who may not have been familiar with OSU Extension.

The survey asked small-acreage farmers to respond to the question, “What would you like us to work on next?” The survey had 249 respondents that shared basic demographic information, preferences for learning and communication, addressed the open-ended question, “What do you need to learn or be able to do so that you can be a more successful farmer/rancher/landowner?” and provided their interest level in a variety of potential program areas.

Outputs and/or results

Evaluation of survey results showed that the process of developing and disseminating the survey resulted in the targeted clientele participating. Sixty-nine percent of the respondents identified themselves as a farmer/rancher, 46% as a landowner, and 17% selected “other.” The “other” category allowed for input and the majority self-identified as “hobby farmers” or hoping/planning to farm in the future. Respondents were able to select more than one identifier. Ninety-five percent of the respondents indicated that they currently own a small-acreage farm:

- Less than 5 acres: 23%
- 6 to 10 acres: 17%
- 11 to 20 acres: 13%
- 21 to 50 acres: 20%
- More than 50 acres: 22%

The respondents showed a wide span of farming experience, with 7% who hadn’t started farming yet, 31% with less than 5 years, 38% with 6 to 20 years and 21% who have been farming for over 20 years. Another survey question asked participants to indicate what crops and animals they raise. The respondents represent highly diversified farms leading to multiple programming interests.

Since the survey respondents represent the scale, wide-range of expertise, and multiplicity of enterprises, the Extension faculty are confident that data characterize the actual educational needs of their clientele and yield valuable information for program development.

The Southern Willamette Valley Small Farms Needs Assessment, including survey questions and synthesized data, is available at <http://smallfarms.oregonstate.edu/south-valley/>

Impacts

The methods described may be useful to other Extension professionals interested in analyzing the educational needs of the clients they serve. The documented process of reviewing existing data that pertain to the target population, interviewing key community partners, organizing focus groups, identifying which program areas are attended to and developing, disseminating, and finally evaluating responses of a survey questionnaire provides confidence to develop a plan to address current educational program needs. The needs assessment document may also be used as a reference for local community partners as they continue to support small-acreage farms in the Southern Willamette Valley.

References

- [1] Angima, S. & Etuk, L. Needs assessment primer. Oregon State University Extension Service. http://extension.oregonstate.edu/sites/default/files/for-employees/employee-resources/needs-assessment/needs_assessment_version_7_-_final.pdf

评估威拉米特山谷南部地区小面积农民的教育需求

Melissa Fery, 副教授(实践)和 Amy Garrett, 助理教授(实践)
俄勒冈州立大学推广服务

Assessing the Educational Needs of Small-Acreage Farmers in the Southern Willamette Valley Region

Melissa Fery, Associate Professor (Practice) and Amy Garrett, Assistant Professor (Practice)
Oregon State University Extension Service

简介

在威拉米特山谷南部地区, 针对小型农场规划实施了需求评估, 确定相关主题以便在未来五年内重点关注教师们的工作。俄勒冈州立大学推广服务小农场教师领导所带领的工作, 包括确定和使用现有的数据和评估, 面试社区关键合作伙伴, 召集咨询重点小组, 在俄勒冈州对 Benton, Linn 及 Lane 县市农民和土地所有者, 进行问卷调查。

介绍

在推广服务中, 需求评估应该是方案规划和评审的一部分[1]。确定和规划有关教育计划的需求评估, 被认为是时间分配和制定决策的指南。在过去十年中, 对部分小农户的人群已经进行了调查, 以确定有兴趣的主题和便利时间的安排。两名为小型农场提供服务的推广教职人员, 为满足当前课程设计中不断变化的需求, 因为要满足潜在新机会的来临, 希望通过高质量, 全面的评估来确定现有计划的优先次序或重新定位。需求评估的目的是提供定性和定量数据, 以指导制定有意义的计划, 为小农户(小农户, 土地所有者和宅基农)提供信息和资源, 帮助他们达成目标。

该项目的目标是:

- 了解俄勒冈州威拉米特山谷南部地区小面积农民和土地所有者的需求。
- 使用评估过程收集的信息, 从需求来继续和/或开发新的教育计划。
- 与其他推广教职人员和利益相关者分享社区合作的过程和结果。

活动和/或方法

第一步是审查符合本项目目标的现有评估和调查数据, 并总结相关调查结果。经审查和总结的评估包括 2007 年和 2012 年美国农业部(USDA)“农业统计”, 针对人口学数据, 加强俄勒冈州扩展有机农业(2012 年推广教育出版物)和四个俄勒冈州粮食银行社区食品评估, 为区域农民提供了挑战和机遇的信息。俄勒冈州立大学(OSU)推广服务社区需求评估(2012 年), 根据威拉米特妇女农场网络调查(2012 年)以及以农民对成功与挑战的观点为题的论文: 俄勒冈州威拉米特山谷小型农场研究(2014 年), 提供了发展一般程序性主题的宝贵见解。此外, 一个非营利组织的“家庭农民之友”为俄勒冈州的农民和牧场主举行了 18 次听证会, 确定了政策行动的五项优先事项。最后, 当地一家报纸在 2016 年发表了一系列的农民采访, 诉说了对小农场面临的挑战和轶事。

接下来, 12 个关键的社区合作伙伴组织和机构已经完成了访谈, 为该地区的小农场提供支援, 并提供计划或提供网络选择。在谈话中, 每个合作伙伴回答了三个问题, 以便收集定性数据:

1. 您的单位目前在与小型农场有关的工作是什么?
2. 您是否确定了威拉米特山谷南部地区小农场的具体教育需求或差距?
3. 根据您在小农场社区工作中的经验, 您有否会看到 OSU 推广教程有须要补充情况?

通常推广教育的教职人员会被要求分享专业知识和研发不在其工作范围之内的程序计划, 而且超出个人的专长, 或应由其他组织解决的问题。因此, 需求评估过程的一个重要部分是确认已经在做的工作, 以便方案的努力和举措不被重复。家庭园丁, 入学大学生和农场实习生, 以及小型企业发展支持, 相关的学习计划都可以在整个地区使用。

总而言之, 对现有数据和访谈的资料, 对该地区现有的条件有所了解, 并提出了潜在的计划重点。使得推广学院对现有课程的审查了解了哪里不须分配资源。所有这些信息都被编成一份评估文件, 并提交给区域小农户咨询委员会, 这个小组将提供审查和评论。委员会还就即将进行的调查问题提出了建议。为了最大限度地提高效率, 尝试为我们的合作伙伴之间的小农场客户提供最佳服务, 努力与几位同事和新的教师(林业推广, 畜牧和牧草推广, 美国农业部 NW 气候中心)接触, 并让他们提出一些问题, 让有兴趣的参与者选择性回答。

最后, 制定了调查问卷, 推出试点向该地区的农民, 牧场主和土地所有者来传送。该调查由网络(Qualtrics, Provo, UT)进行管理, 并接受从 2017 年 2 月 23 日至 2017 年 5 月 31 日约 3 个月的回应。在此期间, 有关调查的通知是通过社交媒体, 电子和平面通讯, 电子邮件, 新闻稿, 传单和讲义来分发的。为了接触那些可能不熟悉俄勒冈州立大学推广教育的人们, 在这方面也已经作出重大努力。

这项调查要求小面积农民回答“您希望我们下一步做什么?”这项调查显示有 249 位受访者分享了基本的人口信息, 学习和沟通的偏好, 也有针对开放式的的问题, “您需要学习什么或能够做到什么, 使您能成为更成功的农民/牧场主/土地所有者?”, 并在各种潜在计划领域提高了对兴趣低的程度。

成果和/或结果

调查结果的评估说明了调查问卷的设置和文件传送的过程, 主要是针对既定目标客户的参与。百分之六十九的受访者认为自己是一个农民/牧场主, 46%是土地所有者, 另有 17%选为“其他”类别。“其他”类别多数自称为“业余爱好农民”, 或希望/计划在未来参与农场工作。受访者能够选择多个标识。百分之九十五的受访者表示, 他们目前拥有一个小面积的农场:

- 小于 5 英亩: 23%
- 6 至 10 英亩: 17%
- 11 至 20 英亩: 13%
- 21 到 50 英亩: 20%
- 超过 50 亩: 22%

受访者表现出广泛的农务经验, 其中 7% 没有开始耕作, 31% 不到 5 年, 38% 为 6 至 20 年, 21% 超过 20 多年。另一个调查问题要求参与者指出他们饲养的农作物和动物。受访者代表高度多元化的农场, 导致出多类程度的兴趣。

调查的对象代表各规模, 广泛的专业知识范围和多元化的企业。因此, 扩展部门的教师相信, 数据代表了客户实际对教育的需求, 为项目开发创造了有价值的信息。

威拉米特山谷南部小农场需求评估, 包括调查问题和综合数据, 可在 <http://smallfarms.oregonstate.edu/south-valley/> 取得。

影响

本文所描述的方法对于有兴趣分析服务客户的教育需求, 对于其他推广教育专业人员都可能有用的。调查与既定目标人群和有关的现有数据的文件化程序, 访问关键社区合作伙伴, 组织焦点小组, 确定计划领域的参与和发展, 传播和最终评估调查问卷的回答, 在各方面都提供了信心来制定计划, 并解决当前教育计划的需求。需求评估文件也可用作当地社区伙伴的参考, 因为支持威拉米特山谷南区的小面积农场的工作仍在继续中。

参考 References

- [1] Angima, S. & Etuk, L. Needs assessment primer. Oregon State University Extension Service. http://extension.oregonstate.edu/sites/default/files/for-employees/employee-resources/needs-assessment/needs_assessment_version_7_-_final.pdf

A Survey of Small Farmers to Assess Interest in a Food Hub in Oregon's Mid-Willamette Valley

Javier Fernandez-Salvador, Assistant Professor (Practice); Erica Chernoh, Open Campus
Coordinator; and Eliza Smith, Student Researcher
Oregon State University Extension Service

Abstract

The majority of farms in Oregon's Mid-Willamette Valley are less than 50 acres and play an essential role in the state economy. The city of Salem commissioned Oregon State University Extension Small Farms Program to survey small farmers to evaluate their interest in a food hub. The survey was conducted from fall 2016 to spring 2017 via in-person, on-site interviews with 19 farmers from the Mid-Willamette Valley. Objectives of the survey were to gather general farm information (size, crops, farm product marketing, and farming challenges); food hub feasibility data; and preliminarily assess the growers' needs of the Extension service. Farms of different sizes produced a wide variety of crops, livestock, and agricultural value-added products. Sales venues and marketing strategies were diverse. The growers identified labor and finances as top farming challenges. Ninety-five percent of the growers stated interest in increasing local sales through participation in a food hub in the region. A majority of the farmers were interested in a food hub that would provide community education, direct sales to the public, aggregation of products to sell to large buyers, and value-added processing. Their main concerns about a potential food hub were that prices would be too low for it to be viable, a possible lack of demand for their products, and that the small scale of their farm would limit their involvement. Participants suggested a wide variety of research topics and interests for future Extension support and outreach. The results of this study demonstrate the wide diversity of production practices amongst growers and that there is significant interest from small farmers in a food hub to support small farmers in the Mid-Willamette Valley.

Introduction

Agriculture is an important industry in Oregon, and is linked to 13.2% (\$50 billion) of all sales in the state [9]. Oregon's Mid-Willamette Valley contains the majority of the state's farms according to 2012 census data, with 2,567 farms in Marion County, 1,143 farms in Polk County, and 2,028 farms in Yamhill County [11]. While large farms are an important part of the state's economy, small farms less than 50 acres in size account for 61.4% of Oregon's farms [7].

Small farms are fueling the local food movement that has become increasingly popular in recent years [10]; however, small farmers often have difficulties accessing wholesale and retail markets due to economies of scale. Food hubs are a viable option for selling local produce [6]; they have been especially successful in metropolitan areas, where they serve as a centralized location for small farmers to sell or distribute their products [5]. The USDA definition of a food hub is broad but identifies aggregation, distribution, and marketing (or the coordination of these activities) as key services that all regional food hubs provide [5]. Food hubs may be a good resource for small farmers because they can provide essential time and cost-saving services that small farmers could not access themselves [5]. Food hubs can take a virtual and/or a physical form, from online databases to co-ops or storage and distribution centers [5]. Food hubs can also provide community education about the value of buying food from local farmers to support the local

economy and preserve farmland [4]. Food hubs can take several forms; they can serve as an intermediary between farmers and businesses (wholesale) or farmers and consumers (retail). Of the food hubs operating in the U.S., 33% use a farmer-business intermediary model, 39% use a farmer-consumer intermediary model, and the remaining 28% are a hybrid between the two models [4]. Surveying farmers is a useful method to determine farmer interest in a potential food hub [8]. In 2016, the city of Salem, Oregon, contracted the Oregon State University (OSU) Extension Mid-Valley Small Farms Program to conduct a needs assessment survey of small farms in the Mid-Willamette Valley (Marion, Polk, and Yamhill counties) to gauge farmer interest in alternative marketing routes, such as food hubs. Clackamas, Benton, and Linn counties were included in the survey as well, since they border the Mid-Willamette Valley and often use Extension services from the Mid-Willamette Valley.

Needs assessments are useful tools in agricultural extension work to determine the gap between a current and a desired situation [2]. There are three components of the needs assessment process; pre-assessment, assessment, and post-assessment [2]. The pre-assessment stage includes gathering background information and secondary data about similar projects, as well as identifying the current and desired situations for the specific project. Subsequently, a needs assessment is conducted to gather data in order to assess the gap between the current and desired situations [2]. For this needs assessment survey, in-person, on-site interviews and online surveys were used to collect primary qualitative and quantitative data.

Objectives

The objectives of the survey were to: (1) determine key farm traits for participants, (2) assess farmers' interest and what features and services could be offered in a food hub in Salem, Oregon, and (3) preliminarily evaluate the needs of growers from the regional Extension service to determine what resources and services they currently use and which of those could be improved or provided in the future.

Research Materials and Methods

The survey was conducted between September 2016 and March 2017. Farmers were identified for interviews from internet searches and OSU Extension contact lists. Eighteen in-person, on-site interviews were conducted, and one phone interview for a total of 19 interviews. Figure 1 shows the study interview sites in the Mid-Willamette Valley region, as well as the proposed site for a food hub. Using the same interviewer for all interviews ensured consistency in data collection. The interview questions were broken into three sections: general farm information, interest in a potential food hub, and preliminary OSU Extension needs assessment. Quantitative data collected included farm location, farming tenure, total and farmed acreage, crops/products farmed and sold, product availability, approximate gross farm sales, and sales outlets. Qualitative data collected included interest in increasing local sales, preferences for what a food hub would include, farming challenges, resources (online resources, workshops, classes, etc.) that farmers would like Extension to provide, and ideas for new Extension programming.

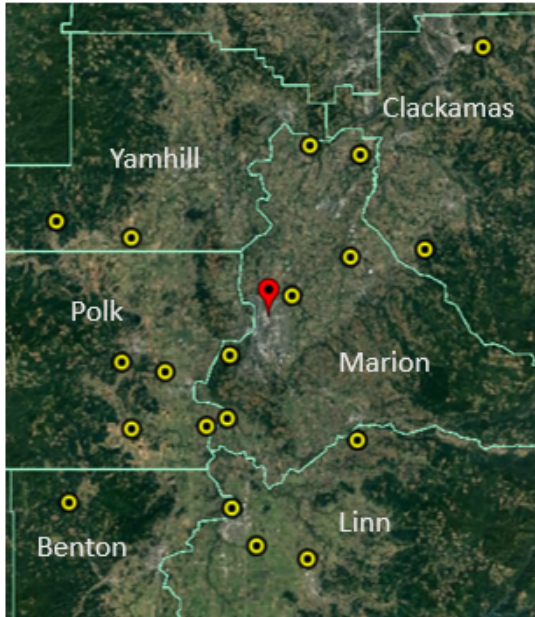


Figure 1. Location of interview sites for participating farms (circles) and proposed food hub site (in Salem, pin marker) the in Mid-Willamette Valley, Oregon.

Results

General Farm Information

Interviews were conducted in six counties in the Mid-Willamette Valley in Oregon, with the majority in Marion and Polk (58%). Over half of the farmers interviewed (60%) had been farming from 4-10 years, followed by those who have farmed for over 20 years (27%). Over one third of those surveyed own or lease over 100 acres of farmland, while one quarter own or lease between 30 and 50 acres (Figure 2). When asked how much of their total acreage they farm, one third (33%) farmed 5.1-15 acres, and 27% stated they farm 30-50 acres. Three quarters (74%) of the farmers' acreage is not in production, and more than a third (37%) have less than half of their total acreage in production.

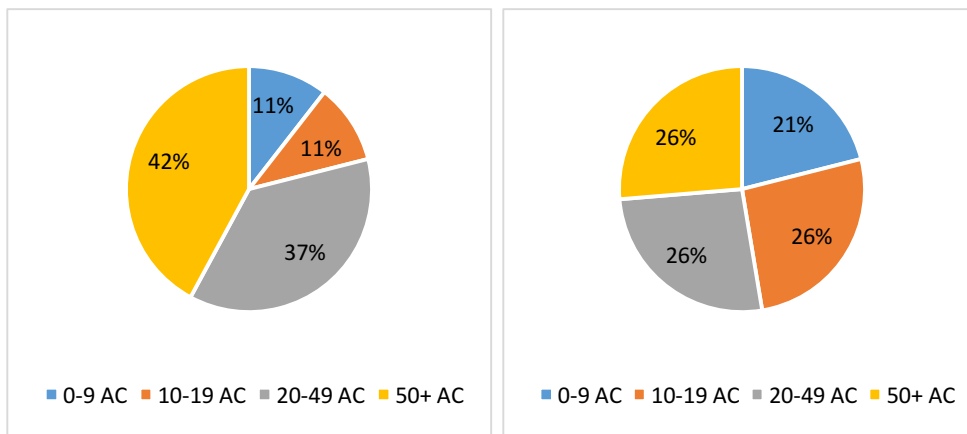
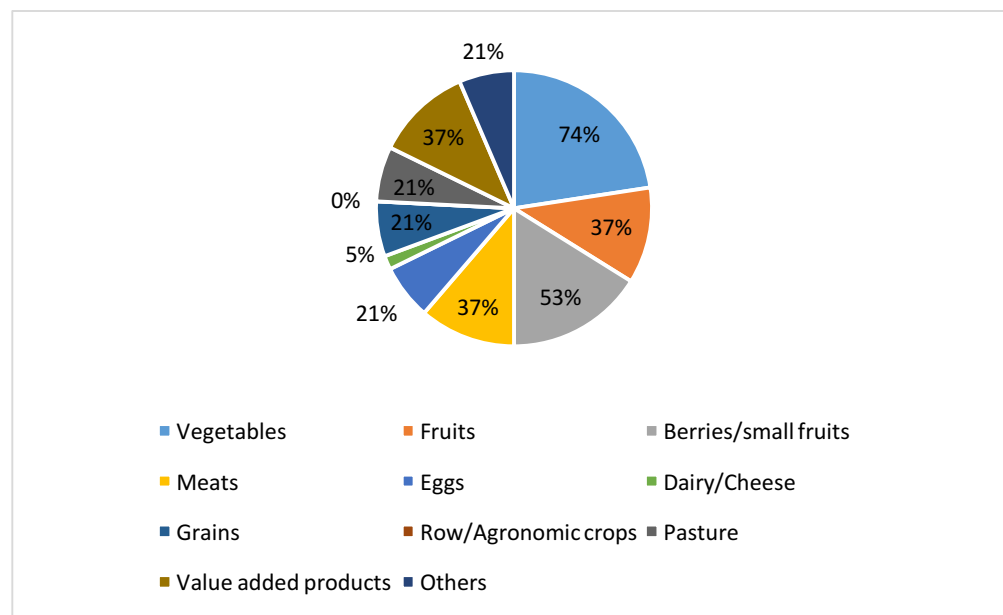


Figure 2. Percentage of small farmers surveyed by acreage (left) total farm area in acres (right) acreage in production.

Three quarters of farmers interviewed grew mixed vegetables, followed by half that grew berries and small fruits, and a third that produced value-added products, fruits, or meats (Figure 3). Most of the farms (89%) are diversified, producing more than one category of crop or product. Figure 3 shows the breakdown of agricultural categories produced by the farmers interviewed.



*Figure 3. Percentage of crops and products grown and produced by surveyed farmers.**

*Participants were allowed to provide more than one response. Percentages reflect multiple responses, totaling more than 100%.

Almost two thirds of the farmers (58%) had products available year-round, while about one third (32%) had products available 4-7 months a year, and the rest had them available 8-11 months a year. Of the farmers interviewed, the largest portion conducts most of their total sales through community supported agriculture (CSA) and/or via wholesale (Figure 4). For a definition of CSA, visit AFSIC (<https://www.nal.usda.gov/afsic/community-supported-agriculture>) [1].

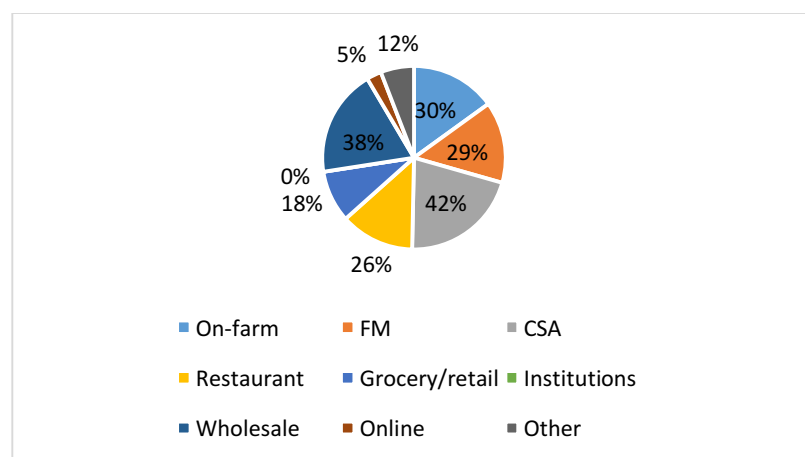


Figure 4. Percentage of outlets where participants sell the largest percentage of their crops and products.†*

*Participants were allowed to provide more than one response. Percentages reflect multiple responses, totaling more than 100%.

Food Hub Feasibility Assessment

In the food hub portion of the survey, 18 participants (95%) stated they are interested in increasing local sales through a food hub located in Salem, Oregon, while one participant was not interested because all the farm production is already sold to long-term wholesale customers. The potential food hub services that participants thought would more useful to their farm operation were prioritized as community education, value-added processing, and aggregation with other services depending on the respondents' interest (Table 1).

Table 1. Percentage of farmers that responded that the listed services would be helpful to their farm operation.

Service	Responded that it would be helpful
Aggregation	68%
Transportation	58%
Distribution	63%
Cold storage	58%
Freezer storage	26%
Dry product handling	21%
Light processing	26%
Direct sales	68%
Value added processing	74%
USDA meat processing	42%
Community education	84%
Marketing support	58%
Local label	53%
Organic certification assistance	37%
GAP/food safety certification assistance	47%

Three quarters of the participants said they had heard the term “food hub” prior to the survey, while the remaining quarter stated they had not. Over half of the farmers (58%) defined a food hub as a centralized location that would connect farmers to buyers. Also, almost half the participants (47%) agreed that, “A food hub is a business model that is needed in the Mid-Valley,” and that they couldn’t think of other business models that would be more beneficial for the region. Over one third (37%) of the participants responded that the food hub might be a good idea (many indicated they would like more information before committing to participating in a food hub), and 89% of the participants thought there could be “Potential barriers to selling products via a food hub.” The most common self-perceived barriers for selling at a food hub include lack of scale, price too low to justify sales, and lack of demand (Figure 5).

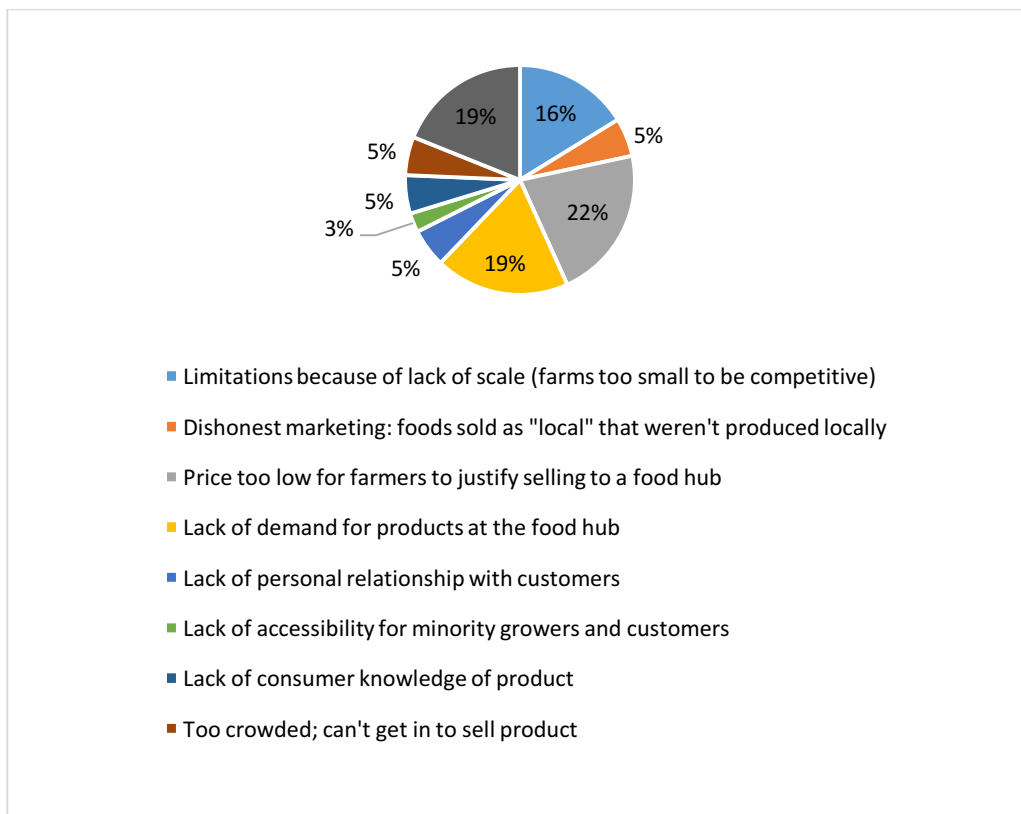


Figure 5. Percentage of participants who see various potential barriers to selling via a food hub.

More than half of participants (58%) said they would use the food hub at least once a week (drop product or use facilities such as a commercial kitchen), while another 16% said they would use it during a certain, limited time of the year when their product is available. Participants were asked what their price requirements would be to sell via a food hub, and over half (55%) said they would not go below their current lowest price. More than two-thirds of participants (68%) indicated that they are interested in participating in a yearly production planning meeting to decide who will grow what crops for the food hub, and 79% said they would participate in a follow-up meeting to discuss the food hub formation in more detail.

Extension Needs Assessment

Seventy-nine percent of participants said they had used information from OSU Extension to find solutions to their farming challenges. Farmers reported labor availability and financial issues as the most prevalent farm-related (Figure 6).

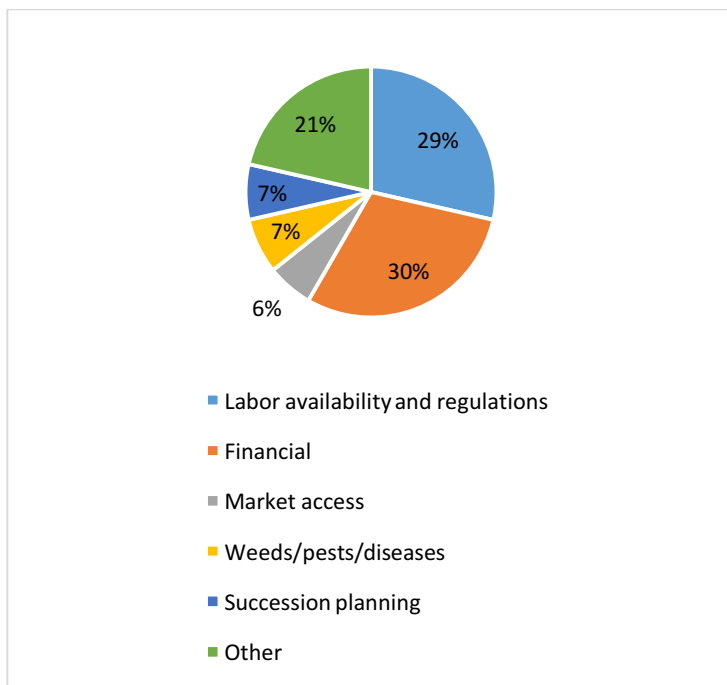


Figure 6. Percentages of the greatest farming challenges that participants encounter.

Participants were also asked what OSU Extension can do to further support their success farming and what ideas they have for new OSU Extension resources or programing. Participants suggested various research topics (30%) and new program and resource development (19%) as their top ideas. Programming and resource development on organic pest management (15%) and greenhouse production (12%) were mentioned by several participants as the primary topics that they would like to OSU Extension address in the future. There were other specific topics mentioned during the interviews, but these two were the only ones mentioned by more than one farmer. When asked what OSU Extension does to support them already that they would like to see more of, over a third of participants (35%) responded that they already feel well supported by OSU Extension, while 29% said they would like more support for organic production.

Discussion

Small Farm Characteristics in Oregon's Mid-Willamette Valley

Many of the farmers do not use all of their acreage for farming (either to produce, to grow a cover crop, as pasture, or as habitat for beneficial organisms), and some noted they could (or do) produce more product than they can sell, but they are limited by demand of their current market outlets. Introduction of a food hub market system may provide additional market outlets for these individuals, allowing them to expand their production acreage and increase profitability. Further work is needed to determine why producers are not using all of their land and if there are any resources or programs that Extension could provide to support farmers in this position.

Food Hub Feasibility

This paper reports analysis performed on quantitative data only. Additional qualitative data was collected and analyzed and will be presented in a separate publication. Participation in a food hub was of interest to all but one of the survey participants as a way that small farmers in the region could increase their local sales. While the farmers were interested in the food hub, some

also perceived that they would not be able to obtain the price they need for their products to maintain the viability of their business. Farmers commented that they had been part of efforts to establish community centers (commercial kitchens, food hubs) for agriculture in the past that had been unsuccessful and were therefore suspicious of the viability of this proposed food hub.

All of the farmers who produce meat commented that a USDA meat processing facility is at the top of their list for what a food hub could provide. There are currently very few USDA-certified meat processing facilities in Oregon that will work with small farmers, preventing those who run small-scale operations from maintaining and furthering their farm businesses. Development of a USDA meat processing facility was also listed as an area of interest for Salem-based market participants, as reported by the 2017 Salem Community Food Study. Currently, the closest processing facility is located in Mt. Angel, a town approximately 20 miles northeast of Salem. The facility is a small-scale business that does not have the capacity to serve all of the small farmers who would produce above the exemption level for meats if another facility was available.

Extension Needs Assessment

Participants provided a wide range of ideas for ways OSU Extension can continue to support them, as well as new ideas for programs and resources. However, to better understand what farmers in the Mid-Willamette Valley need from OSU Extension, further research must be conducted.

Conclusions

There is a robust population of successful small farmers in Oregon's Mid-Willamette Valley. This study showed the majority of the survey participants are interested in a food hub that would unite them with buyers, provide post-harvest or processing facilities, and educate the community about the benefits of buying local food. Farmers perceived that in order to participate in a food hub, they need to be assured that they will receive the price they need for their products, and that the food hub will provide additional benefits by housing essential infrastructure (e.g., distribution center, commercial kitchen, USDA meat processing facility, etc.).

OSU Extension is a well-known and frequently used resource for farmers in the Mid-Willamette Valley. Based on the needs assessment in this survey, a larger and more in-depth needs assessment needs to be conducted to determine specific needs of small farmers in the valley. The Mid-Valley Small Farms Program is currently developing such a survey that will be distributed online and in-person to as many small farmers as possible in the region with the goal of developing relevant extension programs and resources to benefit small farmers.

Acknowledgements

OSU's Mid-Valley Small Farms Team acknowledges Marion and Polk county Extension service districts and the city of Salem for funding. Kim Hanson and the University of Oregon also assisted with survey design.

References

- [1] AFSIC Staff. 2017. Community Supported Agriculture. USDA NAL.
<https://www.nal.usda.gov/afsic/community-supported-agriculture>

- [2] Altschuld, J.W., & Watkins, R. 2014. A primer on needs assessment: More than 40 years of research and practice. In J.W. Altschuld & R. Watkins (Eds.), *Needs assessment: Trends and a view toward the future*. New Directions for Evaluation, 144, 5–18.
- [3] Angima, S., Etuk, L., King, D. 2014. Using needs assessment as a tool to strengthen funding proposals. *Journal of Extension* [Online], 52(6) Article 6TOT1.
<https://www.joe.org/joe/2014december/tt1.php>
- [4] Cantrell, P., Heuer, B. 2014. Food hubs: Solving local. The Wallace Center at Winrock International. <http://ngfn.org/solvinglocal>
- [5] Fischer, M., Hamm, M., Mott, C.S., Pirog, R., Fisk, J., Farbmang, J., & Kiraly, S. 2013. Findings of the 2013 National Food Hub Survey. Michigan State University Center for Regional Food Systems & The Wallace Center at Winrock International.
<http://foodsystems.msu.edu/activities/food-hub-survey>
- [6] Lerman, T., Feenstra, G., & Visher, D. 2012. A practitioner's guide to resources and publications on food hubs and values-based supply chains: A literature review. UC Davis: Sustainable Agriculture Research and Education Program.
- [7] Losh, D. 2016. Oregon agriculture facts and figures. Salem, OR: Oregon Department of Agriculture.
- [8] Munden-Dixon, K., Furman, C., Gaskin, J., & Samples, K. 2015. Assisting small and mid-size farmers to increase their access to markets: A case study of an extension program to facilitate food hubs in Georgia. *Journal of Extension* [Online], 53(4) Article 4FEA4.
<https://joe.org/joe/2015august/a4.php>
- [9] Sorte, B., & Rahe, M. 2015. Oregon agriculture, food and fiber: An economic analysis. Corvallis, OR: Oregon State University.
- [10] Thilmany, D., Bond, C.A., & Bond, J.K. 2008. Going local: Exploring consumer behavior and motivations for direct food purchases. *American Journal of Agricultural Economics*, 90(5), 1303-1304.
- [11] United States Department of Agriculture, National Agricultural Statistics Service and Oregon Department of Agriculture. 2012. County summary highlights: 2012.

评估俄勒冈州威拉米特山谷中部 小农户对食物中转站的兴趣调查

Javier Fernandez-Salvador, 助理教授(实践); Erica Chernoh, 开放校园协调员;
Eliza Smith, 学生研究员, 俄勒冈州立大学推广服务

A Survey of Small Farmers to Assess Interest in a Food Hub in Oregon's Mid-Willamette Valley

Javier Fernandez-Salvador, Assistant Professor (Practice); Erica Chernoh,
Open Campus Coordinator; and Eliza Smith, Student Researcher
Oregon State University Extension Service

简介

俄勒冈州威拉米特山谷中部地区(Mid-Willamette Valley)的大多数农场面积不到 50 英亩, 但对于整个州的经济起着至关重要的作用。州政府所在地塞勒姆市(Salem)委托俄勒冈州立大学推广农场计划来调查小型农场, 评估他们对食物中转站(中心)的兴趣。该调查是从 2016 年秋季至 2017 年春季间进行的, 现场采访了来自威拉米特山谷中部地区的 19 名农民。调查的目的是收集一般农场信息(规模, 作物, 农产品营销和农业挑战);食物中心可行性的数据;并初步评估种植者对推广教育服务的需求。不同规模的农场种植了各种作物, 包括牲畜和农业增值产品。销售场所和营销策略也是多样化。种植者认为最大的农业挑战是劳动和财政。百分之九十五的种植者表示有兴趣通过参与该地区的食物中心来增加销售量。大多数农民对于提供社区教育, 向公众直接销售, 集合产品销售给大型买家和增值加工的食品中心, 很感兴趣。他们对潜在食品中心的主要担忧是, 价格太低而不现实, 对其产品可能缺乏需求, 而且因为农场规模小也会限制其他他们的参与。参与者提出了广泛的研究课题和兴趣, 以便将来推广教育的支持和扩展。这项研究的结果表明, 种植者之间的生产实践有着广泛的多样性。而且, 小农户对于支持威拉米特山谷中部地区的食物中心的小农户也非常感兴趣。

介绍

农业是俄勒冈州的重要产业, 是占全州销售额的 13.2% (500 亿美元) [9]。根据 2012 年人口普查数据, 俄勒冈州中部威拉米特山谷占有整个州大部分的农场, 马里恩 (Marion) 县有 2,567 个农场, 波尔克县 (Polk) 有 1,143 个农场和山丘县有 2,028 个农场 [11]。虽然大农场是国家经济的重要组成部分, 但小于 50 英亩的小农场占有俄勒冈州农场的 61.4% [7]。

近年来, 小农场正在推动当地的食物运转, 而且越来越受欢迎 [10]。然而, 由于规模较小, 小农户往往难以进入批发和零售市场。食品中心是销售当地农产品的可行选择 [6]。他们在大都市地区特别成功, 在这些地区, 它们是小农户出售或分销其产品的集中地点 [5]。美国农业部对粮食中心的定义是广泛的, 但是将所有区域粮食中心综合提供的关键服务作为分配和营销 (或这些活动的协调) 来确定 [5]。食物枢纽可能是小农的良好资源, 因为他们可以提供小农不能自己付出的重要时间和降低成本的服务 [5]。食品中心可以采用虚拟和/或实体形式, 从在线数据库到合作社或存储分发中心 [5]。食物中心还可以提供社区教育, 以便了解购买当地农民食品的价值, 以支持当地经济和保护农田 [4]。食物中心可以采取多种形

式;它们可以作为农民和企业(批发)或农民和消费者(零售)之间的中介。在美国经营的食物中心, 33%使用农民商业中介模式, 39%使用农民消费者中介模式, 其余 28%是两种模式之间的混合型[4]。调查民意是确定农民对潜在食物枢纽感兴趣的有用方法[8]。2016 年, 俄勒冈州塞勒姆市(Salem)与俄勒冈州立大学(OSU)扩建山谷中部小农场计划签约, 对威拉米特山谷地区(Willamettal Valley 包括 Marion, Polk 和 Yamhill 县)的小农场进行了需求评估调查, 衡量农民对替代营销路线的兴趣, 例如使用食物中心。调查中还包括 Clackamas, Benton 和 Linn 县, 因为它们与威拉米特山谷(Willamette Valley)交界, 并经常使用威拉米特山谷(Mid-Willamette Valley)中部地区的推广教育服务。

需求评估是农业推广工作中有用的工具, 用于确定当前情况和所需之间的差距[2]。需求评估过程有三个部分: 预评估, 评估和后评估[2]。预评估阶段包括收集有关类似项目的背景信息和次要数据, 以及确定具体项目的当前状况和所需。随后, 进行需求评估以收集数据, 以评估当前和期望情况之间的差距[2]。对于这种需求评估调查, 使用现场访谈和在线调查来收集主要的定性和定量方面的数据。

目标

调查的目的是: (1) 确定参与者的主要农场特征, (2) 评估农民的兴趣, 以及在俄勒冈州塞勒姆市(Salem)的食物中心提供的特征和服务, (3) 初步评估来自区域推广服务的种植者的需求, 以确定他们目前使用哪些资源和服务, 以及将来哪些资源和服务需要改进。

研究材料与方法

这项调查是在 2016 年 9 月至 2017 年 3 月期间进行的。从网络搜索和俄勒冈州立大学(OSU)推广教育联系人资料中来确定为被访谈的农民。进行了十八次现场采访, 一次电话采访, 总共进行了 19 次采访。图 1 显示了威拉米特中部地区的研究访问地点以及建议食物的中心站点。对所有采访使用同一访问者来确保数据收集的一致性。面试问题分为三个部分: 一般农场信息, 对潜在食物中心的兴趣, 以及从网络搜索和俄勒冈州立大学(OSU)推广服务需求做初步评估。收集的定量数据包括农场定位, 农耕地, 总耕地面积, 农作物/农产品销售, 产品供应量, 大概总销售额和销售点。收集的定性数据包括增加本地销售的兴趣, 对食品中心将应包括的内容, 农耕挑战, 农民希望推广教育能提供的资源(在线资源, 研讨会, 课程等)以及新计划的想法。

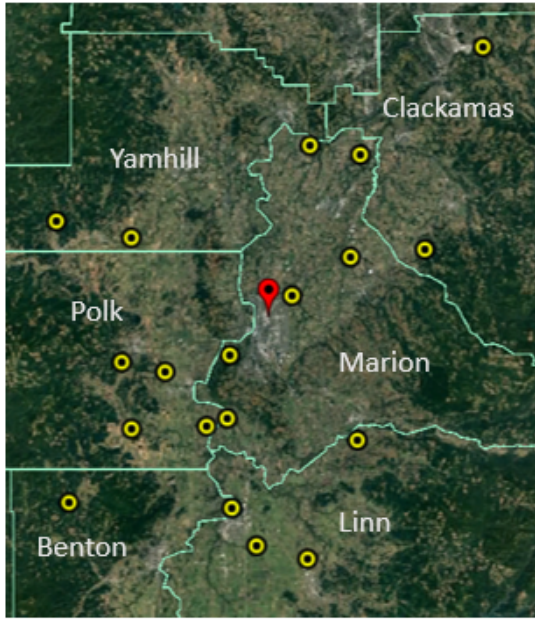


图 1. 位于俄勒冈州威拉米特山谷(mid-Willamette Valley)中部地区的农场地地点(圈子)参与面试和建议食物中心站点(定位于塞勒姆市)。

结果

一般农场信息

在俄勒冈州的威拉米特山谷中部地区的六个县进行了访谈, 其中大多数在马里恩 (Marion) 和波尔克 (Polk) 县 (58%)。接受采访的农民中有一半以上 (60%) 从 4-10 年种植经验, 其次是农民有 20 多年经验 (27%)。超过三分之一的受访者拥有或租用超过 100 英亩的农田, 而四分之一自有或租赁在 30 至 50 英亩之间 (图 2)。当被问及他们的总面积多少时, 三分之一 (33%) 养殖了 5.1-15 英亩, 27% 表示他们种植 30-50 英亩。大约四分之三 (74%) 的农民种植面积尚未生产, 三分之一左右 (37%) 的农民种植面积不到生产总面积的一半。

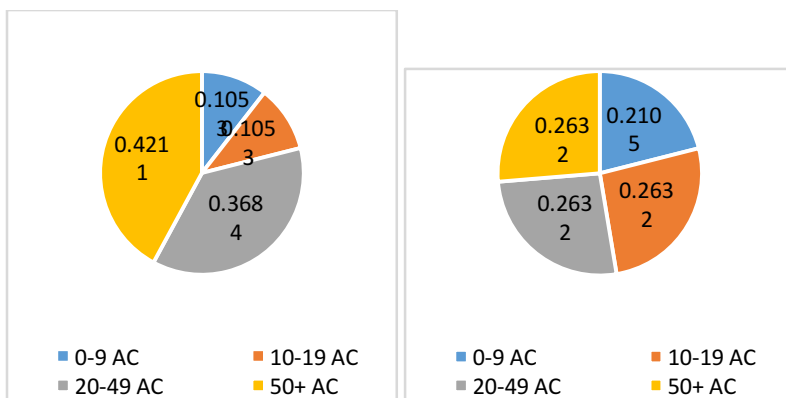


图 2. 小农户面积(左)农田总和面积(右)种植面积的的百分比。

接受采访的四分之三的农民种植了混合蔬菜, 另一半是种植了浆果和小果实, 三分之一生产增值产品, 水果或肉类 (图 3)。大多数农场 (89%) 是多样化, 生产多于一类的作物或产品。图 3 显示了受访农民生产的农业类别分解。

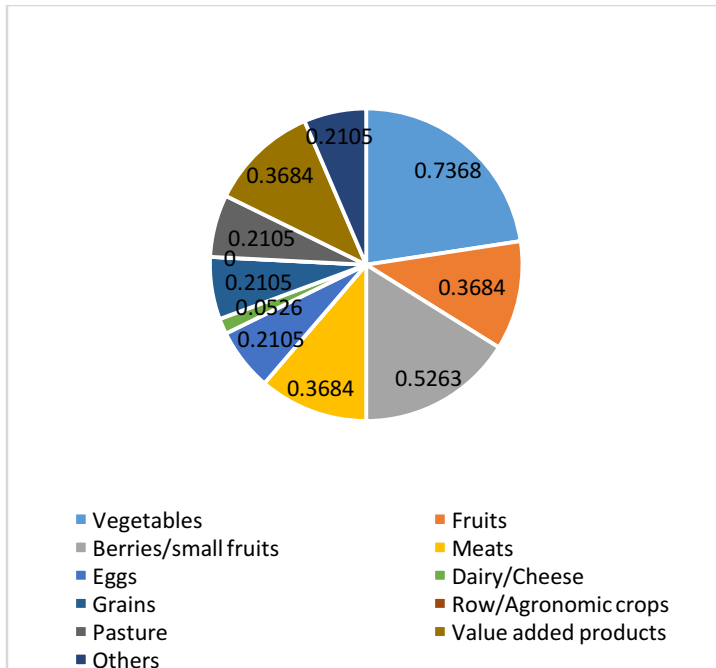


图 3. 受调查农民种植和生产的作物和产品的百分比*

*允许参与者提供多个响应。百分比反映了多个响应, 总计超过 100%。

近三分之二的农民(58%)供应全年销售产品, 而三分之一(32%)的农产品每年只有 4-7 个月的产品销售, 其余的产品每年可用 8-11 个月的供应。在接受采访的农民中, 最大的部分通过社区支持农业(CSA)和/或通过批发(图 4)进行了大部分的销售。有关 CSA 的定义, 请访问 AFSIC (<https://www.nal.usda.gov/afsic/community-supported-agriculture>)[1]。

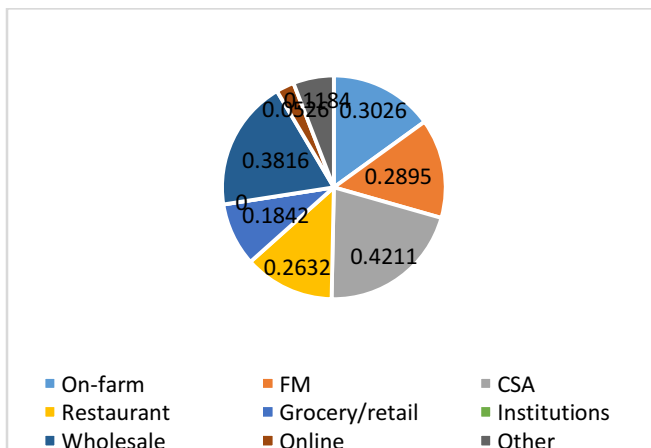


图 4. 参与者出售作物和产品销售最大百分比*†

*允许参与者提供多个响应。百分比反映了多类回应, 总计超过 100%。

食物枢纽可行性评估

在调查的食物中心部分, 有 18 名参与者(95%)表示有兴趣通过位于俄勒冈州塞勒姆的食物中心提高本地销售, 而一位参与者并不感兴趣, 因为所有的农场生产已经被卖给长期, 长期批发客户。参与者认为对其农场运营更有用的潜在的食物中心服务被优先考虑为社区教育, 增值处理和根据受访者的兴趣与其他服务的汇总(表 1)。

表 1. 答复上市服务对农场经营有帮助的农民百分比。

Service 服务	Responded that it would be helpful
Aggregation 聚合	68%
Transportation 运输	58%
Distribution 分配	63%
Cold storage 冷库	58%
Freezer storage 冰库	26%
Dry product handling 干燥产品处理	21%
Light processing 光处理	26%
Direct sales 直销	68%
Value added processing 增值加工	74%
USDA meat processing USDA 肉类加工	42%
Community education 社区教育	84%
Marketing support 营销支持	58%
Local label 本地标签	53%
Organic certification assistance 有机认证协助	37%
GAP/food safety certification assistance GAP /食品安全认证协助	47%

四分之三的参与者表示, 他们在调查之前曾听过“食物枢纽”一词, 而其余的季度则表示没有。一半以上的农民(58%)将食物枢纽定义为将农民与买家联系起来的集中地点。此外, 近一半的参与者(47%)同意“食品中心是中谷需要的商业模式”, 他们无法想到其他对该地区更有利的商业模式。超过三分之一(37%)的参与者回答说, 食物中心可能是一个好主意(许多人表示他们希望在参与食物中心之前想要更多的信息), 89%的参与者认为可能会有“潜在的通过食品中心销售产品的障碍”。在食品中心销售最常见的自我发现的障碍包括规模不足, 价格太低, 无法证明销售, 缺乏需求(图 5)。

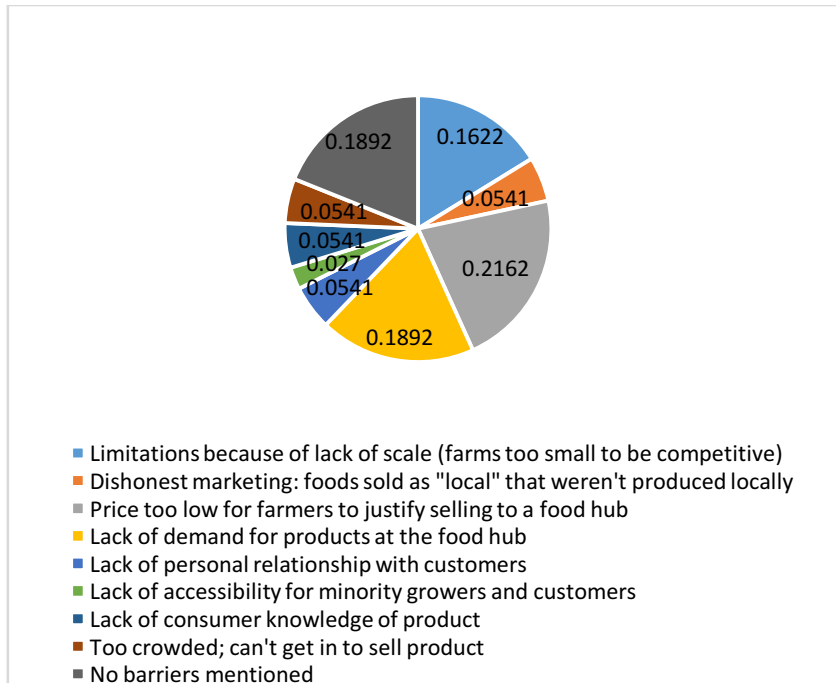


图 5. 看到通过食物中心销售的各种潜在障碍的参与者的百分比。

超过一半的参与者(58%)表示他们每星期至少使用食物中心一次(放下产品或使用商业厨房等设施), 另有 16% 的受访者表示将在一定时间内使用食物中心他们的产品可用的一年。有与会者被问及通过食物中心销售的价格要求, 超过一半(55%)表示不会低于目前的最低价格。超过三分之二的参与者(68%)表示有兴趣参加年度生产计划会议, 以决定谁将为食物中心种植哪些作物, 79% 的受访者表示将参加后续会议更详细地讨论食物枢纽形成。

扩展需求评估

79% 的参与者表示, 他们已经使用俄勒冈州立大学(OSU)扩展的信息来寻找解决农业挑战的方法。农民将劳动力可用性和财务问题列为农场最普遍的(图 6)。

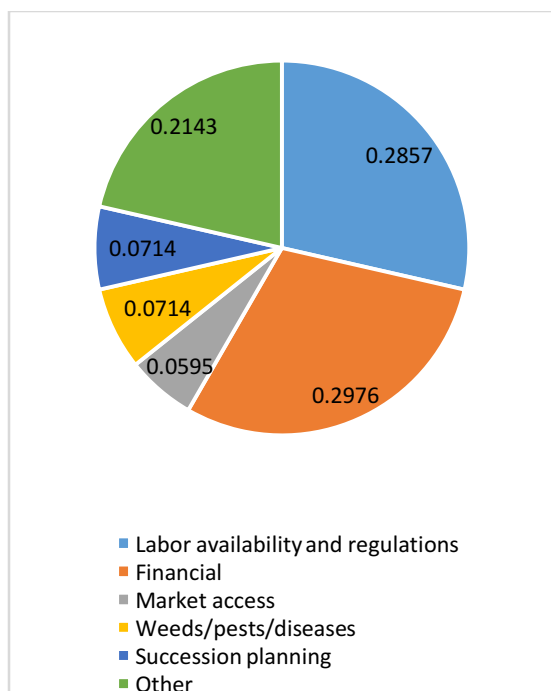


图 6. 参与者遇到的最大的农业挑战的百分比。

还有与会者也被问及俄勒冈州立大学(OSU)推广服务可以做些什么来进一步支持他们的成功农业, 以及他们对新的俄勒冈州立大学(OSU)推广服务资源或编程有什么想法。参与者提出了各种研究课题(30%)和新的方案和资源开发(19%)作为其主要思想。有机虫害管理(15%)和温室生产(12%)的编制和资源开发由几位参与者提及, 作为其未来俄勒冈州立大学(OSU)推广服务必须专注的主要议题。访谈中还有其他具体的话题, 但这两个是唯一有一个农民提到的话题。当被问及俄勒冈州立大学(OSU)推广服务部门是否支持他们, 他们希望看到更多的参与者时, 有三分之一以上的参与者(35%)回应说已经得到了俄勒冈州立大学(OSU)推广服务的支持, 而有 29%的受访者表示希望更多地支持有机生产。

讨论

俄勒冈州中部威拉米特山谷中部地区的小农场特征

许多农民不使用他们所有的种植面积(生产, 种植覆盖作物, 作为牧场, 或作为有益生物的栖息地), 有人指出他们可以(或做)生产更多的产品销售, 但是受到目前市场网点的需求的限制。推出食品中心市场体系可为这些个人提供额外的市场渠道, 使他们能够扩大生产面积并提高盈利能力。需要进一步的工作来确定生产者为什么不使用他们所有的土地, 以及推广服务是否可以提供支持这一职位的农民的资源或方案。

食物中转站的可行性

本文仅对定量数据进行了分析。收集和分析了额外的定性数据, 并将在单独的出版物中提出。除了其中一名调查对象外, 参与食物中转站的活动都是有兴趣的, 因为该地区的小农可以增加本地销售量。虽然农民对食物中心感兴趣, 但也有人认为, 他们无法获得他们的产品所需的价格来维持其生意。农民认为, 过去曾经成功建立农业社区中心(商业厨房, 食物中转站)已经不成功, 因此怀疑这个拟议的食物中转站的可行性。

所有生产肉类的农民都认为,美国农业部肉类加工设施位于食品中心可以提供的列表之上。美国农业部认证的肉类加工设备目前在俄勒冈州很少,将与小农一起工作,防止那些经营小规模经营的人员维持和提高农场生意。据报道,2017年萨勒姆社区食品研究报告显示,美国农业部肉类加工设施的开发也被列为塞勒姆市场参与者的一个兴趣领域。目前,最近的加工厂位于山天使,塞勒姆东北约20英里的城镇。该设施是一个小型企业,如果有其他设施,则无法为所有生产超过肉类豁免水平的小农户提供服务。

扩展需求评估

参与者为OSU推广服务可以继续支持他们提供了广泛的想法,并为计划和资源提供了新的想法。然而,为了更好地了解俄勒冈州立大学延伸中的威拉米特中部的农民需要进一步的研究

结论

在俄勒冈州的威拉米特山谷中部地区,成功的小农户人数众多。这项研究显示,大多数调查参与者对一个食物中心感兴趣,他们将与买家团结,提供收获后或加工设施,并教会社区了解购买当地食物的好处。农民认为,为了参与食品中心,他们需要放心,他们将获得他们所需要的产品的价格,食品中心将通过住房基础设施来提供额外的收益(如分发中心,商业厨房,USDA肉类加工设备等)。

俄勒冈州立大学(OSU)推广服务部是威拉米特山谷中部地区(Mid-Willamette Valley)农民的知名和经常使用的资源。根据本次调查的需求评估,需要进行更大,更深入的需求评估,以确定山区小农的具体需求。中谷小农场计划目前正在开展这样一项调查工作,将在该地区尽可能多地向在线和亲自派发的小农户进行调查,目的是制定相关的推广计划和资源,以惠及小农。

致谢

俄勒冈州立大学(OSU)的山谷中部地区小农场小组感谢:马里恩(Marion)和波尔克(Polk)县推广务区;塞勒姆市的资助;以及金汉森(Kim Hanson)和俄勒冈大学调查设计的协助。

参考 References

- [1] AFSIC Staff. 2017. Community Supported Agriculture. USDA NAL. <https://www.nal.usda.gov/afsic/community-supported-agriculture>
- [2] Altschuld, J.W., & Watkins, R. 2014. A primer on needs assessment: More than 40 years of research and practice. In J.W. Altschuld & R. Watkins (Eds.), Needs assessment: Trends and a view toward the future. New Directions for Evaluation, 144, 5–18.
- [3] Angima, S., Etuk, L., King, D. 2014. Using needs assessment as a tool to strengthen funding proposals. Journal of Extension [Online], 52(6) Article 6TOT1. <https://www.joe.org/joe/2014december/tt1.php>
- [4] Cantrell, P., Heuer, B. 2014. Food hubs: Solving local. The Wallace Center at Winrock International. <http://ngfn.org/solvinglocal>
- [5] Fischer, M., Hamm, M., Mott, C.S., Pirog, R., Fisk, J., Farbman, J., & Kiraly, S. 2013. Findings of the 2013 National Food Hub Survey. Michigan State University Center for Regional Food Systems & The Wallace Center at Winrock International. <http://foodsystems.msu.edu/activities/food-hub-survey>
- [6] Lerman, T., Feenstra, G., & Visser, D. 2012. A practitioner's guide to resources and publications on food hubs and values-based supply chains: A literature review. UC Davis: Sustainable Agriculture Research and Education Program.
- [7] Losh, D. 2016. Oregon agriculture facts and figures. Salem, OR: Oregon Department of Agriculture.
- [8] Munden-Dixon, K., Furman, C., Gaskin, J., & Samples, K. 2015. Assisting small and mid-size farmers to increase their access to markets: A case study of an extension program to facilitate food hubs in Georgia. Journal of Extension [Online], 53(4) Article 4FEA4. <https://joe.org/joe/2015august/a4.php>
- [9] Sorte, B., & Rahe, M. 2015. Oregon agriculture, food and fiber: An economic analysis. Corvallis, OR: Oregon State University.
- [10] Thilmany, D., Bond, C.A., & Bond, J.K. 2008. Going local: Exploring consumer behavior and motivations for direct food purchases. American Journal of Agricultural Economics, 90(5), 1303-1304.
- [11] United States Department of Agriculture, National Agricultural Statistics Service and Oregon Department of Agriculture. 2012. County summary highlights: 2012.

Livestock Handling: How Little Changes Can Have Great Rewards

Chris Schachtschneider, Assistant Professor (Practice)
Oregon State University Extension Service

Abstract

The practice of herding livestock must be nearly as old as the history of domesticated cattle. In the cultures that practice livestock herding in North America, there have been people who were good at handling livestock and others who were almost magical in their ability to move and place livestock. In accounts of the great cattle drives from Texas to the northern states, some handlers could create scenarios where the cattle chose to do what the handlers wanted rather than being driven and forced. These reports further mention how easy those herds were to handle on the long drives [1]. Although these handling methods were highly effective, they never became dominant in our teachings of livestock handling. With each passing generation, there are some who possess these skills, who are believed to almost have a supernatural ability that is out of reach of the “common man.” Bud Williams was one of these gifted handlers who spent his life educating others.

Background

The Bud Williams style of stockmanship is based on his observations of cattle and other livestock while trying different handling methods and fine-tuning those the livestock best responded to [2]. The results are a set of basic handling concepts which are claimed to increase productivity, reduce sickness, and create remarkable control over a cow herd [3, 4]. Steve Cote, livestock handling expert and Bud Williams follower, has spent the last 20 years perfecting Bud’s teachings. Cote states that a handler following these methods will be able to place cattle at a specific location in the pasture, and the cattle will remain in that area for days, in that spot, as long as there is adequate feed [5, 6]. These properly-placed animals will reportedly travel down into the riparian area to drink, then return back to the placed location with the rest of the herd. Bud and Steve have also been able to load livestock into trailers without the use of corrals or panels. It appears that when these concepts are properly applied, the handling possibilities are endless [7].

Activities

The Bud Williams method follows eight basic principles:

1. Problems with handling arise from human errors, not the animal(s)
2. Strive for willing submission, not force
3. Animals want to see what is pressuring them
4. Emphasis on the release of, rather than the application of pressure
5. Move in straight lines, perpendicular to desired direction
6. Move with the animals’ direction of travel to slow or stop them and against to start or speed them up
7. Think of herd movement like the wheels of a car
8. Focus on the herd as a whole instead of on individual animals.

Let’s take a look at each of these principles in more detail.

1. Problems with handling arise from human errors, not the animal

To truly unlock the power and functionality of proper livestock handling, we need to accept that when things go wrong, it is ultimately our fault. Once we accept this, we can focus on what went wrong, correct the problem, and continue to perfect these techniques. Livestock will always respond to pressure and handling in the same manner; therefore, they are an excellent teacher when we are willing to listen. When things go wrong, rather than using force to get the job done, step back, take a deep breath, and look inward to identify what we are doing to cause the undesirable behavior [8].

2. Willing submission vs. force

Livestock respond to handling pressure better when it is their idea to do what is asked of them. Many times when working livestock, handlers try to make the animals do what the handler wants, which becomes force. Force is any pressure that is applied to livestock after they have decided not to do what is asked. This kind of pressure increases anxiety and resistance in the animal and usually, the animal's focus turns to ways to escape the pressure rather than looking to the handler for direction. All livestock accept pressure differently, so there is not a position, speed, or distance that will generate a uniform response by all animals. Only the animal(s) can identify when the handler is using force; therefore, observation of how the livestock are responding to handling techniques is paramount. Handlers need to watch for signs of stress (vocalization, elevated head, excessive swishing of tail, increased speed, quitting the herd, breaking back, etc.) to assess whether the handler is asking the animal or forcing the situation. If stress is noticed in the herd, handlers should stop and evaluate what is causing the stress (refer to principle 1) and adjust as needed.

There are times when handlers can do everything right, but the livestock are not ready for what is being asked. When this happens, there are two options for the handler. The first option is to go around and try again, until the livestock are ready. This works well when loading into a trailer or going into a chute or gate. These activities create pressure, and it can take time for the livestock to be comfortable enough to do what is asked. In between each try, handlers should continue to fine tune their handle on the animals without the extra pressure. This can be done with more basic maneuvers like starting, stopping, and turning. If an animal is determined to go a specific direction which is not where the handler wants, then quiet persistence is needed. With quiet persistence, the handler is a constant presence with the animal until they are ready to listen to the handler. Following behind (see principle 3) without driving works well on animals that are determined to go in a specific direction. Eventually, they will want to turn and face the handler and can then be guided back to the desired location.

The other way a handler can use quiet persistence is to be in the way of the animal's desired direction such as when sorting an individual from a herd. With this, the handler is not trying to drive the animal away, but rather block the animal without forcing a change in direction. If the handler is persistent, animals will eventually decide that trying to go around the handler is not a viable option and will seek a new direction. Again, this should always be done without force, so the handler should keep enough distance from the target animal so that it does not show signs of stress.

3. Animals want to see what is pressuring them

As prey animals, livestock want to know where pressure is coming from and where it is going [5, 9]. This is a problem if we consistently work directly behind them (Figure 1). The two most common symptoms of animals not being able to see the handler are turning around and breaking back, both of which can greatly reduce the efficiency of moving livestock. Always be aware of this when working behind livestock. Williams and Cote recommend working in a zig-zag pattern to help mitigate this issue (Figure 1). For animals that are not focused on the handler, following behind can become a great tool to bring that attention back to the handler [5].

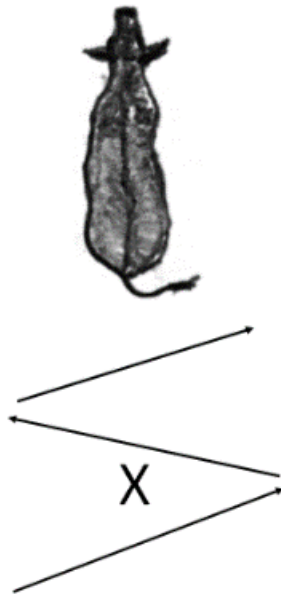


Figure 1. Do not work directly behind a single animal for too long. Zig zags are better.

4. Emphasis on the release, rather than the application of pressure

Animals learn from the release of pressure, rather than its application. With proper release, livestock can be trained to understand what specific pressure means and what they need to do to remove that pressure. If a handler pressures a cow on the shoulder then stops or steps back when the cow moves forward and away, that cow was just taught that pressure has a release when she moves properly. This can be built upon to continue to teach that cow—and the whole herd—to move forward with “good movement” (movement which continues after pressure is removed and causes others to join and follow), turn with precision, and stop to be placed. Success is seen as the animal/herd choosing to remove that pressure themselves, making it *their* idea to move in your desired direction. In less successful animal handling, people tend to keep movement going using constant pressure. In this situation, animals can never find a release and start leaving the herd in search of a place without pressure. This behavior is generally met with increased pressure to force them back into the herd, compounding the issue as more and more animals feel uncomfortable with the constant pressure and try to leave. This pressure is not due strictly to handler location but can include arm waving and shouting. Williams’ rule is hands in pockets (to start) with your mouth shut, to keep pressure at a minimum and coming only from handler position.

5. Move in straight lines and perpendicular to the desired direction

Livestock are instinctively aware and cautious of predators and the way predators circle prey. Circles also make it more difficult for an animal to understand exactly what you are doing. Working in straight lines is not predator behavior and will instantly remove some stress and worry from livestock [2, 5, 8]. Straight lines are predictable; therefore, livestock will know exactly where you are heading and can plan their movements accordingly. As the handler starts working in straight lines, animals will naturally move perpendicular away from that pressure. This makes direction easy to control. All the handler needs to do is work perpendicular to the desired direction and livestock will want to go there. This again will be their idea because the handler hasn't told the animals what to do, the livestock choose to move away in a predictable manner. When assessing this principle, draw a "T" from the desired direction and make your straight lines accordingly (Figure 2). When driving animals, modify this principle and work in a zig-zag pattern to keep up with the herd's progress. The movement of the handler is walking toward the tailheads of the animals from the side. Williams tries to pick a spot at the opposite end of the herd so that when he gets there, the last cow on that side will be a foot or so ahead of him.

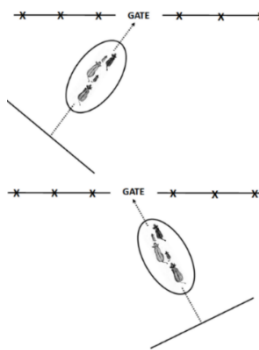


Figure 2. To determine the line in which a handler should work, draw a "T" from the desired direction and work the line. Adjust this T as needed to achieve the wanted direction.

6. Move with the animals' direction of travel to slow or stop them and against to start or speed them up

This principle is exceptionally useful when handling stock in chutes or when placing livestock. When working animals in a chute, we have a natural tendency to get behind the animal and drive them into the race and chute. However, walking past the animals from head to tail creates the same movement into the chute without the shouting and banging that often results from a resistant animal [2, 5, 10]. Working the opposite direction, tail to head, will slow movement until you reach their head in which case they will stop and look at the handler [2]. This is effective when placing livestock on range and you reach the desired location.

7. Think of herd movement like the wheels of a car

When a herd is lined out and needs to turn, common theory is that handlers need to push the leaders over in the desired direction. However, there are many different ways that changes in direction can be achieved from multiple locations around a cow herd. When a cow herd is moving, imagine that each corner is effectively one wheel of a car [11]. When going straight, each wheel moves at exactly the same speed, but when turning, these speeds alter. When driving livestock from behind, and the herd needs to move to the right, the right side of the herd needs to slow down and the left side needs to speed up in order to execute a smooth turn (Figure 3). To

accomplish this when driving from behind, handlers on the right need to reduce pressure (possibly backing up) and the handlers on the left need to increase their pressure slightly. In this scenario, the handlers also utilize principle 5 by causing a change in the livestock's direction of movement that becomes perpendicular to the new line formed by the handlers (Figure 2). A single handler can apply pressure on the lead animals when working behind by moving straight out and away from the herd (Figure 4). Although they can be a great distance away, this new handler position will influence the leaders and cause a change in direction. When driving livestock, it is very difficult to move from the back to the front without causing changes in direction, so applying this principle is the most effective way to achieve direction changes from behind.

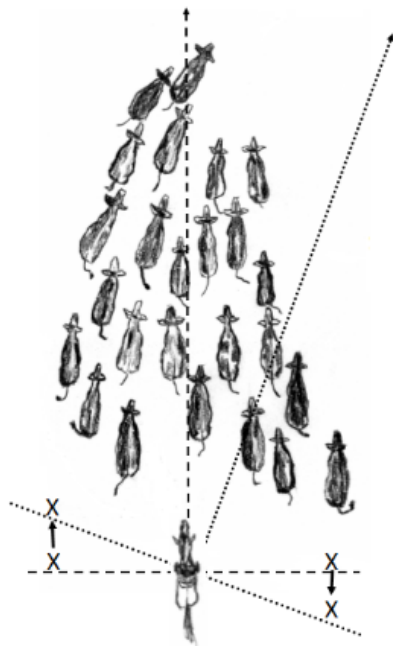


Figure 3. To change direction when driving livestock, rather than moving up to the front to push the leaders, a simple change in position can accomplish the same thing by applying these principles. The X's represent the handlers who need to change position (arrows).



Figure 4. Turning livestock from the back can be achieved by moving straight out the opposite of the desired direction.

8. Focus on the herd as a whole instead of on individual animals

Livestock traveling in a herd naturally have “good movement,” which will attract other animals to follow and join [2, 5, 11]. Don't sacrifice good movement and direction to pick up a few animals on the fringe. These animals will more than likely be attracted to the moving herd and follow right along if given the opportunity. Base your position on the needs of the herd as a whole, and try not to focus on individuals. Many who find that one animal out of line will often change the herd direction for the worse because they forgot to consider what their position is doing to the whole herd.

Wade Black, the equine instructor at Treasure Valley Community College in Ontario, Oregon, teaches his students about the art and science of horse training. He teaches that a person can have all of the science of horse training memorized, yet still be ineffective in application by not practicing and perfecting the art. These principles are the basic “science” of low-stress livestock handling, but the art comes with practice and special dedication to principle 1, so get out there and practice. Your animals will be the perfect teacher, if you are willing to listen to them.

References

- [1] Hibbard, W. 2015. Cattle handling in early north America: An historical analysis. *Stock Journal*, 4(2), 19-53.
- [2] Hibbard, W. 2012. Bud William’s low-stress livestock handling. *Stock Journal*, 1(1), 1-159.
- [3] Njisane, Y.Z. and Muchenje, V. 2017. Farm to abattoir conditions, animal factors and their subsequent effects on cattle behavioural responses and beef quality - A review. *Asian-Australasian J. Anim. Sci.*, 30(6), 755-764.
- [4] Breuer, K., Hemsworth, J., Barnett, L., Matthews, and Coleman, G. 2000. Behavioural response to humans and the productivity of commercial dairy cows. *Appl. Anim. Behav. Sci.*, 66(4), 273-288.
- [5] Cote, S. 2004. Stockmanship: A powerful tool for grazing lands management.
- [6] Cote, S. 2013. On placing cattle. *Stock Journal*, 2(1), 13-21.
- [7] Hibbard, W. 2012. The case for low-stress livestock handling. *Stock Journal*, 1(2), 1-9.
- [8] Hibbard, W. 2016. Foundation of low-stress livestock handling. *Stock Journal*, 5(1), 11-20.
- [9] Ham, J. 2016. Cattle handling made simple. *Stock Journal*, 5(2) 47-56.
- [10] Grandin, T. 1989. Behavioral principles of livestock handling. *Prof. Anim. Sci.*, 5, 1-11.
- [11] Williams, E. 2013. Bud Williams stockmanship.

Note: Images for the figures in this paper were generated from the book *Stockmanship: A Powerful Tool for Grazing Lands Management* [5].

家畜处理:少改变能有大收益

Chris Schachtschneider, 助理教授(实践)
俄勒冈州立大学推广服务

Livestock Handling: How Little Changes Can Have Great Rewards

Chris Schachtschneider, Assistant Professor (Practice)
Oregon State University Extension Service

简介

养殖牲畜的做法几乎与养牛的历史一样古老。在北美畜牧业养殖的文化中,一直善于处理牲畜的人就如几乎具有魔法能力来移动和放置牲畜的人。在德克萨斯州的牛群往北部大迁移的驱动下,一些业者可创造出一种场景,让那里的牛群自行选择前进,而不是被驱动和强制的。这些报告进一步提到了如何处理这些放牧的长途跋涉[1]。虽然这些处理方法非常有效,但在我们的家畜处理教训中,它们从未成为主流。随着每一代人的迁移,有些人拥有这些技能,这些几乎拥有超常能力的人,已经超出了“普通人”的能力范围。布威·威廉姆斯(Bud Williams)是有天赋的牲畜处理者之一,他花了他的生命来教育别人。

背景

Bud Williams 的处理风格是基于他对牛和其他牲畜的观察,同时尝试不同的处理方法和微调以最适合方式来处理家畜[2]。结果就产生了一组基本的处理概念,被声称提高生产力,减少疾病,并创造出对牛群出色的控制[3, 4]。家畜处理专家史蒂夫·科特(Steve Cote),布德威廉姆斯(Bud Williams)的追随者们,已经在过去 20 年中完善了 Bud 的教诲。科特指出,遵循这些方法的处理人员将能够将牛放在牧场的某个特定地点,只要有足够的饲料,牛就会在那个地方留下几天。据报道,这些适当放置的动物将进入河岸地区饮用,然后与其他群体一起回到放置的地点。Bud 和 Steve 也能够将牲畜装载到拖车中,而不使用畜栏或隔板。看来当这些概念得到适当应用时,适当处理的可能性是无止境的[7]。

活动

Bud Williams 方法遵循八项基本原则:

1. 处理有问题是源于人为错误,而非动物之错
2. 争取自愿遵循,而不是强制执行
3. 动物想知道是什么给他施以压力
4. 强调压力释放而不是使用压力
5. 沿直线移动,并垂直于所前往的方向
6. 与动物的行进方向一起移动来缓慢或停止进行,不要要求启动或加速
7. 放牧应像汽车轮子一般的运转
8. 放牧应专注于整体行动而不是针对个体动物。

让我们更详细地看看这些原则。

1. 处理问题是人为错误而非动物造成的

要真正解开适当牲畜处理的力量和功能,当事情出错时我们需要接受,最终都是我们的错。一旦我们接受这一点,就可以专注于出问题的原因,去纠正错误,并继续完善这些技术。家

畜总是以同样的方式应对压力和做出相同的反应;因此,当我们愿意听时,动物是一个优秀的老师。当事情出错时,不要用武力来处理,要退一步,深吸一口气,向内观看,以确定我们正在做错什么而来引起不良的行为[8]。

2. 愿意遵循与强制

当家畜明白他们需要做什么的时候,他们会更好地来应对压力。很多时候,当处理牲畜时,处理者试图让动物做到处理者想要的东西,这就变成了强制性的压力。强制力量是在牲畜决定不想做所要求的事情之后而感受到的压力。这种压力增加了动物的焦虑和抵抗力,通常,动物倾向于用逃避压力的方式来对待,而不是去向处理者寻求解决问题的方式。所有牲畜都有不同的方式来应对压力,在不定的时空和速度下,所有动物在面对压力时的反应有所不同。只有动物才会识别处理程序在何时使用的动作是强制行为;因此,能够观察到牲畜的反应是至关重要的。处理者需要注意到有遭受压力的迹象(鸣声,举头,尾巴过度摆动,加速度提高,离群,等等),以这些现象来评估处理者是否在引导动物或在强迫他们。如果处理人员注意到畜群在受压力中,就应该停止行动去寻找造成压力的原因(参考原则 1),并根据情况进行需要的调整。

有时候,处理人员所做的一切均属正常,但牲畜还没有准备好去做被要求的事情。当这种情况发生时,处理人员有两个选项。第一个选择是从头开始再试一次,直到牲畜准备好了。这种方式适当用于装载到拖车或进入滑道或门栏时。这些举措会造成压力,牲畜需要足够的时间来做被要求的动作。在重复尝试之间,处理人员应该继续微调他们对动物要求的处理,而不会产生额外的压力。这些都可以通过更多的基本操作来完成,如启动,停止和转弯。如果一个动物决定走一个不是想要的方向,那么处理人员需要镇定地去坚持。在处理人员安静而镇定的持续要求下,动物会采取配合。用跟尾队型(参见原则 3)而非被规定前行,对那些要自行朝着特定方向行动的动物而言更为恰当。到最后,他们会转过头来面对处理人员,最终可以被引导回到所指定的方向。

处理人员可以使用平静而持续的一种方式阻碍动物想要去的方向,例如有个体从群体中分离开时。这样,处理人员不是试图驱赶动物,而是阻止动物而不被强制来改变方向。如果处理人员坚持这个举动,动物最终会知道想试图绕行而过是不可行的,所以会将寻求去走新的方向。再次强调,这些行动应该在没有施加的情况下完成,所以处理人员应该与所针对的动物保持足够的距离,使其不会产生有压力的感觉。

3. 动物想知道压力来自何处

就如捕食动物一样,牲畜想知道压力来自何处,而又往哪里去[5, 9]。如果我们一直是后知后觉,这将会成为一个问题(图 1)。动物当无法看到处理人员的时候,两个最常见的症状会出现,他们可能转身回头,也可能脱离队伍,两种情况都可以大大降低牲畜的移动效率。在家畜背后工作时,必须始终意识到这一点。威廉姆斯和科特推荐以锯齿(Z)形示图案,来帮助缓解这个问题(图 1)。对于没有专注于处理人员的动物,尾随的动作可以成为提高到处理人员注意力的一个很好工具[5]。

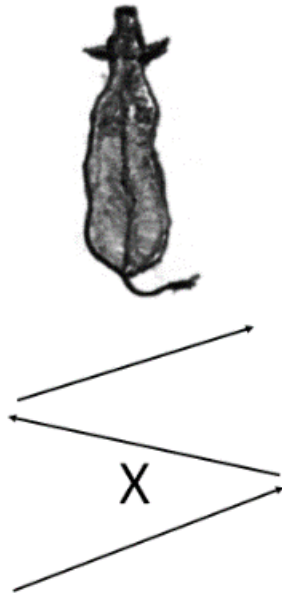


图 1. 不要直接在单一动物身后工作太久。用锯齿形 (Z) 移动会更好。

4. 强调释放压力, 而不是施加压力

动物可以从释放压力中学习, 采用施加压力是行不通的。通过适当压力释放, 可以训练牲畜了解具体的压力是什么, 以及他们需要做什么来消除这种压力。如果一个处理人员一头牛在肩膀上施加压力的使其向前移动时停止或退后, 那只母牛刚刚被教导, 当她正确地移动时跟随就是因为有压力的释放。这可以建立在继续教导牛和整个牛群向前移动“良好运动”(压力消除后继续运动, 导致其他牛群加入跟随), 来精确转动, 消除停置。成功地往正确方向移动, 令动物/群体感觉是他们选择的结果, 进而达成消除压力的效果。在较不为成功的动物处理中, 往往是因为人们持续地施加压力的结果。在这种情况下, 动物永远不会找到释放, 并开始离开牧群寻找一个没有压力的地方。这种行为通常会觉得压力不断地在加大, 迫使他们重新进入牛群, 随着越来越多的动物感到不舒服, 试图离开, 造成复杂的问题。这种压力的由来不仅仅限于处理器人员所处的位置, 并包括他的挥手动作和叫喊声。威廉姆斯的规则是处理人员应该把手放在口袋中(开始时), 然后闭上嘴巴, 以保持最低限度的压力。

5. 以直线向目标方向垂直移动

牲畜本能地意识到并且谨慎捕食者的行为和对猎物绕圈的方式。绕圈子会使得动物更难以了解你所要做的事情。直线前进不是捕食者的行为, 并会立即消除家畜的一些压力和忧虑 [2, 5, 8]。直线是可预测的; 因此, 牲畜将确切地知道你正在哪里, 并可以相应地规划他们的动作。当处理者开始直线工作时, 动物将自然地垂直离开该压力。这使得方向易于控制。所有的处理人员需要做的是垂直于所需方向的工作, 牲畜将要去那里。这又是他们自己的想法, 因为处理人员没有告诉动物该做什么, 而是牲畜选择会可预测的方向移动。当落实这个原则时, 从所需要移动的方向画一个“T”并相应地进行直线(图 2)。驾驭动物时, 要修改这一原则, 以锯齿形 (Z) 的方式工作, 以跟上畜群的前进步伐。处理人员的动作从侧面走向动物的尾标。威廉姆斯试图在牛群的另一端选择地点, 所以当他到达那里时, 那一边的最后一头牛刚好在就在他前面。

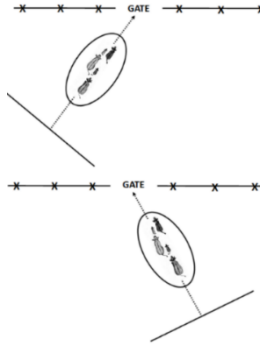


图 2. 要确定处理程序应该工作的行, 从所需的方向绘制一个“T”并进行排列。根据需要调整此 T 以实现想要的方向。

6. 随着动物进行的方向来减慢或阻止他们, 在启动或加速时则要反向而为

这种原则在处理滑槽中或放置牲畜时非常有用。在滑槽中锻炼动物时, 我们有一种自然的倾向从背后将动物推移到滑槽中。然而, 从动物头端走到尾部会产生相同的效果, 不必呼喊或敲击而使动物不会产生抗拒来进入滑槽[2, 5, 10]。相反的方向, 从尾巴到头部, 将会减慢行动, 在这种情况下, 他们会停下来看着处理人员[2]。当要将牲畜置放在范围内前往到达所指定的地点时, 这个方法是有用的。

7. 将牛群运转想像成汽车轮子一样

当一群排列的牛群队需要转身时, 一般来说就是处理人员需要把领头的牛推往所期望的方向。然而, 有许多不同的方式可以使牛群来转变方向。当一队牛群移动时, 想像每一个角落就是一辆汽车的一个轮子[11]。当直走时, 每个车轮以完全相同的速度移动, 但是当转弯时, 速度会改变。如果是从后面驾驭牲畜, 当畜群需要向右移转时, 畜群的右侧需要减速, 左侧需要加速才能维持平稳的转弯(图 3)。用从后面驾驭的方法来实现这一点, 右侧的处理人员需要减低压力(可能是要往后退), 而左侧的处理人员则需要稍微增加压力。在这种情况下, 处理人员也可以利用原理 5 来影响移动的方向, 这种变化与由处理人员形成的新垂直线(图 2)。一个处理人员可以通过直接移出牛群(图 4)直接向外移动, 对领头动物施加压力。虽然他们距离很远, 但这个处理人员所处的新位置将会影响到领头的牛, 导致方向的改变。驾驭牲畜时, 很难从后方使其移动方向, 所以应用从后驾驭原则是实现改变方向最有效的途径。

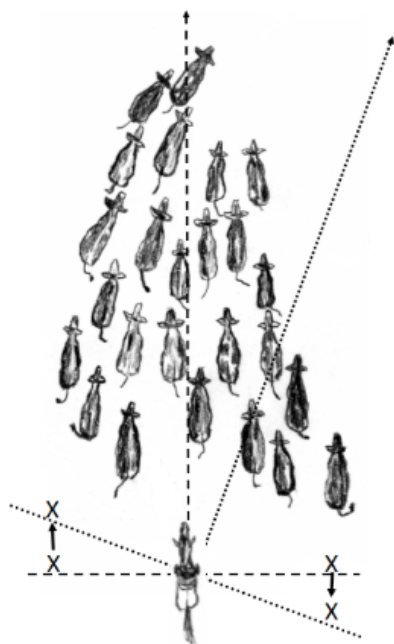


图 3. 为了改变驾驶牲畜的方向, 而不是前进推动领导者, 通过应用这些原则, 简单的位置变化可以达到同样的目的。X 代表需要改变位置(箭头)的处理程序。

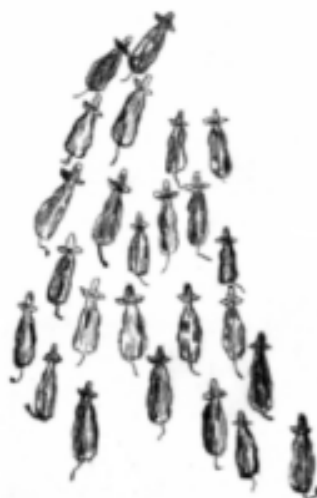


图 4. 从背面转动牲畜可以通过与所需方向相反的方向直线移动来实现。

8. 注意力集中在整体而不是个别动物身上

畜牧业自然形成有“好运动”, 吸引其他动物追随并加入[2, 5, 11]。不要牺牲良好的运动和方向来拾取边缘上的少数几只动物。如果给予机会, 这些动物将更有可能被吸引到移动的牧群中, 就跟着群体走。应该根据整个牧群的需要, 将确定你所在的位置作为基准, 不要专注于单一个动物的状态。许多人都发现只要一只动物脱线, 经常会改变牧群的方向, 因为处理人员忘记考虑他们的位置会对整个牧群会产生的影响。

俄勒冈州安大略市(Ontario, Oregon)的宝藏谷社区学院(Treasure Valley Community College)的驯马教练韦德·黑德(Wade Black, Treasure Valley Community College in Ontario, Oregon)教他的学生有关于马匹训练的艺术和科学。他说一个人可以记下所有的马训科学, 但如果没有实练去完善来应用这些艺术, 那么都是没有效果的。这些原则是低压处理家畜的基本“科学”, 而艺术则以实践为特征, 以原则 1 为特色, 所以要走出去, 多练习。如果你愿意听他们, 你的动物将是完美的导师。

参考 References

- [1] Hibbard, W. 2015. Cattle handling in early north America: An historical analysis. *Stock. Journal*, 4(2), 19-53.
- [2] Hibbard, W. 2012. Bud William's low-stress livestock handling. *Stock. Journal*, 1(1), 1-159.
- [3] Njisane, Y.Z. and Muchenje, V. 2017. Farm to abattoir conditions, animal factors and their subsequent effects on cattle behavioural responses and beef quality - A review. *Asian-Australasian J. Anim. Sci.*, 30(6), 755-764.
- [4] Breuer, K., Hemsworth, J., Barnett, L., Matthews, and Coleman, G. 2000. Behavioural response to humans and the productivity of commercial dairy cows. *Appl. Anim. Behav. Sci.*, 66(4), 273-288.
- [5] Cote, S. 2004. Stockmanship: A powerful tool for grazing lands management.
- [6] Cote, S. 2013. On placing cattle. *Stock. Journal*, 2(1), 13-21.
- [7] Hibbard, W. 2012. The case for low-stress livestock handling. *Stock. Journal*, 1(2), 1-9.
- [8] Hibbard, W. 2016. Foundation of low-stress livestock handling. *Stock. Journal*, 5(1), 11-20.
- [9] Ham, J. 2016. Cattle handling made simple. *Stock. Journal*, 5(2) 47-56.
- [10] Grandin, T. 1989. Behavioral principles of livestock handling. *Prof. Anim. Sci.*, 5, 1-11.
- [11] Williams, E. 2013. Bud Williams stockmanship.

Note: Images for the figures in this paper were generated from the book *Stockmanship: A Powerful Tool for Grazing Lands Management* [5].

注意：本文中图片的图像是来源自“图书编制：放牧地管理工具”[5]。

Using Women Farmer Networks as a Tool for Extension Work

Maud Powell, Associate Professor (Practice) and Melissa Fery, Associate Professor (Practice)
Oregon State University Extension Service

Abstract

One important outreach and educational tool that agricultural educators, farmers, and extension educators can use to facilitate farm success is the creation of farmer networks (communities of practice). Communities of practice approach learning as social participation. Their function as an enhancement to learning is well known [2, 3]. The project *Creating Farmer Networks for Beginning and Small Farmers* aimed to accomplish a number of objectives related to farmer networks. The first objective was to design a toolkit for developing farmer-to-farmer networks. The toolkit, available for download, contains information on the relevance and impacts of farmer networks, a facilitation manual, and corresponding outreach materials including sample flyers, a list of potential activities and class offerings, possible organizational structures, and an explanation of online social networking opportunities. Second, we conducted four half-day trainings for agricultural educators on the nuts and bolts of starting a farmer network, including the use of a steering committee to design a program that meets the needs of the target audience. In addition, we designed and conducted four half-day meetings with pilot women farmer networks. The meetings resulted in the successful formation of three women farmer networks and the training of 40 agricultural educators. Evaluation and impact data has been collected to measure success of the project. Since completion of the initial grant-funded project in 2014, work on developing and strengthening new and existing farmer networks has continued. In 2015, a group of producers formed the Southern Oregon Seed Growers Network with the support of Extension staff. The network has resulted in an online pinning map to ensure that seed growers have the isolation needed to ensure seed purity and ongoing bi-monthly seed tours. In 2016, a fourth Oregon women farmer network formed in Douglas County. Building on the success of women farmer networks, the Oregon State University Center for Small Farms hosted the 6th National Women in Sustainable Agriculture conference in 2016. Over 400 people attended the conference, and initial impact reports from the conference indicate a continued need for farmer networking. Impacts from these activities have been measured through evaluations and surveys following each of the programs. Results indicate that many agricultural educators who received training in the toolkit have or plan to use the information to start their own networks. A vast majority of participants in the Women in Sustainable Agriculture conference reported a high degree of the satisfaction in the conference with plans to implement knowledge and skills.

Introduction

In 2007, three Oregon State University (OSU) Extension faculty (Melissa Mathewson, Maud Powell, and Melissa Fery) spearheaded two women's agricultural networks called the League of Women Farmers and the Willamette Women's Farm Network. According to the USDA census, the number of women agricultural producers in Oregon is continuing to increase, with women representing 39% of Oregon farmers as of the 2012 census. The national average is 31%. Women producers reported a need for Extension programming that addressed the specific needs of women farmers and ranchers, including skill-building training in areas traditionally performed by men. While the first two networks established were focused on women, Extension educators saw the value of different types of agricultural networks, which provide forums for farmers to

share information and build mutually beneficial relationships. Many of the activities and planning we used were based on the experience of the two networks and highlights specific examples of their formation and management, but the information is transferable to other types of networks.

According to the University of Wisconsin Center for Integrated Agricultural Studies, farmer networks help “distribute information, offer moral and technical support, and share resource leads. Farmer networks sponsor field days, farm walks, and winter workshops that encourage a flow of ideas,” [1].

A farmer network is also important because it:

- Builds community by creating new friendships and business partnerships by deepening existing ones
- Provides education and mentoring opportunities
- Can target specific audiences with shared interests and concerns
- Gives farmers a venue for peer-to-peer discussion, which often results in innovative production and marketing strategies
- Provides an effective way for agricultural educators to reach and increase the success of sustainable agriculture producers

Data suggest that when farmers convene, new opportunities arise for increased economic viability, improved quality of life, and greater community interaction. The work conducted on farmer networks by OSU faculty represents an emerging model of Extension education, in which the primary role of Extension faculty and staff is to convene producers and facilitate learning.

Activities

During the course of this project, numerous goals and objectives were identified, which guided the activities and methods. Goals and objectives included:

- To train a total of 40 agricultural educators on the nuts-and-bolts of developing successful farmer networks in Washington, Idaho, Oregon, and Montana. Trainings occurred in four locations, with an average participation of 10 individuals per site.
- To hold four half-day meetings with women farmers to help launch new women farmer networks in Washington, Oregon, Idaho, and Montana.
- To hold 16 consulting sessions (four with each state partner) with agricultural educators who were starting new women farmer networks. There were additional consulting sessions as needed with a minimum of 10 during the second and third years of the project.
- To produce an on-line and paper toolkit for developing farmer-to-farmer networks. The toolkit includes information on the relevance and impact of farmer networks, facilitation manual, and outreach materials including sample flyers and brochures, a list of potential activities for farmer networks, sample list of class offerings, a list of options for organizational structure of the network, an explanation of on-line social networking opportunities, and other resources available to farmer networks.
- To host a national conference for women in sustainable agriculture for farmers, ranchers, and agricultural educators.

- To start a new network for Southern Oregon seed growers with bi-monthly meetings and tours, hosted by farmers and accompanied by an on-farm workshop, presentation, or demonstration.
- Support other Extension educators interested in facilitating farmer networks in local regions.

Extension agents used a variety of activities to successfully implement these goals. In terms of the farmer network trainings, they did extensive outreach to partners in Idaho, Washington, Oregon, and Montana helping to build new relationships between university Extension and nonprofit professionals. They conducted research for the toolkit, which incorporated many sources of information including their own experience in conducting farmer networks. They spent a large portion of time writing, compiling, and editing the toolkit until the publication date. They conducted outreach to encourage agricultural educators to attend workshops in all four states and facilitated four workshops that were dynamic and encouraged participation and interaction between attendees. They conducted online surveys of women farmers and agricultural educators to assess impact of the project.

Teaching methods used during the course of this project consisted of trainings, one-on-one mentoring, the creation and dissemination of a toolkit, two conference sessions, and a webinar. During the training sessions, the Extension educators used PowerPoint presentations that included multiple case studies to bring the information to life. Additionally, they divided participants into small groups and had them engage in role-playing sessions, then reflected on their experiences and insights with the entire group. During the steering committee sessions with new women farmers' networks, they had the groups brainstorm topics and skills they would like covered during subsequent network meetings. Sessions were interactive and teaching conducted included many specific examples of successful networks.

Coordination and planning for the National Women in Sustainable Agriculture conference began in July 2015. The program committee released a call for proposals in January 2016, and received 117 submissions for conference sessions. Through a rigorous screening process, the committee chose 42 of the proposals. All workshop topics address the various facets of "sustainability" in agriculture, including organic certification and production.

The program committee also researched potential keynote speakers and approached the top two candidates who fit into the conference budget. Natasha Bowen, author of *The Color of Food*, was the keynote speaker, and Chef Cathy Whims was the capstone speaker. Another feature was a panel discussion of four women producers who have been farming for more than 25 years, who provided insight and advice based on their long-term experiences.

The budget committee worked to secure 31 sponsors, who set up information tables at the conference and whose sponsorships offset conference costs. Proposals for competitive and non-competitive grant funds were also developed that led to funding opportunities.

Over 400 farmers and agricultural educators attended the Women in Sustainable Agriculture conference in 2016 in Portland, Oregon. The conference has been held every two to three years since 2005, and had never been hosted on the West Coast. The conference steering committee

consisted of 12 members, mostly agricultural educators from universities and agencies, from around the country.

The day before the official conference started, 140 people attended one of seven tours. Tours included “Oregon Orchards,” “Pacific Pastures and Animals,” “Community Farms and Food,” and “After the Harvest.”

During the course of this project, the committee produced a printed conference program which include abstracts from all presenters and built a comprehensive conference website.

Outputs

There were many results associated with these projects. The toolkit, “*Creating Farmer Networks: A Toolkit for Promoting Vibrant Farm Communities*” was published in February 2013 by OSU Extension and is now available for download through the OSU Extension Catalog. The publication is a 54-page Pacific Northwest Extension publication, which ensures its wide distribution throughout the northwest. The toolkit includes information on planning a network; recruitment; and network development including structure, communication, programming, evaluation, tips for success, common problems, and facilitation resources. Also included were many examples of surveys, outreach materials, and links to more resources. The toolkit was distributed for free at all workshops in Montana, Idaho, Washington, and Oregon.

The project resulted in the creation of three additional women farmers’ networks in the Pacific Northwest. A 75-minute session was also held at the OSU Small Farms Conference in Corvallis in February 2013. Sixty-one people attended the workshop, “Starting a Farmer to Farmer Network.” Additionally, they traveled to Montana, Idaho, Washington, and northern Oregon to hold workshops in March and April 2013. The first workshop was for agricultural educators, in which they presented information on how to use the toolkit. Sixty-two combined agricultural educators representing various sectors of agriculture participated in the workshops in Washington, Oregon, Montana, and Idaho. All participants received a copy of the toolkit. Much of the workshop was interactive with role playing and small-group exercises. Groups were diverse in terms of age, gender, and agricultural operations and the setting was intimate creating a nice workshop for agricultural educators. The educators also facilitated a half-day steering committee meeting with regional women farmers to begin their launch of the local women farmer network in all four states. They worked closely with partners in each state to narrow in on a region and a target audience so that they reached our intended outcomes and audience. There were 84 combined participants in Montana, Oregon, Idaho, and Washington.

Another workshop, “Finding Support through Farmer-to-Farmer Networking,” at the 4th National Conference for Women in Sustainable Agriculture was conducted in Des Moines, Iowa, in November 2013. This venue provided an opportunity to extend the reach of the network toolkit to a national level. The workshop was well received by agriculture educators, primarily Extension educators attending the conference.

In 2014, a webinar for agricultural educators titled, “Farmer Networks: Getting Started and How Can They Help?” was held. The webinar was based off the toolkit and was part of an Oregon

Food Bank project. In 2016, the educators presented information of the Farmer Network Toolkit at the National Small Farms Conference in Virginia Beach.

In terms of the Southern Oregon Seed Growers Association, the following meetings were held in 2016:

- Seed Breeding for Organic and Sustainable Systems (17 attendees)
- Growing Medicinal Herb Seeds and the Profitability of Seed Production (25 attendees)
- Biennial Seed Tour (32 attendees)
- Contracting with Seed Companies (54 attendees)
- Seed Processing and Equipment (27 attendees)
- Running a Seed Business (8 attendees)
- Seed Mentorships (19 attendees)
- Growing Small Grains on a Farm (42 attendees)

Impacts

To measure impact, an assessment of agricultural educators and farmers who participated one year after the Farmer Network workshops was conducted. Agricultural educators were sent an online survey with qualitative and quantitative questions for use in assessing impact. The data can be summarized as follows:

- 22% of respondents (agricultural educators who took the network training) are currently involved with a network, and 41% said this was after the training.
- 33% of respondents plan on beginning a network in the future. Some examples of networks that are currently in formation include
 - a peer-to-peer network for information sharing and on-farm workshop series
 - a network for Palouse area producers centered on conservation and precision farming
 - new farmers and farmers in priority watersheds
 - small producers for a local institutional market
- 17% of respondents used the toolkit after the trainings. Uses included a guide for initial meeting topics, as a resource guide, and as a guide for revamping an existing network.
- 81% of respondents said they intend to use the toolkit in the future.

According to respondents, benefits of participating in a network include:

- Networking (26%), education (24%), mentoring (14%), socializing (13%)
- 92% of respondents plan to stay involved with their network.
- 87% have an increased knowledge after participating in a network.
- 83% have increased networking.
- 80% feel more connected with the farming community. All of these are important aspects of farmer networks.

Impacts from the 2016 National Women in Sustainable Agriculture conference have been measured by the number of farmers and agricultural educators in attendance at the conference, results from surveys provided at the end of the conference, and results from online evaluations six months after the completion of the conference. Evaluation and surveys measured satisfaction levels with conference organization, conference topic choices, speakers' presentations and

delivery, and the information learned during the sessions. Evaluations to be conducted eight months after the conference will determine short- to mid-term behavior changes resulting from information learned during the conference sessions. Additionally, surveys will determine the extent to which agricultural educators are using information from the conference in their current programming.

167 people responded to a post conference survey. A total of 165 responded to the question, “Did you learn anything at the conference you will use in your work?”; 97% indicated that yes, they would, with 5% indicating no, they wouldn’t.

A total of 162 people responded to the question, “Do you plan to take any action as a result of attending this conference?”; 95% said yes and 5% said no.

A total of 165 rated the overall conference, with 67% rating it as excellent and 27% rating it as very good.

The conference organizers are currently working with the OSU Institutional Review Board to develop a list of 10 qualitative questions to ask 40 random conference participants in interviews eight months after the conference (August, 2017). The purpose of the interviews is to discover if conference participants are using newfound knowledge and skills in their operations, and if they made valuable connections from the conference. Finally, the interviews will address questions related to the nature of the conference, whether or not and how having a conference directed toward women producers and agriculture educators differed from gender-inclusive convenings. The results of the interviews and follow-up evaluation will be developed into a journal article with the intention of publishing.

Southern Oregon Seed Growers Association tours and meetings have been concluded with written evaluations. Of the total of 189 evaluations filled out over the course of 2016, the overall program rating was 4.62 out of 5, with 78% of attendees indicating that they plan to use information and/or skills learned at the meetings. Grant funding for 2018 will fund evaluating longer-term impacts of the new network.

Farmer-to-farmer networking which encourages interactive learning by convening farmers for informal information sharing, mentoring, and socializing is a successful Extension educational model. Farmer networks build community between farmers, which results in innovative production and business strategies and increased knowledge. The authors intend to continue supporting agriculture educators interested in starting and maintaining farmer networks.

References

- [1] UW-Madison Center for Integrated Agricultural Systems. 1996. Farmer-to-farmer networks: effective grass-roots sharing, Research Brief #23. <https://www.cias.wisc.edu/farmer-to-farmer-networks-effective-grass-roots-sharing/>
- [2] Wenger, E. 1999. Communities of practice: Learning, meaning, and identity. Cambridge University Press.
- [3] Wenger, E., McDermott, R., and Snyder, W.M. 2002. Cultivating communities of practice. Harvard Business School Press.

使用妇女农民网络为推广教育工作

Maud Powell, 副教授(实践)和 Melissa Fery, 副教授(实践)
俄勒冈州立大学推广服务

Using Women Farmer Networks as a Tool for Extension Work

Maud Powell, Associate Professor (Practice) and Melissa Fery, Associate Professor (Practice)
Oregon State University Extension Service

摘要

农业教育者, 农民和推广教育者可以用来促进农业成功的一个重要的外联和教育工具就是建立农民网络(实践社区)。实践社区将学习视为社会参与。他们对于增强学习的功能是众所周知的[2, 3]。为新农户和小农户创建农民网络的项目旨在实现与农民网络相关的一些目标。第一个目标是设计一个工具包用于开发农民与农民之间的网络。该工具包可供下载, 其中包含有与农民网络相关性和有影响的信息, 便利手册以及相应的宣传材料, 包括样本传单, 可能的活动和授课清单, 可能的组织结构以及在线社交网络机会的说明。第二, 为农业教育工作者进行了为期四个半天的培训, 其中包括使用指导委员会设计符合目标满足需求的计划。此外, 我们还设计和举办了与试点妇女农民网络四个半天的会议。这些会议成功地组建了三个妇女农民网络, 并培训了 40 名农业教育工作者。已经收集了有关评估和影响的数据, 以衡量项目的成功。自 2014 年初有资助项目竣工以来, 开展和加强新农户网络工作在继续进行。在 2015 年, 一批生产者在推广人员的支持下组建了南俄勒冈种子种植者网络。该网络已经在在线地图上形成了一个固定点, 以确保种子种植者有足够的隔离, 以确保种子纯度, 和持续的举办每两个月一次的种子展览。2016 年, 道格拉斯县(Douglas County)成立了第四家俄勒冈妇女农民网络。在农民网络成功的基础上, 俄勒冈州立大学小农场中心于 2016 年主办了第六届全国可持续农业妇女大会, 超过 400 人参加了会议, 会议初步影响报告显示, 农民网络有持续的需求。这些活动的影响是通过每个方案之后的评估和调查来衡量的。结果表明, 许多接受了该工具包培训的农业教育者已经或计划使用这些信息来建立自己的网络。可持续农业妇女大会的绝大多数与会者在报告中说对会议高度满意, 并计划实施所获得的知识和技能。

介绍

2007 年俄勒冈州立大学(OSU)扩建学院(Melissa Mathewson, Maud Powell 和 Melissa Fery)率先推出了两个名为“妇女农民联盟”和“威拉米特妇女农场网络”的农业网络。根据美国农业部的人口普查, 俄勒冈州的妇女农业生产者数量继续增加, 截至 2012 年人口普查, 妇女占俄勒冈州农民的 39%。全国平均水平为 31%。妇女生产者报告说, 需要扩大推广教程规划, 以满足妇女农民和牧场主的具体需要, 包括以往只提供给男性的技能培训。虽然前两个网络的建立侧重于妇女, 推广教育者看到了不同类型的农业网络的价值, 为农民提供了分享信息和建立互利关系的论坛。我们使用的许多活动和规划都是基于这两个网络突出了其形成和管理的具体实例, 但这些信息可以转移到其他类型的网络。

据威斯康辛大学综合农业研究中心介绍, 农民网络有助于“分发信息, 提供道德和技术支持, 共享资源。农民网络赞助田野外出日, 农场散步和冬季研讨会, 以鼓励思考与互动,”[1]。

农民网络也很重要,因为它:

- 通过深化现有的友谊和商业伙伴关系来建立社区
- 提供教育和指导机会
- 可以针对具有共同兴趣和关切的特定受众群体
- 为农民提供点对点讨论的场所,这通常会导致生产和营销策略的创新
- 为农业教育者提供农业生产延伸成功的有效途径和可持续性

数据表明,当农民聚会集思时,出现了增强经济的可行性,提高生活质量和增加社区互动交流的新机会。由俄勒冈州立大学教师的农民网络揭示出推广教育的工作代表了新兴的模式,推广教育职员工的主要任务是召集生产者,促进学习。

活动

在本项目期间,确定了许多目标和目标,用来指导相关活动和方法。目标和目的包括:

- 在华盛顿,爱达荷州,俄勒冈州和蒙大拿州,开展成功的农民网络,共培训 40 名农业教育工作者。共有四个培训地点,平均每个培训站点有 10 人参加。
- 与妇女农民举行为期四个半天会议,协助启动新的农民网络以帮助在华盛顿,俄勒冈州,爱达荷州和蒙大拿州的妇女农户。
- 农业教育者正在开办 16 个新的农民网络咨询会议(每州合作伙伴各 4 次)。在项目的第二年和第三年期间,还需要额外的增加至少 10 个咨询会议。
- 制作用于开发农户对农户在线网络和文书设计的工具包。该工具包包括关于农民网络的相关性和有影响的信息,包括样本传单和小册子,农民网络潜在活动清单,类别提供样本清单,网络组织结构选项清单,对在线社交网络机会的解释以及农民网络可用的其他资源,以便利宣传。
- 为妇女农民,牧场主和农业教育者举办全国可持续农业会议。
- 由农民主办为南俄勒冈州的种子种植者开展新的网络,每两个月举行一次会议和室外活动,伴随着农场的讲习班,展示或示范。
- 支持其他有兴趣的教育工作者来促进当地农民网络的拓展和教育。

推广教育代理人使用各种活动来成功实现这些目标。在农民网络培训方面,他们与爱达荷州,华盛顿州,俄勒冈州和蒙大拿州的合作伙伴进行了广泛的合作,帮助建立大学推广教育和非营利专业人员之间的新关系。他们对该工具包进行了研究,该工具包包含了许多信息来源,包括他们在开展农民网络方面的经验。他们花了大量时间编写和编辑工具包,直到发布为止。他们进行了外联活动,鼓励农业教育工作者参加所有四个州的讲习班,并推动了四个有活力的讲习班,鼓励与会者的参与和互动。他们对妇女农民和农业教育者进行了网络调查,以评估项目所产生的影响。

在本项目期间使用的教学方法包括培训,一对一指导,创建和分享工具包,两次会议和网络研讨会。在培训期间,扩展教育工作者使用 PowerPoint 演示文稿,其中包括多个案例研究来将信息带入生活中。此外,他们将参与者分成小组,让他们参与角色扮演课程,然后反映他们与整个团队的经验和见解。在与新的妇女农民网络的指导委员会会议期间,他们让群体集思广益,在随后的网络会议期间,要涵盖的相关的主题和技能。会议是互动和教学,包括许多网络成功的具体例子。

于 2015 年 7 月开始协调与规划可持续性全国农业妇女会议, 计划委员会于 2016 年 1 月发出邀请, 并提交了 117 次议程。委员会通过严格筛选过程, 选择了 42 项提案。所有研讨会议题都涉及农业“可持续性”的各个方面, 包括有机认证和生产。

方案委员会还研讨了可能的主旨发言人, 并接触了符合会议预算的最有可能的两名候选人。“食物之颜色”的作者娜塔莎·鲍文(Natasha Bowen)是主旨发言人, 厨师凯西·怀姆斯(Cathy Whims)是最佳的演讲者。另一个特点是小组讨论包括了四名已经耕种了 25 年以上的女性生产者, 他们根据自身长期经验提供了洞察力和建议。

预算委员会致力于争取 31 个赞助商, 他们在会议期间设立了信息表, 赞助商承担了会议费用。还制定了竞争性和非竞争性赠款资金的提案, 从而导致获取资助的机会。

在 2016 年在俄勒冈州波特兰(Portland, Oregon), 超过 400 名农民和农业教育者参加了可持续农业妇女大会。会议自 2005 年以来每二, 三年举行一次, 从未在西海岸举办。会议指导委员会的 12 名成员由来自全国各地的大学和机构组成, 大都是农业教育工作者。

正式开幕前一天, 共有 140 人参加了七次室外参访旅游。包括“俄勒冈果园”, “太平洋牧场动物”, “社区农场和食物”, “收成后”。

在本项目期间, 委员会制作并发印会议方案, 其中包括所有演讲人的摘要, 并建立了一个综合性会议网站。

成果

这些项目有很许多成果。“创建农民网络: 促进充满活力的农场社区的工具包”于 2013 年 2 月由俄勒冈州立大学(OSU)推广部门发布, 现在可通过俄勒冈州立大学(OSU)推广网站目录下载。该出版物是一本 54 页的“西北太平洋地区推广”出版物, 确保其在西北部广泛分布。该工具包含有关网络规划的信息; 招聘; 网络开发, 包括结构, 沟通, 程序设计, 评估, 获取成功提示, 常见问题和促进资源。还有许多调查案例, 外联材料和更多资源的链接。该工具包是免费发放给在蒙大拿州, 爱达荷州, 华盛顿州和俄勒冈州的所有讲习班。

该项目导致在太平洋西北地区多增加了三个妇女农民网络。2013 年 2 月在俄勒冈州立大学(OSU)科瓦利斯(Corvallis)举行的小农场会议上也举行了 75 分钟的会议。六十一人参加了“设立农民对农民网络”研讨会。此外, 在 2013 年 3 月和 4 月他们还前往华盛顿州, 爱达荷州, 蒙大拿州和俄勒冈州北部举办研讨会。第一期研讨会是给农业教育工作者介绍了如何使用该工具包的信息。华盛顿, 俄勒冈州, 蒙大拿州和爱达荷州的 62 名农业教育工作者, 代表各个农业部门参加了的研讨会。所有参与者都收到了一份该工具包。讲习班大部分是角色扮演和小组互动。参与群体在年龄, 性别和农业经营各方面是多样化的, 为农业教育者设立了一个很好的学习环境。教育工作者还促成了与区域妇女农民进行为期半天的指导委员会会议, 开始在所有四个州启动当地的农民网络。他们与每个州的伙伴密切合作, 针对各区域目标, 使他们达到给受益者们预期的结果。蒙大拿州, 俄勒冈州, 爱达荷州和华盛顿州总共有 84 名参与者。

在 2013 年 11 月在爱荷华州德梅因市举行的另一个第四届全国可持续农业妇女全国会议上,“通过农民与农民网络寻求支持”的研讨会,提供了扩大网络工具包范围的机会。研讨会受到农业教育工作者的好评,主要是出席会议的皆为推广教育工作者。

2014 年,举办了一个农民教育工作者网络研讨会,题目是“农民网络:如何入门和寻求帮助”。网络研讨会是基于该工具包,并且是俄勒冈州粮食银行项目的一部分。在 2016 年,教育工作者在弗吉尼亚州 Virginia Beach 的小型农场会议上介绍了农民网络工具包的信息。

在 2016 年,俄勒冈州南部种子农业协会举行了下列会议:

- 有机和可持续系统种子育种 (17 人)
- 生长药用植物种子和种子生产的利润 (25 人)
- 双年播种活动 (32 人)
- 种子公司签约 (54 人)
- 种子加工设备 (27 人)
- 经营种子业务 (8 人)
- 种子导师 (19 人)
- 农场种植小粮 (42 人)

影响

衡量影响,对农民教育工作者和农民进行农民网络讲习班一年后的考核。用于评估影响,向农业教育工作者发送了一个定性和定量问题的在线调查。数据可归纳如下:

- 22%的受访者(接受过网络培训的农业教育工作者)目前正在参与一个网络,41%的受访者表示这是培训之后发生的。
- 33%的受访者计划在未来开始设立网络。目前正在形成的网络的一些例子有
 - 一个用于信息共享和农场实习的个人对个人网络
 - 一个以保护和精确农耕为中心的 Palouse 地区生产者网络
 - 新农户和优先流域农民
 - 当地特定市场的小型生产者
- 17%的受访者在培训后使用了该工具包。用途包括初步会议主题指南,资源指导,以及改善现有网络的指南。
- 81%的受访者表示打算在未来使用该工具包。

据受访者介绍,参与网络的好处包括:

- 网络(26%),教育(24%),指导(14%),社群交流(13%)
- 92%的受访者计划继续参与其网络。
- 参与网络后,有 87%有知识增长。
- 83%的增加网络参与。
- 80%的人感觉到与农耕社区有更多的联系。所有这些都是农民网络的重要因素。

2016 年全国妇女参与可持续农业会议的影响,是由参加会议的农民和农业教育者人数,会议结束后六个月提供的调查结果以及在线评估结果衡量的。评估和调查通过会议组织,会议主题选择,演讲者演讲和交付以及会议期间获得的信息来衡量满意度。在会议八个月后

进行的评估将确定会议期间获悉的资料所产生的短期至中期行为变化。此外, 调查将确定农业教育者在目前的计划中使用会议信息的程度。

167 人回应了会后调查。

总共 165 位回答了这个问题:“你在会议中学到什么实用的东西吗?” 97%表示是他们, 5%表示他们不会。

共有 162 人回答了这个问题:“你是否打算参加这次会议采取任何行动?”;95%的人说是的, 5%的人说不。

总共 165 个评价总体会议, 67%的评价是优秀, 27%的评价是非常好。

在会议召开后八个月(2017 年 8 月), 会议组织者目前正在与俄勒冈州立大学(OSU)机构审查委员会一起制定 10 个定性问题清单, 以便向 40 位随意挑选的会议参与者询问采访。访谈的目的是想知道会议参与者是否能使用新获得的知识和技能, 并且是否在从会议中获得宝贵的联系资讯。最后, 采访将会讨论与会议有关的问题, 无论是否针对妇女生产者 and 农业教育者所举行的会议, 有那些区别。访谈结果和后续评估结果整理后将出版公佈。

南部俄勒冈种植者协会实地考察和会议结果, 已经完成了书面评估。在 2016 年完成的 189 项评估中, 总体课程评分为 4.62 分(满分为 5 分), 其中 78%的参与者表示计划在使用会议中得到的信息和/或技能。2018 年将拨款用于评估新网络的长期影响。

通过农民对农民网络进行非信息共享, 指导, 和社交活动是一个成功的推广教育模式。农民网络在农民之间建立社区, 导致创新的生产和业务战略, 能增加知识。作者打算继续支持有兴趣开展和维护农民网络的农业教育工作者。

参考 References

- [1] UW-Madison Center for Integrated Agricultural Systems. 1996. Farmer-to-farmer networks: effective grass-roots sharing, Research Brief #23. <https://www.cias.wisc.edu/farmer-to-farmer-networks-effective-grass-roots-sharing/>
- [2] Wenger, E. 1999. Communities of practice: Learning, meaning, and identity. Cambridge University Press.
- [3] Wenger, E., McDermott, R., and Snyder, W.M. 2002. Cultivating communities of practice. Harvard Business School Press.

The Issues, Practices and Thoughts on the Cultivation of Modern Professional Farmers

Based on the Case Study of Jiangsu Agri-animal Husbandry Vocational College

Huagen Yuan, Zhaoshou Xi, Chunmao Jiang
(Jiangsu Agri-animal Husbandry Vocational College, Jiangsu Taizhou, 225300)

Abstract: The Modern Professional Farmers (MPF) is the important driving force behind China's modern agriculture development, cultivating MPF is not only the key strategic option for the modernization of agriculture and building a well-off society in an all-around way, but also is the most important task for carrying out our "Three Rural: Issues of Agriculture, Farmers and Rural Areas" initiative. This paper analyzed the existing problems among Chinese modern professional farmers and based on the case study of farmers' training in Jiangsu Agri-animal Husbandry Vocational College, pointed out the new patterns and new thoughts on the cultivation of MPF, as well as exploring the ways and thinking on how to improve the cultivation of MPF.

Key Words: Modern Professional Farmers (MPFs); Cultivation; Issues and thoughts

Along with the increased pace of Chinese industrialization, urbanization and agricultural modernization, farmers are moving to non-farm fields and urban areas on a day-to-day basis, division of labor in Agricultural production, processing, circulation, and sales becomes ever more refined, and the population engaged in the agricultural is declining. In order to solve the problems of "Who will do the farming" and "How to farm", our country attaches great importance to the new professional farmers cultivating work, each year, nearly 200,000 people attend various forms of training, and then become certified MPF. However, due to late start, traditional biases, the developing policy, mode and operation mechanism are still not perfect, compounded by the lack of systematic research, our MPF cultivating work still has many problems. This paper analyzes the problem of MPF in our country at present stage, and based on the case study of farmers' training in Jiangsu Agri-animal Husbandry Vocational College, put forward the new patterns and new thoughts on the cultivation of MPF, as well as exploring the ways and thinking on how to improve the cultivation of MPF so as to speed up the pace of agricultural modernization in our country.

1. The origin and connotation of MPF

In 2005, Chinese Ministry of Agriculture first proposed the idea of cultivating "Professional Farmers" in "The proposals on the Implementation of Rural Practical Talents Cultivation of 'Millions of Secondary Specialized School Students' Plan"; In 2006, the Central No. 1 document "Proposals on Promoting the Construction of New Socialist Countryside from the State Council of the Central Committee of the Communist Party " first discussed cultivating modern farmers equipped with "culture, technology and management know-how", among whom the professional farmers consist of the main body; Since 2012, the No. 1 Central documents emphasis for four consecutive years the "fostering of MPF", this is the Central Committee's strive to solve the key questions of "who will do the farming" and "how to farm"

from the long-term and holistic perspective, to achieve the breakthrough of modern agricultural development bottleneck, and supplement the modern agricultural development, and finally to realize the coordinated development and integration of urban and rural areas as a whole, a smart and far-reaching decision rich in connotation and benefits.

MPFs refer to those modern agricultural workers who take farming as their profession, have a certain degree of professional skills and receive major income from agriculture. They can be classified into three groups:

1. Production-running type. Those farmers are professional farmers who have a certain degree of resources and professional skills, with investment capabilities and receive income mainly from agriculture-related businesses. They are large-scale farming contractors, family farm owners and leaders in Farmers' Cooperative etc.
2. Skill-oriented type. Those MPFs refer to those who engage in farming consistently and participate actively in new-model production-running entities such as Farmers' Cooperative, Family farm, Large-scale farms and Agricultural enterprises etc. They are mainly made up of agricultural workers and farmers who have a certain level of professional skills.
3. Social service type. The social-service MPFs are those who directly involved in pre-production, mid-production, post-production agricultural service and draw income mostly from this process, with related service skills, they mainly consist of rural communicators, country brokers, farm machinery service professionals and plant protectors who oversee disease prevention and treatment, village-level animal epidemic prevention coordinators etc.

2. The main problems of MPF cultivation in China

2.1. The traditional biases toward Agricultural workers

China is a huge agricultural country, agricultural workers have been subjected to the bondage of traditional farming culture for thousands of years. Along with the scientific and technological development and the insurgence of migrant workers, currently the farmers in China mainly consist of left-behind women and elderly people. This demographic group has three major problems: **firstly, low educational levels**; more than 70% of 100 farmers have only graduated from primary schools or junior-middle schools. **Secondly, low scientific awareness**; take farming tractors' inventory for example, developed countries such as Italy, South Korea and the UK boast 2667.7units/100km², 1525.7units/100km², and 728.0units/100km² respectively, however, China only owns 146.7units /100km², a lag of 20 years behind most developed countries and regions. **Thirdly, lack of owners' and legal awareness**; Under the broad backdrop of market economy, Chinese farms are usually poorly aware of national policies, some even have distorted or insular world values, knowing less than 5% of Chinese laws and regulations, even lacking basic knowledge of "Agricultural Law" and "Rural Land Contract Law".

2.2. Monotonous and backward cultivating mode

Currently, our MPFs cultivation takes the traditional form of classroom teaching, which lacks relativity and efficiency. There are several problems with this mode: firstly a lack of needs research for cultivation, the course materials and setup are repetitive and monotonous, the agricultural knowledge and technologies taught in this mode can be irrelevant and inefficient; secondly, too much focus on theories, even with practical training, it tends to just "scratch the surface", not up to the par for the conversion of agricultural research achievements; thirdly, many training institutes only focus on finishing the training and clocking all the hours rather

than find out whether the learners can implement the knowledge and conduct follow-up guidance on the trainees in the process of production and management.

2.3. Professional farmers' cultivation lacks effective integration and certification management.

Until now more than a dozen of Central Committees' ministries and commissions have organized and carried out farmers' educational and training programs, each department has their own fund for training, however, due to the lack of overseeing and planning, they are poorly integrated, thus causing programs to be randomly assigned and poorly executed, leading to a waste of resources and failure of achieving expected training goals. At the same time, the national certifying and investigating organ has not set up a comprehensive evaluation system, further complicated by the gap between different regions, resulting in a lack of effective and implementable certification and evaluation mechanism for MPFs. As a result, farmers cannot participate in the monitoring and evaluating process of training institutes.

3. A practical study of MPF cultivation

Jiangsu Agri-animal Husbandry Vocational College has always been revolving around the demands of local agricultural development while fully making use of its advantages in human talents, technologies, achievements and training bases etc. It pioneered a new mode of MPF cultivation and achieved a certain level of efficacy.

3.1. Cultivating concept and mode

(1) Whole-heartedly serving "Three Rural"

Our college firmly adheres to our schooling philosophy of "closely attached to Agri-Husbandry Production Chain", set more than 10 departments such as Animal Science, Animal Medicine, Horticulture, Aquatic Science and Agri-business Management etc. with 46 majors and more than 70% of all the students choose to study agriculture-related majors. Every year, we hold MPF Innovation and Enterprising Training to replenish the pool of future MPFs.

(2) "Needs-oriented Training and Complete Course Tracking". The college centers its principle on meeting the needs of local farmers and set MPF cultivating scheme and plans catering to the needs of adult farmers and general farming practices, while tracking the whole process in order to help trainees develop their career after finishing the courses.

(3) Dual-track concept of "Elevating both social training and education". While carrying out the cultivation schedule, we attach great importance to secondary and undergraduate training and vocational skills certification among MPFs, the dual-track concept not only tests the efficacy of MPF training but also drives the transition from traditional farmers to professional farmers. In recent three years, more than 600 MPFs apply for our continuous education program and more than 3,000 people attended our certifying tests for vocational skills.

(4) Elaborately-crafted "1332"cultivating mode

We actively seek to do research on the ways to cultivate MPFs and craft "1332"cultivating mode (1 core—the core course centering on skill-training; 3 links—collective teaching, practical work and follow-up; 3 emphasis—enterprising skills, professional skills, information skills; 2 investigations—research on needs before training, evaluation and seminar post training). Under the "1332" scheme, some realistic approaches have been worked out. **Firstly,**

“Science and technology entering households” approach. Our college set new varieties breeding demonstration bases in Binhai, Hai’an, Tai Xing etc regions such as Sujiang Pig, Black Muscovy Duck, “Sumu NO. 1”, and “White Geese Supporting System” Breeding Bases etc. We have trained 200 Science and Technology Model Households in total, 1000 Sci-Tech Motivating Households, and 10 distinct model villages as well as 3 special breeding demonstration bases. **Secondly, the “School-Region Coordination” approach.** Hongze County is a key county in terms of Siji Goose Cultivation, the local cultivation has long been plagued by numerous factors such as “low productivity, low competitiveness and low-scale production”. Our college has formed close ties with this county and jointly operated MPF training lasting for one year, after one year’s training and tracking service later, 10 trainees have successfully turned into entrepreneurs. **Thirdly, the “School-Enterprise Cooperation” approach.** Joining hands with Chinese Modern Husbandry Vocational Group (Alliance), we actively pursue the promotion of ecological and green cultivating mode, successfully started Taizhou Branch of Gaoyou Duck Breeding Company, Chang-Tai Agri-husbandry Sci-Tech Company Ltd., which are two “Factories on Campus”, trained more than 21,000 workers and farmers within three years.

3.2. Measures and Achievements

(1) Combine various resources to create a platform for MPF cultivation

Our college has combined various resources and optimized training conditions in order to forge a modern MPF cultivation base. We have established **three training centers**, namely Agricultural Sci-Tech Training Center, Husbandry and Veterinarian Technology Promotion Center and Practical Farming Techniques Training Center. The classrooms(Conference rooms), Trainees Canteen, Practical Training Halls etc are well-equipped, can house 700 trainees at each session; **Three practical training bases** have also been created, namely Jiangsu Modern Sci-Tech Park of Animal Husbandry, Chinese Medicine Sci-Tech Park and BeiKang Pharmaceutical Company, occupying more than 3,000 mu (2 million square meters). We have also set up 18 training institutes such as Hongrun Family Farm, Gede E-commerce Company Ltd., and Taizhou Farmers Sci-Tech Training Institute etc. Our college has since been awarded honorary titles by Chinese Ministry of Agriculture such as “National MPF Training Base”, “Modern Agricultural Technology Training Base of Ministry of Agriculture”, “Jiangsu Vet Training Center”, and “Jiangsu Farmers Training Base”.

(2) Set up research mechanism and map out the MPF cultivation plan

Our college has developed matched “MPF Cultivation Course Menu” and “Distinct Syllabus”, along with “MPF Course Database” to cater to the needs of distance-learning and lifelong study of trainee farmers after careful research and discussion on cultivating schemes by experts. The school has developed over 20 different types of training handouts and course materials for MPFs in recent three years, among which the nationally-acknowledged and adopted ones “Start your agricultural startup-Agricultural Enterprise Building Courses”, “Eight Steps to Building an Agricultural Company” were awarded first prize in Jiangsu Province, “Agricultural Products Marketing Skills and Strategies”, “Development of Domestic and Foreign Family Farms” were awarded first prize for course materials in Jiangsu Province.

(3) Implement “Double-100” project and build up MPF Training Team

We spare no efforts on implementing the “Double-100” teachers’ training project, and selected

100 experts and scholars in relative fields from agricultural education to scientific research and technology promotion together with another 100 successful and prominent agricultural entrepreneurs from local areas to jointly establish the MPF Cultivation Database, where at least two experts teach each courser. At the same time, under the college's projects of "Stationing in enterprises and enriching farmers" and "Relying on counties to empower and enrich farmers", we chose famous experts and local agricultural workers to form Follow-up Service team to conduct reviews and elicit feedbacks from professional farmers and solve any problems that might crop up in the process.

(4) Strengthen the completion of rules and regulations to ensure the quality of MPF cultivation

To improve organization setup and rules-making, we put forward policies such as "Implement 'Three Projects', earnestly substantiate 'Three Rurals'", "Notice on establishing Sci-Tech Service Team", "Notice on the implementation of 'Hundred Teachers Prospering Hundred Villages'", we also drafted and perfected "Ways of implementing social training", "Management on Trainees", "Management on Teachers", "Follow-up Service Policies" etc, in order to ensure the quality of MPF cultivation.

(5) Create a unique brand for Jiangsu Agri-animal Husbandry Vocational College and have achieved great success of MPF cultivation.

By combining different measures and strands of resources into one force, our MPF cultivation work has achieved great success. In recent three years, our college has held over 600 training sessions for 31 provinces and cities, trained more than 50,000 professional farmers ranging from family farmers, large-scale farmers, college graduates cadets, to agriculture-related majors etc. Xinhua News Press, CCTV and Jiangsu Education TV Station have all covered extensively on our "Three Rural" Project, in three years we got about 300 pieces of coverage from different news presses. Two case studies have been listed in "2012 Yearly Report On the Quality of Chinese Higher Vocational College Education"; One case study has been written in "Chinese Higher Education-Vocational Education: 10 years laying foundation for regional coordinated development"; Two case studies being chosen in Achievements Exhibition of The Fifth National Key Vocational Colleges; Our college has received honorary titles such as "Distinct Contributing Unit for Provincial Enriching-Farmers Project", "Provincial Outstanding Contributor For Empowering Farmers with Science and Technology", "Provincial Advanced Unit for Agricultural Technology Promotion", for 5 consecutive years we also garnered more than 20 awards such as "Provincial Advanced Unit for Enriching Farmers Project", and "2015 Yearly Advanced Work Unit for MPF Cultivation By Ministry of Agriculture".

4. Suggestions on the cultivation of MPFs

4.1. Speed up the integration of resources and draft the training plan for MPF

Local regions need to draft a plan according to the requirements from various national ministries and committees, integrating different kinds of programs so as to create a unified plan for MPF training. Currently, from local government to the central committee, a consensus on MPF cultivation has been reached. Since 2012, the Ministry of Agriculture has initiated the pilot project for MPF cultivation, proposed to cultivate 10,000 MPFs within the next 3 years by selecting 100 pilot counties and choosing 2 to 3 major industries from each county according to the distribution of agricultural industries.

4.2. Increase investment in educational training and speed up the transformation of traditional ideologies among MPFs

In the cultivation of MPFs, transformation of ideologies is the prerequisite of realizing all-around development for farmers, which holds great importance for training work. Farmers are the main body of MPF cultivation, so our country increase the investment in rural education and encourage farmers to go into the classrooms during slack season to improve their literary and scientific awareness and absorb scientific knowledge and culture. In this manner, farmers treat farming as a profession and set enriching themselves as the ultimate goal while building up the farm enterprises on their family farms.

4.2. Innovate multivariant cultivation modes and focus on practical teaching

For the now MPF cultivation institutes mainly sit in public organizations (such as vocational schools, agricultural broadcasting schools and higher agricultural colleges), as to some short-term training programs, due to various reasons, the training effectiveness has been low. To solve this, firstly we should launch school-enterprise cooperation, joining farmers' cooperatives and training institutes together to run MPF cultivation so as to improve the training's relevancy and practicality. Secondly we should establish long-term plan and follow-up service mechanism so as to implement "life-long learning and service plan"; thirdly we should further improve our trainers' team, follow-up service team and online courses as well as hatching bases; fourthly, we need to fully make use of our demonstration role and radiate our strength to other areas, summarize the model students and increase promotion of the training programs, using word-of-mouth to motivate farmer learners; lastly, we should properly guide agriculture-related majors in colleges to become prospective MPFs.

4.3. Perfect legislation and timely issue legal guidelines for MPF cultivation

Developed countries such as America, Germany and Japan attach great importance to legislation to protect the cultivation of MPFs. Currently, in China, the relevant laws only stipulate some basic guidelines for MPF cultivation while lacking operability. Under the great initiative to develop modern agriculture and intensify urban-rural development, we need to issue proper laws and regulations on MPF cultivation so as to legalize and systemize MPF cultivation. To be specific, firstly the complete training system should be finished; secondly to establish rule system recognized by MPFs; thirdly, we need to reinforce our efforts to increase land circulation, investment in agricultural infrastructure and credit financing etc so as to increase the attractiveness of agricultural sectors.

References

1. Chen Beilei, Tong Juxi. Thoughts and Strategies on Enhancing MPF Cultivation at Local Government Level [J]. Guizhou Agricultural Science. 2013, 41(6);249-251
2. Li Wenzhong, Jiao aiying. The Problems and Solutions of MPF Cultivation [J]. Agricultural Economy and Science. 2013, 24(10).192-194.
3. Xu Hao. MPF Cultivation: Ways and Measures [J]. Chinese Distance Education. 2012,11(5):70-73.
4. Guo Zhiqi, Qi Guo, Yang Hui etal. Research on MPF Cultivation [J]. Chinese Vocational

Education, 2012, 15:7-13

5. Li Wei. A Research on the Problems of MPF Cultivation [D]. Southwestern University of Finance and Economics. 2014

6. Han Na. Chinese MPF Research [D]. Dalian Maritime University. 2013

新型职业农民培育的问题、实践与思考

——以江苏农牧科技职业学院为例

袁华根 奚照寿 蒋春茂¹

(江苏农牧科技职业学院, 江苏泰州, 225300)

摘要: 新型职业农民是我国发展现代农业重要的人力资源支撑, 培育新型职业农民是我国农业现代化和全面建设小康社会的必然战略选择, 更是当前“三农”工作的重中之重。本文分析了现阶段我国新型职业农民存在的问题, 并以江苏农牧科技职业学院新型职业农民培育实践为例, 提出我国新型职业农民培育的新模式、新思路, 探索促进新型职业农民培育的思路和对策。

关键词: 新型职业农民; 培育; 问题与思考

随着我国工业化、城镇化与农业现代化进程的加快, 农民不断向非农领域和城镇迁移, 农产品生产、加工、流通、销售等领域的分工更趋细化, 从事农业的人口不断减少。为解决“谁来种地”和“怎样种地”的问题, 国家高度重视新型职业农民培育工作, 每年有近20万人通过各种形式的培育, 经过认定成为新型职业农民。但是, 由于起步晚, 传统观念束缚等原因, 培育政策、模式和运行机制不完善, 缺乏系统研究, 我国新型职业农民培育工作仍然存在诸多问题。本文分析了现阶段我国新型职业农民存在的问题, 并以江苏农牧科技职业学院新型职业农民培育实践为例, 提出我国新型职业农民培育的新模式、新思路, 探索促进新型职业农民培育的思路和对策, 以加快我国农业现代化建设的步伐。

一、新型职业农民的缘起与内涵

2005年, 我国农业部在《关于实施农村实用人才培养“百万中专生计划”的意见》中首次提出培养“职业农民”的意见; 2006年, 中央1号文件《中共中央国务院关于推进社会主义新农村建设的若干意见》首次正式提出培养“有文化、懂技术、会经营”的新型农民, 其中职业农民是主体; 自2012年起, 中央一号文件连续四年强调要“大力培育新型职业农民”, 这是中央立足全局与长远, 着力解决“谁来种地”“如何种好地”的关键问题, 为突破现代农业发展瓶颈、补齐现代农业发展短板, 并最终实现城乡一体化统筹协调发展而采取的明智之举, 可谓内涵丰富、意义深远。

¹ 袁华根, 1981年6月生, 男, 江苏农牧科技职业学院, 讲师, 硕士研究生, 主要研究方向为动物营养与思路科学、新型职业农民培育等。

新型职业农民是指以农业为职业、具有一定的专业技能、收入主要来自农业的现代农业从业者。分为三大类型：

1. 生产经营型职业农民。生产经营型职业农民，是指以农业为职业、占有一定的资源、具有一定的专业技能、有一定的资金投入能力，收入主要来自农业的农业劳动力，主要是专业大户、家庭农场主、农民合作社带头人等。

2. 专业技能型职业农民。专业技能型职业农民，是指在农民合作社、家庭农场、专业大户、农业企业等新型生产经营主体中较为稳定地从事农业劳动作业，并以此作为主要收入来源，具有一定专业技能的农业劳动力，主要是农业工人、农业雇员等。

3. 社会服务型职业农民。社会服务型职业农民是指在社会化服务组织中直接从事农业产前、产中、产后服务，并以此为主要收入来源，具有相应服务能力的农业社会化服务人员，主要是农村信息员、农村经纪人、农机服务人员、统防统治植保员、村级动物防疫员等农业社会化服务人员。

二、现阶段我国新型职业农民培育存在的主要问题

1. 农业从业人员受传统观念禁锢

我国是农业大国，从事农业的生产者受几千年传统农耕文化的禁锢，随着科技发展和农民工大潮的兴起，现阶段我国的农民队伍主要由留守妇女和留守老人为主体。这个群体主要有三大问题。一是文化程度偏低。我国平均每100个务农农民中，仅有小学、初中学历的占到70%以上。二是科技素质较低。以农用拖拉机保有量为例，意大利、韩国、英国等发达国家农用拖拉机保有量为2667.7台/100km²，1525.7台/100km²，728.0台/100km²，而我国仅为146.7台/100km²，落后于主要发达国家和地区20年。三是主体观念和法制意识缺乏。在市场经济的大背景下，我国农民不同程度地存在着政策观念淡薄、封闭保守、理想信念淡化、价值观失衡等现象，且对国家颁布的法律法规的认识率不足5%，甚至对《农业法》、《农村土地承包法》也缺乏基本了解。

2. 培育模式单一陈旧

目前，我国新型职业农民培育主要采用集中授课的传统培训模式，缺乏针对性和有效性。该模式存在以下问题：一是缺乏培育需求调研，培训课程和内容千篇一律，所教授的农业知识和技术缺乏针对性和有效性；二是以理论讲解为主，即使有实践操作，也是“蜻蜓点水”，没有达到传递农业科研成果的实际效用；三是许多培训机构主要以完成培训任务为主，只要完成规定的培训时间，就算培训任务完成，是不是能学以致用，不去了解，更缺少对参训者在后期的生产经营过程中进行有针对性的跟踪指导。

3. 职业农民培育缺乏有效整合和认定管理

目前中央有十几个部委都组织实施了农民的教育培训项目,各部门都有自己的农民培训专项资金,但缺少统一领导规划,相互之间缺乏衔接,项目的随意性比较大、持续性比较差,造成了培训资源的浪费,使培训效果达不到预期目标。同时国家缺乏对培训机构的资质、培训情况的审核和调查,未建立一套行之有效的考核机制,加之地域之间的差异,也缺乏可行的新型职业农民认定评价标准,农民无法有效参与对培训工作的监督评价。

三、新型职业农民培育的实践研究

江苏农牧科技职业学院一直紧紧围绕地方农业经济发展需求,充分发挥人才、技术、成果和基地等优势,创新培育职业农民模式,取得了一定的成效。

1. 培育理念与模式

(1) **倾情服务“三农”的办学理念。**学院牢固确立“紧扣农牧产业链办学”的办学理念,围绕农牧产业链设置了动物科技学院、动物医学院、园林园艺系、水产科技系、农商管理等 10 个二级院系、46 个专业,15000 名在校生中涉农大学生占 70%以上,每年举办涉农大学生新型职业农民创新创业培训,全力培育后备职业农民。

(2) **“按需培训、全程跟踪”的培育理念。**学院职业农民培育宗旨是围绕地区农业主导优势产业和农民需求,适应成人学习和农业生产规律,制定新型职业农民培育方案和规划,全程记录,实现学员培训过程和离校后全程服务、跟踪服务。

(3) **“社会培训与学历提升”双轮驱动理念。**在落实好培育环节的同时,注重大专、本科学历教育、职业技能鉴定在新型职业农民中的推广,“社会培训与学历提升”双轮驱动既检验了职业农民学习效果,又推动了农民从传统农民向职业农民转变。近三年 600 多名新型职业农民报考我院成人学历教育,开展职业技能鉴定 3000 余人次。

(4) **精心打造“1332”的培育模式。**积极开展培育职业农民实现路径的研究,精心打造“1332”培育模式(1 个核心——以能力培养为核心设置课程;3 个环节——集中授课、生产实践、跟踪指导,3 个重点——创业能力、专业技能、信息技术;2 个调查——培训前开展需求调研摸底、培训后座谈会和调查表检查培训效果)。在“1332”模式下,形成了一系列行之有效的实现形式。一是**“科技入户”形式**。学院先后在滨海、海安、泰兴等地建立苏姜猪、黑羽番鸭、“苏牧 1 号”白鹅配套系等畜禽新品种繁育示范基地,累计培育科技示范户 200 户,科技示范带动户 1000 户,建成 10 个产业特色明显的“一村一品”专业示范村和 3 个特色明显的养殖示范基地。二是**“校地协同”形式**。洪泽县是四季鹅养殖重点县,养鹅业一直被“生产力不高、竞争力不强、规模化较低”等因素长期困扰,我院与该县紧密对接,联合开展了为期 1 年的鹅产业新型职业农民培训,经过一年的培训和随后的跟踪服务,10 名学

员成功走上了创业之路。三是**“校企合作”形式**。依托中国现代畜牧职教集团（联盟）积极推广生态健康养殖模式，建设高邮市红太阳食品有限公司泰州高邮鸭育种分公司、常泰农牧科技有限公司 2 家“校中厂”，三年培育养殖企业员工和养殖户 21000 余人次。

2. 举措与成效

（1）整合多方资源，打造职业农民培育平台。学院充分整合资源优化培训条件，打造现代化新型职业农民培育基地。先后建成农业科技培训中心、畜牧兽医技术培训推广中心和农民实用技术培训中心 **3 个培训中心**，培训教室（会议室）、学员餐厅、实训室等硬件配套设施优良，能同时容纳 700 人培训；建有江苏现代畜牧科技园、江苏中药科技园和倍康药业 **3 大实训基地**，占地 3000 余亩；建成泰兴市宏润家庭农场、泰州歌德电子商务有限公司等 18 家校外培育孵化基地和泰州市农民科技培训学院；学院先后被农业部认定为“全国新型职业农民培训基地”、“农业部现代农业技术培训基地”、“江苏省现代农业技术培训基地”、“江苏畜牧兽医技术人员培训中心”、“江苏省农民培训基地”。

（2）建立调研机制，制定职业农民培育方案。学院在充分调研的基础上，有针对性地制定培育实施方案和教学计划，组织专家对培育方案进行研讨论证，开发配套“新型职业农民培育课程菜单”和特色教材，建设“新型职业农民课程资源库”，满足参训农民的多样化、个性化需求，满足远程学习和终身学习需求；学院近三年开发新型职业农民系列培训教材（讲义）20 套，其中全国通用培训教材《开始你的农业创业—农业创业培训教程》、《农业创业八步走》获江苏省农民培训教材一等奖，《农产品营销策略与技巧》、《国内外家庭农场发展》获江苏省农民培训教学课件一等奖。

（3）实施“双百工程”，组建职业农民培育师资团队。大力实施培训师资“双百工程”，从全省农业教育、科研和技术推广等部门遴选 100 名相关领域理论功底厚、经验丰富的专家教授，吸纳 100 名农民创业典型和地方行业专家，共同组建学院新型职业农民培育师资库，确保每门课程至少两名专家授课。同时，依托学院“驻企兴农工程”、“挂县强农富民工程”，由知名专家教授、地方农技人员组成跟踪服务团队，对职业农民跟踪回访，协助解决发展中的难题。

（4）加强制度建设，保障职业农民培训质量。完善机构设置和制度建设，制定出台了《实施“三大工程”，切实服务“三农”的意见》、《关于成立六大对外科技服务团队的通知》、《实施“百师兴百村”计划的通知》等文件，制定完善了《社会培训实施办法》、《培训学员管理办法》、《培训教师管理办法》、《跟踪服务管理办法》等一系列管理制度，有力保障新型职业农民培训培育质量。

(5) 打造牧院品牌，培训工作取得显著成效。多措并举，形成合力，培训工作成效显著。近三年来，学院累计为全省 31 个市县举办各类培训 600 余期，培育家庭农场主、种养大户、大学生村官、退役士兵、涉农专业大学生等各类新型职业农民 5 万多人次。新华社、中央电视台、江苏教育电视台等中央和省级新闻媒体聚焦我院职业农民培训和科技服务“三农”工作，三年内各类报道近 300 次。2 个案例入选《2012 中国高等职业教育人才培养质量年度报告》；1 个案例被写进了《中国高等教育》高职教育：为区域协调发展奠定基础的十年；2 个案例入选第五届国家示范性高职院校建设成果展示会；学院先后获得“省挂县强农富民工程突出贡献单位”、“省科技富民突出贡献单位”、“省农业科技推广先进单位”，连续五年获“省挂县强农富民工程先进单位”及“2015 年度农业部新型职业农民培育工作先进单位”等 20 多项荣誉称号。

四、新型职业农民培育的建议

1. 加快培训资源整合，拟定农业职业培训规划

地方需就国家各部委开展的涉农培训项目进行统一规划，拟定农业职业培训计划，将各种涉农培训项目整合到新型职业农民的培育中来。目前，从中央到地方，已对培育新型职业农民的重要性形成了共识。2012 年起，农业部启动并实施了新型职业农民培育试点工作，提出力争在 3 年内，选择 100 个试点县，每个县根据农业产业分布选择 2-3 个主导产业，培育新型职业农民 10 万人。

2. 加大教育培训投入，促进农民转变传统观念

在新型职业农民培育中，转变思想观念，是农民实现全面发展的前提，对培育工作具有十分重要的意义。农民是新型职业农民培育的主体，国家加大农村教育培训投入，鼓励农民在农闲时走进教室、走入农村文化室，提升文化修养和科技素质，学习新知识新文化，真正把农民作为一种职业看待，把创业致富成为自己的发展目标，把家庭农场作为农业企业来打造。

2. 创新多元培训模式，注重实践教学

目前新型农民培育的机构主要集中在公立机构（职业学校、农业广播电视学校和高等农业院校），对一些短期培训项目，其培训成本高、监督难、效果不明显。一是要开展校企合作，由农民专业合作社和农业企业与培训机构合作开展新型职业农民培训，提高培育的针对性和实践性。二是要建立培训计划和跟踪服务的长效机制，大力实施“终身学习与服务计划”；三是要进一步加强培育师资库、跟踪服务专家团队、网络课程资源、孵化基地等培育资源建设；四是要充分发挥示范作用和辐射效应，总结培育典型，加大宣传力度，以点带面激发农民积极性；五是要积极引导涉农大学生成为未来职业农民。

3. 完善立法保障，适时出台培育新型职业农民的法律法规

美国、德国、日本等发达国家十分重视通过立法来保障职业农民的培养工作。我国现行的一些法律只对农民教育培训只作了一些原则性的规定，缺少可操作性。在我国大力发展现代农业，全面加强城乡统筹和新农村建设的背景下，适时出台关于新型职业农民培育的法律法规，使新型职业农民的培育制度化、法制化。具体来说，一是要进一步健全农民职业教育培训体系；二是要建立职业农民认定制度；三是要加大土地流转、农业基础实施投入、金融信贷等方面的扶持力度，提高农农业行业的吸引力。

参考文献：

- [1]陈蓓蕾,童举希.地方政府促进新型职业农民培育的思路与对策[J].贵州农业科学.2013,41(6):249-251
- [2]李文忠,焦爱英.新型职业农民培育过程中存在的问题与对策研究[J].农村经济与科技.2013,24(10):192-194
- [3]许浩.培育新型职业农民:路径与举措[J].中国远程教育.2012,,11(5):70-73
- [4]郭智奇,齐国,杨慧等.培育新型职业农民问题的研究[J].中国职业技术教育,2012,15:7-13
- [5]李伟.新型职业农民培育问题研究[D].西南财经大学博士学位论文.2014
- [6]韩娜.我国新型职业农民培育问题研究[D].大连海事大学.2013

Research on Cultivation of Young Farmers' Entrepreneurship

——Practice and Policy Revelation in Chongqing

Hongjing Zeng ¹, Cong Chen ², Xiaohui Yuan ³, Guangde Liu ²

(¹ Chongqing Beibei Teachers Training Institute, Chongqing 400700, China;

² Chongqing Agricultural Broadcasting and Television School, Chongqing 401121, China; ³ Southwest University, Chongqing 400716, China)

1. Introduction

China is a big agricultural country, in which the "Three Rural Issues" (issues of agriculture, the countryside and farmers) have been major concerns relating to the people's livelihood. Particularly, the issues of farmers, such as low income, low educational level and lack of health cares, are the key concerns. As the liberalization of China's household registration policy and the continuous advancement of urbanization, a large number of young and middle-aged farmers have chosen to become workers in cities. This emigration of farmers from rural areas has led urging social issues, such as underuse of farmland, lack of farming work force, imbalance of age populations in rural areas and imbalance of agricultural and industrial productivity. "Who will come farming?" and "How to farm effectively?" have been raised as two key questions about the current issue farmers in China. To solve these problems, the authority has put forward the strategy of "supporting the development of novel agricultural management modes", with its main focus on encouraging the establishment of multiple types of farming operators, including family farms (large individual agricultural operators), agricultural cooperatives and corporatized agricultural enterprises. The major goal of this strategy is to enhance farmer's ability of self-development and self-service as well as their general competitive power.

To explore and develop novel agricultural management modes, it is of great importance to cultivate young agricultural managers because a successful management of either individual farms or agricultural cooperatives requires outstanding management professionals and their entrepreneurial abilities. In China, most of the existing agriculture practitioners are still poorly trained or undereducated, lacking professional skills that can meet the needs of modern agricultural management. In order to cultivate a group of potential modern young farmers, the Ministry of Agriculture, in cooperation with the Ministry of Education and the Central Committee of the Communist Young League, has launched the implementation of the "Young Farmer Cultivation Program". The main expectations of this program are to enhance the entrepreneurial awareness of future agricultural managers and improving their entrepreneurial abilities. As the pioneer of the innovation and development of rural entrepreneurship, the future agricultural professionals are expected to exploit advanced science and technology in production, to adapt successful modern business management modes into agricultural entities. and so as to accelerate the process of agricultural marketization and modernization.

By investigating the sample cases of training practice in Chongqing, this study will discuss the basic path to cultivate young farmers' entrepreneurial capacity based on the theoretical analysis of its connotation, constituent elements and characteristics.

2. The Basic Connotation and Components of Young Farmers' Entrepreneurship

2.1 Connotation

Generally, entrepreneurship is an autonomous, creative process of spending efforts, bearing the systemic risk alone, and ultimately getting the reward. It has been emphasized that entrepreneurs should have the ability to bear potential risks, to invest efforts and time and to create value. The term "entrepreneurship" refers to the whole process of the establishment of an agricultural business entity via entrepreneurial integrating various factors of production, managing the production process and business and enabling the entity to become a competitive enterprise in the market. As an entrepreneur, young farmers have to be equipped with certain entrepreneurial abilities. As pointed out by Sayy, a famous economist, the entrepreneur is the leader, organizer and manager of the entrepreneurial process. Only those entrepreneurs with accurate judgment, strong perseverance, broad knowledge and superior management ability can become successful.

Based on the specific characteristics of the agricultural industry and the current agricultural policy, I believe that the entrepreneurial capacity includes young farmers' abilities of engaging in production and operation, developing creativities, managing and serving their own business activities. To be more specific, these abilities are related to ones intelligence, knowledge, thinking style, personality, motivation and other aspects of the characteristics. As Drucker puts it, "Anyone who dares to face decision-making is likely to be an entrepreneur with entrepreneurial spirit through learning." Entrepreneurs are not born with these special abilities, while they need to acquire entrepreneurship via education, training, and practice. The success in cultivating young agricultural entrepreneurs will bring new energy to the development of China's modern agriculture and have a positive impact on the society. Thus, it is worthwhile to investigate the potential and the feasibility of the "Young Farmer Cultivation Program".

2.2. Constituent elements

The entrepreneurial capacity of young farmers includes several comprehensive abilities (or characteristics): entrepreneurial knowledge, entrepreneurial skills and entrepreneurial spirit.

Entrepreneurial knowledge is the fundamental element. Without entrepreneurial knowledge, the possibility of entrepreneurial success approximates to zero. Before the venture of starting a business, young farmers should be equipped with certain entrepreneurial knowledge. Entrepreneurship knowledge by category, includes comprehensive knowledge and professional knowledge. Comprehensive knowledge refers to the knowledge of laws and regulations, finance, market management, land ownerships, etc. Professional knowledge refers to the management of the specific agricultural production and operations. It is said that theoretical knowledge serve as the guidance of practices. To start a business without entrepreneurial knowledge is like a pool of passive water, which will never find a way out.

Entrepreneurship skills are the key to a successful agricultural business. Starting an agricultural business requires the engagement of young farmers in person to incorporate theoretical knowledge into the practice. This means that young farmers should be able to handle all the decision-making and problem-solving processes with their comprehensive entrepreneurial skills. Entrepreneurship skills include: management skills, interpersonal skills, unity and collaboration skills, information collection skills, agricultural skills. With entrepreneurial skills, one can get scientific entrepreneurship, and successful business.

Entrepreneurial spirit is the driving force. The Schumpeter theory tells us: the entrepreneurial spirit is composed of five important factors, including the spirit of the being first, the desire to succeed, the willingness and a positive attitude to risk, keen awareness of opportunities and a strong sense of dedication. Entrepreneurship is a good way to capture opportunities, dare to bear the necessary risks, to create a new value, and strive to play to creativity, to achieve innovation and a bold culture and psychological process. As a Chinese old saying goes: "one must try to solve problems before asking for help from others". The internal factors are the key to the development of things. A young farmer without entrepreneurial spirit will never succeed even with sufficient financial and policy support. It can be seen that the entrepreneurial spirit should include the spirit of innovation and entrepreneurial mentality. Innovation is the soul of a nation's progress and an inexhaustible motive force for the prosperity of a country. Young farmers should have the courage to innovate in the entrepreneurial spirit and dare to bear the risks during entrepreneurial process such as opportunity risk, technical risks, market risks, financial risks and management risks. In addition, they should have the senses of perseverance, unity, cooperation and integrity so as to promote entrepreneurship to success.

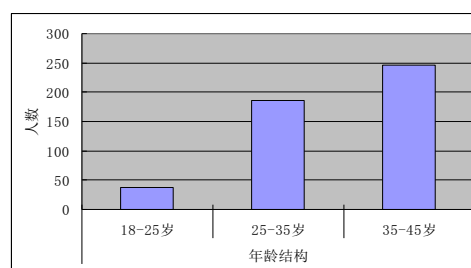
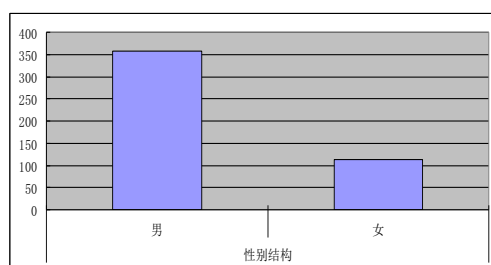
3. Experiences of Cultivating Young Farmers' Entrepreneurship – Chongqing Practice.

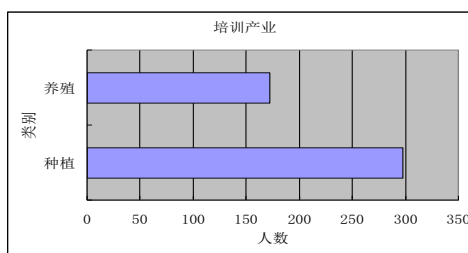
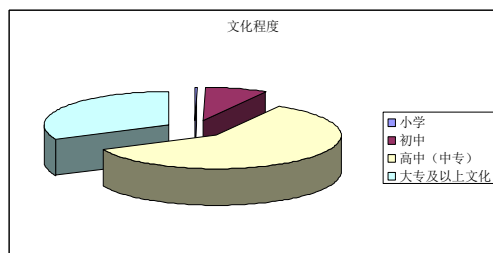
Chongqing is a big city undergoing a pilot trial of the “cities aiding rural development program”. The existing social issues in surrounding rural areas of Chongqing serve as a typical example of the Three Rural Issues and they are urging to be solved. Following the instructions of the “Young Farmer Cultivation Program”, Chongqing has launched a trail in 2015, cultivating 470 modern young farmers in different groups based on the industrial classification of their business.

3.1 Samples and data

The data shows that young farmers participated in the training were mostly entrepreneurs in the “35 to 45-year-old” group, while those trainees in the “30-year-old or less” group account for a smaller proportion. In general, male trainees account for a larger proportion compared to the females. The overall educational level of all trainees was considered relatively high, as there are 281 people (~60%) with high school (secondary) education, 150 people (~32%) with college degree and only 39 people with junior high school education. The vast majority of trainees were migrant entrepreneurs with business experience, having been exposed to market competition and modern business management.

In terms of their business types. Those who engaged in farming industry accounted for a higher proportion compared to those of livestock industry. In addition, their business sizes vary.





In those businesses in the farming industry, there were 238 entities that possessed 500 acres of farmlands, 26 with 500-1000 acres and 35 entities with more than 1,000 acres. The number of entities with a fixed asset of 500 million Yuan or below was 252, while the ones with 500-1000 million Yuan and with more than 10 million Yuan were 25 and 22, respectively. 85 entities had an annual income of 100 million Yuan or below and 35 had an income between 100-300 million Yuan while the number of entities with an annual income more than 3 million was 179.

In those businesses in the livestock industry, there were 50 entities that possessed less than 500 animals, 8 with 500 -1000 animals and 28 entities with 1000 animals or above. The number of entities with a fixed asset of 5 million Yuan or less there are 77, while the ones with 500-1000 million Yuan and with more than 10 million were 6 and 3, respectively. 59 entities had an annual income of less than 1 million, 14 had 100-300 million and 13 had more than 3 million.

In general, the current young farmers' operating capacity has a certain advantage over traditional farmers. They have more social resources, capital, have a high level of knowledge and social experience, and have strong market awareness and the desire to achieve business success. Based on their current situation, however, these entrepreneurs still cannot not satisfy the need for China's agricultural modernization requirements and there is space for improvement in terms of their entrepreneurial capacity.

3.2 A summary of the practice of Young Farmers' Cultivation Ability in Chongqing

3.2.1 Cultivation methods and effectiveness

In order to implement the spirit of the Central No. 1 document, and vigorously enhance the entrepreneurial capacity of young farmers in Chongqing, 2015, Chongqing, the implementation of the young farmers to nurture action launched for the first time. The cultivation of modern young farmers is carried out by the Ministry of Agriculture, the Ministry of Education and the Central Committee of the Communist Young League. The whole cultivation program is implemented in three stages, namely training guidance, business incubation and the post-training service. The program lasts for three years with two years of training and one year of post-training service. The subjects of training were classified into three categories: farming, livestock husbandry, aquaculture and respectively held by the Chongqing Agricultural Broadcasting and Television School (the main training institutions), Chongqing Three Gorges Vocational College, Chongqing City. Before the onset of the program, candidate trainees were selected in strict accordance with the online declaration (modern young farmers reporting system) and their qualification were reviewed by county-level and provincial committees to ensure a good quality of selected trainees. In addition, the training schedules were well-planned in order to fit the temporal and professional needs of the trainees. Moreover, trainers were selected a group of experts with

professional knowledge and practical abilities. During the training program, trainees need to attend both lectures and practical trainings. Practical trainings were performed during the visit to the Bishan wan-mu vegetable industry base, Yongchuan modern agricultural park, Yongchuan has Hu Xin family farm, Nanchuan Lanbo Yuan family farm, Qijiang agricultural expo park and other modern agricultural demonstration base and family farm representatives. These trips served as case studies and allowed trainees to gain experience on agricultural entrepreneurship. After the training, each trainee was granted 10,000 Yuan of support fund and given post-training service. In 2016 the Chongqing Government has granted 31 municipal young entrepreneurs with 150,000 yuan each as business incubation support and establish incubator demonstration base in their respective business entities. Through the systemic training the policy support, young farmers were able to gain entrepreneurial knowledge and skills, and strengthen their entrepreneurial abilities.

3.2.2 Main experience

Through the early practice, I believe that when performing the cultivation of young farmers' entrepreneurial capacity, we must pay attention to the following two major aspects. First, the training program should fit the need of regional development. The level of development of regional economy directly affects the flow and stock of urban and rural labor force, the level of agricultural development and the employment situation, the transformation of agricultural scientific and technological achievements, thus affecting the composition of young farmers to cultivate the main body, cultivate the main ability and training mode change. Governments at all levels and agricultural authorities should strengthen theoretical research and policy research on young farmer cultivation, strengthen top-level design, and provide guidance for fostering young entrepreneurs' entrepreneurial capacity. Secondly, the training program should fit the need of business environment. Before planning for the training, the government should investigate the business environment in local countryside, carry out thorough research on the quantity, quality level and talent type of the industrial leaders, and formulate scientific cultivation plans that include five aspects: education and training, business incubation, management, policy support and post-training service. By doing so, the plans of training will fit the needs of the local agricultural entrepreneurs and can enhance their entrepreneurial capacity more effectively. Potentially, the success of training can increase employment rate, make farmers become more wealthy, beautify rural areas and modernize China's agriculture.

4. Reflections on Deepening the Cultivation of Young Farmers' Entrepreneurship

4.1 Further stimulate social demand of entrepreneurship

To encourage more entrepreneurial young farmers, we must stimulate the social demand of entrepreneurship. As a rational investors, people tend to maximize the rewards and minimize the risk during cost-benefit analysis, decision making and career path choosing. This also applies to the young farmers who are about to start their own business. Before the start of their business, the young farmer will compare entrepreneurial net income with the actual input costs. If the net income is greater than or equal to the cost, they will probably choose to start. This is the so-called principle of cost-benefit. To stimulate the entrepreneurial demand in the society, the state government departments should develop effective measures to gradually enhance the efficiency of agricultural industries, so that farmers income can become higher than or equal to the workers or business benefits. This would help stimulate the enthusiasm of young farmers entrepreneurship. In addition, all levels of government departments should

perform research and work out appropriate measures to ensure that young farmers understand technology, being funded appropriately, getting sufficient support from the policy, being able to bear risks and thus they are confident of starting their own agricultural businesses.

4.2 Further improve the education system of entrepreneurship education

4.2.1 Improve classroom education and training

To ensure young farmers are trained effectively, we must establish a set standardized educational and training system. Trainings should be classified based on different industrial types of business and be scheduled well to fit trainees' needs. In addition, learning materials, such as handouts, presentation slides and books, should be well prepared with systematic and standardized theoretical illustrations that can make it easy for trainees to understand and digest. It is also important to adapt the practical training content in different regions based their available educational resources. Training programs should be performed in accordance to the real situation, and prepared based on the actual needs of young farmers. Thus, training content should be flexible for adaptation. It is suggested to set up three types of theoretical courses, including Entrepreneurial Ideas, Public Knowledge and Professional Skills. The Entrepreneurial Ideas course aims to implement the concept of entrepreneurial education in young trainees to enhance their entrepreneurial awareness and cultivate their enthusiasm. The Public Knowledge course expects trainees to gain knowledge of social morality, laws, credit financing, land transfer, business management and production safety. The Professional Skills courses are prepared for enhancing trainees' practical skills of starting a business. Lastly, local experts qualified to become trainers of the program should be experienced entrepreneurs or expertise in their field, and be able to incorporate theory into practice during their teaching.

4.2.2 Upgrade base - experimental practice

The training programs should be performed based on the principle of "government leadership, departmental participation, overall planning and owners of voluntary" and establish modern youth farmers incubator bases. The incubator bases should have professional advantages, multiple training functions and be able to set up a role model of the entrepreneurship. Moreover, incubator bases should become an functional venue to cultivate the development of modern youth farmers training class and the growth of the cradle, the integration of agricultural science and technology achievements in the use of the base. The administrative departments of agriculture in various districts and counties should regard the modern youth farmer's incubator base as an important starting point for cultivating the main body of the new agricultural management and building a new agricultural management system. Local government should implement the specialized agencies and personnel to establish the "2 +2" tutor system, incorporate the local agricultural technology system reform with construction projects. In addition, governments should provide the incubator bases with "peer-to-peer" intelligence support and follow-up training services. The establishment of incubation base aims to comprehensively enhance the new modern young farmers entrepreneurial capacity, boost the modern characteristics of sustainable and healthy development of agriculture.

4.2.3 Set up a model - to observe

Successful training of entrepreneurial capacity not only requires knowledge inside the classroom, but also needs actual role models in the society. Thus, setting role models of entrepreneurship with agricultural entities in good business conditions, or large-scale family farms or modern agriculture demonstration bases can enable trainees to learn from succeeding

experience of others.

4.3 Further improve the government functions, good business services

The government should play its own advantages of information resources and build efficient young farmers entrepreneurial service information platform to achieve information resources sharing. Entrepreneurship information service platform includes policies and regulations, all kinds of support funds, agricultural parks, projects, expert tutors, talent and material supply. These platforms make it easier for young farmers to access information and to make inquiries. In addition, there is a need to build a platform for entrepreneurship development cooperation. Chongqing is the first city to establish "Youth Farmers Union", with its goal of accelerating the construction of agricultural entrepreneurship platform. This union plans to build more facilities in addition to the existing modern agricultural park. This includes a business park and a science and technology incubator base. Strengthen the "Nong Guang Zhi Yun" wisdom farmers cloud platform construction, the application of cloud computing technology, innovation and integration of existing means and resources for the majority of farmers and new professional farmers, to provide one-stop set of vocational education, skills training, market information, Early warning, expert advice in one of the intelligent service platform.

4.4 To further improve the relevant policies to provide protection

The government should provide agricultural entrepreneurs with policy supports and benefits in aspects of rural land transfer, agricultural infrastructure construction, financial credit, agricultural subsidies, agricultural insurance and social security incline. In addition, there is a need for increasing financial support for new agricultural entrepreneurs, setting up entrepreneurial funds and establishing long-term investment methods. We should focus on increasing the conditions for cultivation and capacity building, strengthening the construction of teaching and training base, improving the conditions of education and training, and enhance the ability of education and training. All these supports will ensure the sense of security in funding and project planning and arouse the entrepreneurial enthusiasm of young farmers.

青年农场主创业能力培育研究

——重庆实践及政策启示

曾洪靖¹, 陈聪², 袁晓辉³, 刘光德²

(¹重庆市北碚区教师进修学院, 重庆 400700; ²重庆市农业广播电视学校, 重庆 401121; ³西南大学, 重庆 400716)

一、引言

我国是一个农业大国,“三农”问题关系国计民生,其核心是“农民”问题。然而,随着我国户籍制度的放宽和城镇化的持续推进,大量青壮年农民选择进城务工,农村耕地撂荒现象严重,农村空心化、农业兼业化、农民老龄化已成为严重的社会问题,“谁来种地,如何种好地”矛盾凸显,亟待解决。在此背景下,国家提出了“扶持发展新型农业经营主体”的重要思路和策略,其重点是扶持发展家庭农场(农业经营大户)、各种类型的农业合作社、公司化农业企业等主体,增强其自我发展、自我服务和竞争能力。

在新型农业经营主体发展过程中,新型农业人才的培育是关键,因为无论是家庭农场、农业合作社还是农业企业,其创立和发展都需要具备创业精神和专业技能的人才经营管理,而现有农业从业人员的素质还有较大差距,不能适应现代农业发展需要。为此,农业部联合教育部、团中央启动实施了“现代青年农场主培养计划”,计划培养一批有潜力的现代青年农民,增强其创业意识,提高其创业能力,为现代农业发展注入新鲜血液,让他们作为农村创新创业先行者,将先进科学技术和生产方式、现代经营理念和产业发展模式引入农业,加快农业的市场化、现代化进程。

本文将在理论分析青年农场主创业能力内涵、构成要素及特征基础上,结合重庆样本及培育实践,探讨深化青年农场主创业能力培育的基本路径,以期为青年农场主培育工作的进一步开展提供参考借鉴。

二、青年农场主创业能力的基本内涵及构成要素

(一) 内涵

一般认为,创业就是通过努力,独自承担系统性风险,并最终获得报酬的自主性、创造性过程。强调企业家应承担风险、投入努力和时间、创造新价值以及获得报酬。本文所谓创业是指创业者整合各种生产要素,创建、经营一个带有企业性质、直接面对市场竞争的农业

作者简介:曾洪靖,女,硕士研究生,主要从事职业教育研究。

E-mail:zhj850916@sina.com

通讯作者:刘光德

E-mail:lgd336@sina.com

经营主体并促成其发展壮大的全过程。而作为创业者,青年农场主必须具备一定的创业能力。正如著名经济学家萨伊指出,创业者是整个创业过程的领导者、组织和管理者,而只有具有准确的判断力、坚强的毅力、渊博的知识和超群的管理能力的创业者才能获得成功。而

结合农业产业的具体特征和当前的时代政策背景,笔者以为,青年农场主的创业能力是指青年农场主在自主创业活动中,从事生产经营、创意开发、管理和服务等相关创业行为的能力,包括智力、知识、思维风格、人格、动机等多个方面的特质。正如德鲁克所说,“任何敢于面对决策的人,都可能通过学习成为一个创业者并具有创业精神”¹。创业者需要的这些能力并不是与生俱来的一种特殊禀赋,而是可以通过后天习得的,在创业能力的培养和发展过程中,社会环境的影响是积极正向的,这也正是“青年农场主培育计划”的意义所在。

（二）构成要素

青年农场主的创业能力是一种综合性的能力,主要包括创业知识、创业技能和创业精神。

1、创业知识是基础。没有创业知识,创业成功的可能性几乎为零。创业之前,青年农场主应具备一定的创业知识。创业知识按类别划分,包括综合知识和专业知识两大类。综合知识包括法律法规知识、金融知识、市场经营知识、土地流转知识等。专业知识指青年农场主所经营的农业产业知识。理论指导实践,如果没有理论知识作为支撑,创业便成了无源之水,无本之木,必定不能成功。

2、创业技能是关键。纸上得来终觉浅,觉知此事要躬行。青年农场主要进行创业,必须要将理论知识融入实践之中,身体力行。这就要求青年农场主必须具备综合性的创业技能。创业技能具体包括:经营管理技能、人际交往技能、团结协作技能、信息收集技能、农业技能等。有了创业技能,才能科学创业,成功创业。

3、创业精神是推动力。熊彼特理论告诉我们:首创精神、成功欲望、甘于冒险和以苦为乐、机会敏锐、强烈的事业心是构成创业精神的五大要素。创业精神就是善于捕捉和利用机会,敢于承受必须的风险,为创造某种新的价值,努力发挥创造力、实现创新的一种勇往直前的文化与心理过程。所谓“人必自助而后人助之”,内因是事物发展的关键,如果一个青年农场主没有创业精神,再多的资金支持、政策扶持都收效甚微。由此可见,创业精神应包括创新精神和创业心态。创新是一个民族进步的灵魂、是一个国家兴旺发达的不竭动力。青年农场主创业时应该具有勇于创新的精神,要敢于承担创业过程中面临的机会风险、技术

¹ 德鲁克:《创业精神与创新》[M]北京:工人出版社,1989

作者简介:曾洪靖,女,硕士研究生,主要从事职业教育研究。

E-mail:zhj850916@sina.com

通讯作者:刘光德

E-mail:lgd336@sina.com

风险、市场风险、资金风险和管理风险等各类风险；应有百折不挠、持之以恒、团结协作、诚信敬业的创业心态，如此才能推动创业迈向成功。

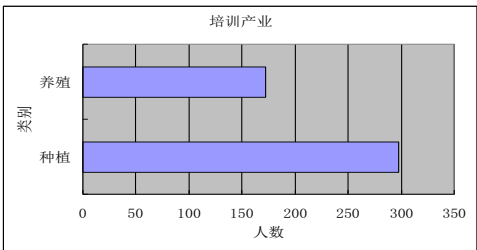
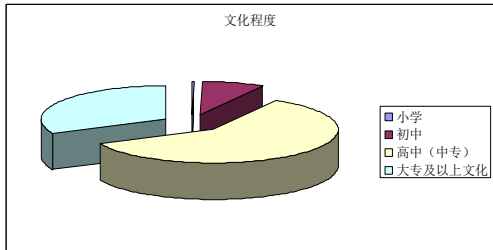
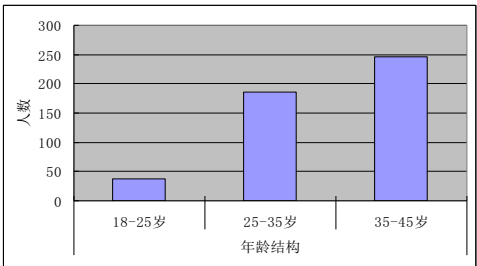
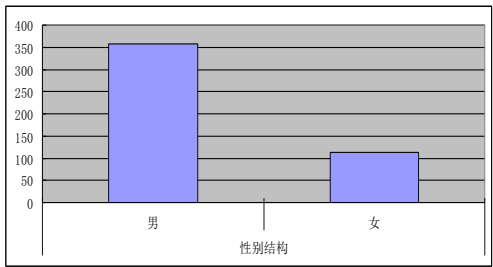
三、青年农场主创业能力培育经验——重庆实践

重庆是一个大城市带动大农村的城乡统筹发展试验区，农村空心化、农民老龄化问题较为突出，培育一大批青年农场主的任务非常迫切。遵循“计划”相关指示，重庆于 2015 年启动了实际行动，分类型、分产业培育了 470 名现代青年农场主。

（一）样本及数据

通过对参与培训的青年农场主的特征进行统计分析发现，创业者大多集中在 35-45 岁年龄段，30 岁以下者较少；男性比例较高，女性比例较小；文化程度相对较高，拥有高中（中专）学历的 281 人，约占总人数的 60%，大专及以上学历的 150 人，约占总人数的 32%，初中及以下文化的仅有 39 人。其中绝大多数创业者具有外出务工、经商经历，经历过市场竞争意识的洗礼，接触过现代经营管理理念的熏陶。

从经营情况看，从事种植业的创业者占比较高，从事养殖业的比例较小。经营规模参差不齐，差距较大。



据统计，在种植业领域，产业规模在 500 亩以下的有 238 家，500-1000 亩的有 26 家，1000 亩以上的有 35 家。固定资产在 500 万以下的有 252 家，500-1000 万的有 25 家，1000 万以上的有 22 家。年收入在 100 万以下的有 85 家，100-300 万的有 35 家，300 万以上的 179 家；在畜牧业领域，产业规模在 500 只/羽/头/箱以下的有 50 家，500-1000 只/羽/头/

作者简介:曾洪靖，女，硕士研究生，主要从事职业教育研究。

E-mail:zhj850916@sina.com

通讯作者:刘光德

E-mail:lgs336@sina.com

箱有 8 家，在 1000 只/羽/头/箱以上的有 28 家。固定资产 500 万以下者有 77 家，500-1000 万的有 6 家，1000 万以上者有 3 家。年收入在 100 万以下的有 59 家，100-300 万的有 14 家，300 万以上的有 13 家，

总体而言，当前的青年农场主的经营能力相较于传统农户具有一定的优势，他们拥有更多的社会资源、资本、具有较高的知识水平和社会阅历，也具有较强的市场意识和成就事业的欲望，但对于要承担中国农业现代化希望的要求而言，其创业能力还有较大差距，急需加大力度进行培育。

（二）重庆青年农场主创业能力培育实践总结

1. 培育方式及成效

为贯彻中央一号文件精神，大力提升重庆青年农场主的创业能力，2015 年，重庆首次启动实施了青年农场主培育行动。现代青年农场主培育是由农业部、教育部、团中央启动实施的，整个培育计划分三阶段实施，即培训指导、创业孵化、跟踪服务等系统的培育方式，培育时间为三年，其中培训二年，跟踪服务一年，分种植业、畜牧养殖、水产养殖 3 个专业，分别由重庆市农业广播电视学校（主要培训机构）、重庆市三峡职业学院、重庆市至品职业培训学校 3 个单位承担市级示范培训。启动前，严格按照网上申报（现代青年农场主申报系统）——县级审核—省级审核的方式，层层把关，精心遴选了一批青年农场主培育对象，科学制定培育计划方案，采取分时段、分产业的方式开展培训，同时，挑选一批具有专业知识和实践能力的专家作为授课教师。启动后，采取理论与实践相结合的方式培训。通过理论授课使青年农场主学员们增长了知识。通过实地观摩，学员们考察了璧山万亩蔬菜产业基地、永川现代农业园区、永川曾胡鑫家庭农场、南川蓝博园家庭农场、綦江农博园等现代农业示范基地和家庭农场典型代表，拓展了青年农场主学员们的见识。培训结束后，采取每个青年农场主扶持 1 万元的方式，进行后续跟踪服务。2016 年重庆首批确认了 31 个市级现代青年农场主创业孵化示范基地，每个给予 15 万元的创业孵化支持。通过系统的培育链条及各相政策支持，有力的提升了青年农场主的创业知识和技能，创业能力得以提升。

2. 主要经验

通过前期实践，笔者认为，青年农场主创业能力的培育一定要注意两个主要问题：一是要与地区发展相结合。地区经济的发展层次，直接影响城乡劳动力的流量与存量、农业发展水平与就业化境、农业科技成果转化，从而影响青年农场主培育对象的组成、培育主体能力

作者简介:曾洪靖，女，硕士研究生，主要从事职业教育研究。

E-mail:zhj850916@sina.com

通讯作者:刘光德

E-mail:lzd336@sina.com

及培育方式转变。各级政府与农业主管部门要加强对青年农场主培育的理论研究和政策研究,加强顶层设计,为培育青年农场主的创业能力提供指导。二是要与创业需求相结合。政府要深入农村,对主导产业发展需求的人才数量、素质层次、人才类型进行摸底调研,制定包括教育培训、创业孵化、认定管理、政策扶持和跟踪服务五个环节的科学的培育方案,满足生产实际和农民需求,提升他们的创业能力,从而带动就业,真正实现农民富、农村美、农业强的终极目标。

四、深化青年农场主创业能力培育的路径思考

(一) 进一步激发创业需求

要提升青年农场主的创业能力,就必须培育激发创业需求。作为理性的经济人,人们必然会根据自身利益最大化、风险最小化原则进行成本收益分析并做出理性职业选择。青年农场主繁荣创业决策过程亦是如此。创业前,青年农场主会对创业所得纯收益与实际投入成本相比较,如果纯收益大于或等于成本,他们才会选择创业。这就是所谓的成本收益原则。培育青年农场主的创业需求,一是国家政府部门要制定行之有效的措施,逐步提升农业产业效益,使务农收益高于或等于务工、经商收益,激发青年农场主的创业的积极性。二是各级政府部门要研究制定相应措施,确保青年农场主懂技术,有资金,享政策、控风险,使他们对从农充满信心。

(二) 进一步完善创业教育培训体系

1. 完善课堂一教育培训

要培育好现代青年农场主,必须要构建科学规范的课堂教育培训机制。一要分产业、分时段开展培训。二要甄选培训教材。要组织专家编写和制作科学、系统、规范、图文并茂、通俗易懂的青年农场主培训文字和其他多媒体教材,供课堂培训教材使用。三要因势利导,科学设置培训内容。坚持一切从实际出发的原则,结合青年农场主实际需要,灵活安排培训内容,综合设置创业理念、公共知识、专业技能三大类课程。通过开设创业理念类课程,对青年农场主实施创业理念教育,提升他们的创业意识,培养他们扎根农村创业的积极性;通过开设公共知识类课程,增加青年农场主的道德法律知识、信贷融资知识、土地流转知识、经营管理、安全生产知识,提升他们的创业能力;通过开设专业技能类课程,提升青年农场主的实用技术水平。四要聘请一批有思想、有专长的“土专家”,理论和实践相结合的“双师型”教师为青年农场主授课。

作者简介:曾洪靖,女,硕士研究生,主要从事职业教育研究。

E-mail:zhj850916@sina.com

通讯作者:刘光德

E-mail:lgd336@sina.com

2. 提升基地——实验实作

坚持“政府主导、部门参与、统筹规划、业主自愿”的原则，开展现代青年农场主孵化基地创建行动。确认一批专业优势明显，培训功能完善，具有一定示范带动作用的创业孵化基地，培育发展成为现代青年农场主培训的课堂和成长的摇篮，农业科技成果集成转化运用的基地。各区县农业行政主管部门要把现代青年农场主创业孵化基地作为培育新型农业经营主体带头人，构建新型农业经营体系的重要抓手。要落实专门机构和人员，加快推进“2+2”导师制，结合基层农技体系改革与建设项目，为创业孵化基地提供“点对点”的智力支撑和跟踪培育服务。通过建立孵化基地，全面提升新型现代青年农场主创业能力，助推现代特色效益农业持续健康发展。

3. 树立样板——考察观摩

培育青年农场主的创业能力不仅要在课堂学习理论知识，更应该深入田间地头，实地考察观摩。这就需要选择经营状况好、规模大的家庭农场、现代农业示范基地为样板，作为青年农场主们实地观摩的地方。

（三）进一步健全政府职能，做好创业服务

政府要发挥自身的信息资源优势，搭建高效的青年农场主创业服务信息平台，实现信息资源共享。创业信息服务平台包括政策法规、各种扶持资金、农业园区、项目、专家导师、人才和物资供应等创业相关信息，使青年农场主方便查询获取。搭建创业发展合作平台。重庆在全国率先创建“青年农场主联盟”加强农业创业平台建设，在现代农业园区设立创业园、科技孵化基地，为青年农场主提供支持。加强“农广智云”智慧农民云平台建设，应用云计算技术，创新整合现有手段和资源，面向广大农民和新型职业农民，提供一站式的集职业教育、技能培训、市场资讯、农情预警、专家咨询于一体的智能化服务平台。

（四）进一步完善相关政策，提供保障

政府要将土地流转、农业基础设施建设、金融信贷、农业补贴、农业保险、社会保障这些政策向青年农场主实行倾斜和优惠。要加大财政支持力度，将培育青年农场主所需的工作经费纳入财政预算，设立专项资金，建立长效投入机制。要着力加大培育条件和能力建设投入，加强教学实训基地建设，改善教育培训条件，提升教育培训能力。通过政策扶持，从项目、资金、保障等各方面给予青年农场主支持，使他们种粮务农不吃亏、得实惠，唤起他们的创业热情。

作者简介:曾洪靖，女，硕士研究生，主要从事职业教育研究。

E-mail:zhj850916@sina.com

通讯作者:刘光德

E-mail:lgs336@sina.com

Discussion of Agricultural Supply Side Structural Reform

Ming Wu

Gushi County Agricultural Broadcasting and Television School of Henan Province,
Gushi County of Henan Province 465200

Abstract: Optimization and reasonable allocation should be conducted on the agricultural production factors to change rural resources into rural internal capital and alleviate the contradiction between supply and demand of capital in the new rural construction; new professional farmers should be fostered to improve the level of rural labor force; the scale of creative agriculture development should be further expanded to improve the industry overall quality and benefits. Financial support should be enhanced for the rural infrastructure construction. The urban public services should be accelerated to extend to the countryside for the construction of beautiful villages and effectively promote structural reform of agricultural supply side.

Key Words: Agricultural Supply Side Structural Reform, Rural Resources, Creative Agriculture, Rural Construction

1. Supply and Supply-side Reform

The relationship of supply and demand is the core issue of economics research. Related research covers fields like the industry, resources, ecology, etc. In November 2015, in the 11th Meeting of Central Leading Group for Financial and Economic Affairs, General Secretary Xi Jinping put forward the “supply-side structural reform”, namely “when moderately expanding the aggregate demand, focusing on improving quality and efficiency of the supply system and strengthening sustained economic growth impetus”. The proposition of “supply-side structural reform” makes the “supply side” as key words of economic development in 2016 become a hotspot in the research of the academic circles recently.

Research on the supply side can be traced back to “Say’s Law” proposed by French economist in the early 19th century. The Law stresses the importance of supply and holds that supply automatically creates an equal amount of demand. However, there are some economists who believe that supply and demand are inseparable and emphasis can not be laid on either side separately. The core of supply-side reform is to reduce an enterprise’s institutional trading costs, including transaction costs, all kinds of taxes and fees, the cost of financing, social security costs, etc. This is conducive to enhancing the innovation ability of enterprises, improving supply quality and efficiency, perfecting the supply structure, and eventually improving the total factor productivity. The purpose of supply-side reform is to place emphasis on reconstruction of enterprise’s micro mechanism, improve optimal allocation of elements and resources and further increase economic efficiency. The core of supply-side reform is to further deepen the reform to liberate productivity. Therefore, we need to pay more attention to the innovative system of medium- and long-term high quality institutional supply commanding overall arrangements. In the mechanism of optimizing supply-side environment, it emphasizes on stimulating the microscopic main body’s potentials of innovation, entrepreneurship and creativity, constructing. Shaping and strengthening long-term new stable

development momentum of Chinese economy with effective system supply and open market space.

The Central Rural Work Conference held in December 2015 stressed that we should enhance agricultural supply-side structural reform, improve the quality and efficiency of agricultural supply system, make agricultural products abundant, and sufficient, make variety and quality fit consumer needs, really form effective supply of agricultural products with a reasonable structure and powerful guarantee. The Central Rural Work Conference put forward “agricultural supply-side structural reform” in agriculture for the first time, which indicates directions for 2016 and agricultural and rural work during the “13th Five-Year Plan” and also sparks a new round of enthusiasm in discussing “issues of agriculture, farmer and rural area.

2. Research on Rural Resources Is of Great Significance to the Agricultural Supply-side Structural Reform

Rural resources refer to resources which can be utilized and developed in the rural areas in a specific range and are the sum of rural natural resources and the rural social resources. Rural natural resources include land resources, forest resources, water resources, ecological resources, mineral resources, etc. Rural social resources include rural human resources and rural culture resources. Strengthening the research on rural resources is of great significance to promote agricultural supply-side structural reform. Rural resources research involves economics, environmental science, agricultural science and other fields, mainly including integration and management of rural resources, rural resources informatization, allocation and development of rural resources, rural resources and environment problems. Among them, capitalized operation of rural resources is the core issue of rural resources research. Across the agricultural supply-side structure reform practice, all places should explore the path to capitalization of rural resources and assets according to characteristics of rural resources. Regarding the capitalization of rural land resources as the sally port, they can take the capitalization of rural human resources as the core and be based on the collective assets inventory and authentic rights to deepen the reform of the rural collective property rights system and strengthen the construction of the rural collective assets capitalization system and the way to innovation. Rural resources capitalization is a process advanced by the market advance. It is the foundation to solve all structural contractions of three agriculture-related issues. Therefore, rural resources capitalization shall be advanced by the marketization.

At present, characteristics of agricultural resources are presented as insufficient capital investment, land fragmentation, and concurrent-business labor. Optimization and reasonable allocation of the agricultural production factors are to convert great sleeping rural resources into real rural internal capital, which can greatly relieve the contradiction between supply and demand of capital in the new rural construction. The current rural resources solidification phenomenon is serious and commercialization and marketization degrees of the rural land resources, housing resources, enterprise resources and monetary resources are relatively low. There is a serious shortage of resources flow and resources value has not yet been reflected really. The strategy for the reform of rural resources is to accelerate the process of commercialization, marketization and capitalization reforms. Rural land, farmers’ homestead land and farmhouse, rural labor force and inventions and other physical or nonphysical goods are commodities. Commercialization of resources, production factors and assets are the premise condition of commodity economy development, and mature commodity economy

paves the way forward for market economy. The second point is to foster new professional farmers and raise the level of rural labor force. Limited number of factors of production determines that the agricultural production input must rely on the quality ascension. Formula fertilization, integrated control of plant diseases and insect pests, prevalent variety cultivation, satellite positioning, the use of modern agricultural machinery and other advanced agricultural technologies play a decisive role in the development of agriculture; non-entity elements like information also help to improve the efficiency of agricultural production. Carriers of all technologies are inseparable from the main body of the productivity: farmers. In order to develop agricultural production, the government can leave no stone unturned to increase the supply of agricultural production factors. According to the theory of supply and demand, if farmers need smaller demands for factors of production, too much supply is still of no help. But after the emergence of new farmers, the problem will be solved. Educated farmers' demand and use for high-quality factors of production can produce positive feedback to the factor suppliers, guide the supply increase and eventually benign interaction of supply and demand can be formed to promote continuous growth of modern agriculture. Through the reform of rural resources, natural resources, capital and human capital will be constantly activated so as to promote the efficiency increase of agricultural production, increase of farmers' incomes and rural ecological value appreciation.

3. Inspiration of Research on Creative Agriculture for Agricultural Supply-side Structural Reform

Creative agriculture originated in the late 1990s. due to the innovative development of agricultural technologies, expansion of agricultural functions, new industrial forms like sightseeing agriculture, leisure agriculture, fine agriculture and ecological agriculture also have achieved rapid development. These new industrial forms blend science and technology, humanistic factors into the agricultural production, integrate relevant resources, expand agricultural functions and improve traditional agriculture to modern one with integration of production, life and ecology through creativity. Creative agriculture abroad started earlier. There are mainly creative agricultural products, farmland landscape, agricultural festivals, agricultural theme parks, agricultural science and technology creativity and other types. These forms abound in developed countries. For example, the Dutch tulips and French lavenders are representatives of the flower field landscape. Farmland art patterns can be found in British crop circles, Japan's paddy art in Japan and the corn maze in the United States. Creative agriculture starts late in China. Therefore, the government should strengthen the creative agriculture research, analyze the connotation, denotation and characteristics of creative agriculture, theoretical issues such as theoretical support and the development situation of domestic creative agriculture based on creative agriculture theories to promote the development of creative agriculture, change the supply surplus of low-end and poor-quality agricultural products and the shortage of high-quality, unique and creative agricultural products.

Creative agriculture reflects the combination of science and art and the fusion of spirit and matter. It leads innovation with creativity and advances with the times. Creative agriculture development regards the sustainable development as its long-term goal and experiential consumption as the main way of development. It relied on high technology and adopts the model of industrial convergence for multi-level development. Therefore, the development of

creative agriculture in China not only needs the government to play a leading role by passing the legislation, implementing preferential policies, increasing financial support and strengthening professional personnel cultivation. The creative agriculture enterprises also should improve the market competitive ability of the creative agriculture from aspects such as product innovation, brand building, industrialization development. The government needs to make innovation in supply of agricultural science and technology innovation, closely focus on the requirements of “high-quality, ecological, high-yield, high-efficiency, safe and creative”, adhere to the development positioning of high-quality green goods of characteristic specialty, ecological efficient, interleaved and staggered, professional and scaled, high-quality and preferential prices, culture creativity”, actively promote scientific and technological innovation, business mechanism innovation and make efforts to build ecological, high-quality agricultural industry system, ecological circular agriculture system and creative agriculture system. In addition, the government needs to vigorously promote the ecological and high-quality characteristic creative agricultural development, make advanced agricultural science and technology and production modes widely applied, allow the ecological boutique creative agriculture development and the effective supply of agricultural products to be integrated organically. Further, it needs to foster a batch of ecological boutique creative agricultural products and agricultural leisure health-keeping products with quality assurance, cultural inheritance and functional diversity and help the agriculture blaze a development road of ecological boutique creative agriculture with “production standardization, best-quality products, management and green development”. What is more, the government also needs to strengthen agricultural supply side structural reform, should develop ecological boutique creative agricultural products with characteristics in accordance with local conditions with the industrial concept. The first production should pay attention to development of traditional products, introduce new products and fully carry out development of ecological fine varieties, protection and utilization of genetic resources. The second production needs to focus on packaging and primary deep processing of ecological high-quality agricultural products, highlight elegant, unique and practical principles. Enterprises should conduct the packaging of ecological agricultural products with high standards, speed up the development of preservation, fresh-keeping and refrigerated transportation of agricultural products, accelerate the promotion of intensive processing of agricultural products, extend the agricultural industry chain and improve added value of agricultural products. In the meantime, they also need to lay emphasis on agricultural extension of multiple functions, such as sightseeing, leisure, tourism, picking and fishing cultural education and combine with construction of beautiful villages and synchronous planning, design and construction with the park. They should highlight the characteristics of creative agriculture, be based on the natural ecology, rural culture, farming civilization, folk traditions and local characteristics and focus on creative leisure farmsteads, science parks, picking experience, sightseeing amusement, farming culture, farming gardens for residents pleasure-boats and fishing to cultivate resounding, widespread and attractive creative agricultural well-known brands, vigorously promote elements like science and technology and humanity to be integrated into agriculture and develop creative agriculture such as farmland artistic landscape, balcony agriculture. Furthermore, the government can encourage the outskirts of major cities to develop factorized, stereoscopic and other high-tech agriculture, improve the supply guarantee ability of local

fresh agricultural products, encourage the development of agricultural production leasing business, actively explore agricultural products' personalized customized services, exhibition agriculture, agricultural crowd funding and other new formats, expand the development scale of creative agriculture and improve the whole quality and efficiency of the industry.

4. Research on Rural Construction and Agricultural Supply-side Structural Reform

Throughout the western developed countries, after urbanization entered the stage of adjustment, rural construction was paid increasingly more attention to. For the revitalization of the countryside, French government built many highways and railways into the rural and poor areas, specially set "rural development and renovation fund" in the state budget and allocated a colossal sum of money for the reorganization and transformation of senile rural areas. In the United States, after when Congress passed the Act of New Town Development in 1968, it proposed the construction of "urban villages" in the 1980s. In 1984, "Rural Center" was established in Massachusetts to study the threats which villages would be faced with in the process of modernization and make efforts to protect original village landscape. In Japan, rapid development of rural urbanization after the 1960s led to serious population outflow in rural areas. To solve this problem, the government formulated plans for rural development. It introduced a series of policies, laws and regulations, such as *Law of Town-Village Mergence* and *Law of Excessive Sparse Population* in succession to control the blind development of big cities, guide the rational distribution of industry, promote rural development and realize the industrialization and life modernization in the countryside. Rural construction started early in Taiwan, China. Taiwan's rural community construction experienced two stages: Taiwan community development which started in 1955 and creation of Taiwan community in 1993. Among them, what is of the most typical significance is that a series of planning was issued successively in the stage of community creation: proposed the idea of "life community" in Taiwan in 1993, introduced "community overall construction plan" in 1995, issued "new hometown community creation plan" in 2002, approved the implementation of "healthy community six-star plan" in 2005, introduced "the second phase plan of new home community creation" in 2008. Taiwan rural community renewal movement driven by these plans took place under the rural social transformation of Taiwan. With the development of modern society, people constantly realize rural areas are not only the space of the food supply of agricultural production, rural natural green land is also space for people to have a rest and places of natural ecological maintenance. In allusion to rural society gradually engulfed by the modernization, the Taiwan region issued a series of plans to solve the conflicts between economic development and resource protection. It gives full play to roles of the administrative power, industry associations and other non-governmental organizations in rural community development, relies on local resources and realizes rural construction by developing rural characteristic brands. Its contents mainly include: maintaining and improving the living environment with historic significance and preservation value; perfecting the transportation system; renovate and reconstruct old communities; improving the quality of the rural environment; preserving and take advantage of historic sites; keeping the ecological environment, etc.

Agricultural supply-side structural reform must pay attention to the rural construction. At present China has increased financial support for the rural infrastructure construction to build, manage, protect and operate good rural infrastructure and make urban-rural gap significantly

reduced. It should also perfect long-term mechanism of rural infrastructure investment and promote the urban and rural infrastructure interconnectivity, co-construction and sharing. In addition, the government can accelerate the urban public service to extend to rural areas, conduct problem-addressing actions on rural living environment and beautiful and livable rural construction, promote the rural labor force employment, entrepreneurship and citizenization of migrant workers, implement poverty alleviation projects and be determined to win the battle of poverty alleviation. In the study of rural construction, rural tourism planning and development should be the important contents. The government should vigorously develop the rural tourism management to make the rural resources convert locally into operating capital and farmers locally engaged in business activities, which can be regarded as effective means to solve the current dual structure of urban-rural economy and regional economy. Practice shows that some areas in China, especially mountainous areas rich in tourism resources and not suitable for large-scale intensive industrial development may steer clear of industrialization to solve the problems of the region's social and economic development by means of tourism development. For the industrial development, these areas do not have comparative advantages relative to the plain regions. However, the development of tourism can be a comparative advantage with mountain landscape and rich tourist resources in mountainous areas compared with plain areas. Through tourism development, mountainous area's economy can achieve social and economic development by not becoming coastal economic enclaves; through the development of tourism, Chinese rural areas can keep their inherent traditional rural landscape and retain traditional agricultural civilization, make people remember nostalgia and become special forms of new villages. Through the tourism development, China's agriculture can improve its additional value of agricultural production by means of tourism, expand the ability of agricultural production and promote the development of agricultural modernization. When strengthening the construction of rural infrastructure, the government also should constantly improve levels of rural preschool education, rural teachers and other basic public services and drive the construction of beautiful countryside and farmers' happiness homeland into the fast lane. It should speed up to make up for deficiencies of agriculture and rural areas, must stick to the industry nurturing agriculture and cities supporting the countryside, promote the balanced allocation of urban and rural public resources and equal exchanges of urban and rural elements, steadily improve the level of urban and rural equal basic public services, abide by the law of rural development, incarnate rural characteristics, pay attention to local flavor, keep rural styles and features and strive to build a happy home for farmers.

References:

- [1]Gao Chao. Discussion of Rural Urbanization [J]. Development of Small Cities and Towns, 1999(6).
- [2]Feng Hua. Hotspot in the Twenty-first Century-Developing Small Towns and Promoting Urbanization [M].Beijing: Science Press, 2000.
- [3]Liu Jianzhe. Taiwan's Rural Community Renewal [J]. Taiwan Agricultural Research, 2005(2).
- [4]Feng Shuquan. Foreign Basic Experience in Rural Construction [J]. Scientific Socialism, 2006(1).

- [5]Zhang Yifan and Wang Ailing. Origin of Creative Agriculture and Innovation Forms in Reality [M].Beijing: China Agriculture Science and Technology Press, 2010.
- [6]Wang Dongpu. A Study of Rural Resources Capitalization [D]. Beijing: Master's Dissertation of Renmin University of China, 2011.
- [7]Zhang Ruolin. A Study of China's Creative Agricultural Development [D]. Beijing: Master's Dissertation of China Agricultural University, 2012.
- [8]Mao Kejun, Yu Zhanping and Qu Fuling. A Study of China's Rural Resources Assets Marketization and Capitalization [M]. Taiyuan: Shanxi Economic Publishing House, 2013.
- [9]Zhou Li. A Study of Integrative Development of Cultural Creative Industry and Tertiary Industry [M].Beijing: Enterprise Management Publishing House, 2014.
- [10]Jia Kang. Core Connotation of Supply-side Reform Is to Liberate Productivity [J].China Economic Weekly, 2015(49).
- [11]Song Dongsheng. Research on Regional Creative Agricultural Development: Path Exploration based on Empirical Analysis [M]. Beijing: Guangming Daily Press, 2015.
- [12]Zheng Fengtian. Promote Agricultural Supply-side Reform and Construct Beautiful Countryside ----Four Bright Spots of the Year's No. 1 Central Document [J]. Price Theory and Practice, 2016(1).
- [13]Zhang Jigang. Develop Creative Agriculture and Promote Agricultural Supply-side Reform. <http://mt.sohu.com/20160124/n435673928.shtml>
- [14]Zhang Hui and Yue Yanxiang. Rational Thinking of All-for-one Tourism [J].Tourism Tribune, 2016(9).

农业供给侧结构改革刍议

吴 明

(河南省农业广播电视学校固始县分校, 河南固始, 465200)

摘要: 对农业生产要素进行优化和合理配置, 将农村资源转变成农村内部资本, 缓解新农村建设中的资本供需矛盾; 培育新型职业农民提高农村劳动力水平; 进一步扩大创意农业发展规模, 提升产业整体素质和效益。加大对农村基础设施建设的财政支持力度, 加快推动城镇公共服务向农村延伸, 建设美丽乡村, 有效促进农业供给侧结构性改革。

关键词: 农业供给侧结构性改革; 农村资源; 创意农业; 乡村建设

一、供给与供给侧改革

供给与需求的关系是经济学的核心问题, 相关的研究遍及产业、资源、生态等领域。2015年11月中央财经领导小组第十一次会议上, 习近平总书记提出了“供给侧结构性改革”, 即“在适度扩大总需求的同时, 着力加强供给侧结构性改革, 着力提高供给体系质量和效率, 增强经济持续增长动力。”“供给侧结构性改革”的提出使“供给侧”作为2016年经济发展的关键词, 成为近期学术界研究的一大热点。

关于供给侧的研究可以上溯到19世纪初法国经济学家提出的“萨伊定律”, 这一定律强调供给的重要性, 认为供给自动创造出等量的需求。但是, 也有经济学家认为供给与需求是不可分割的, 不能单独强调任何一方。供给侧改革的核心, 是降低企业的制度性交易成本, 包括交易成本、各种税费、融资成本、社会保障成本等。这有利于增强企业创新能力、提高供给质量与效率、改善供给结构, 最终提高全要素生产率。供给侧改革的目的侧重于企业微观机制的重构, 提高要素和资源优化配置, 进而提高经济效率。供给侧改革的核心是进一步深化改革以解放生产力。因此, 需要更加注重以中长期的高质量制度供给统领全局的创新模式, 在优化供给侧环境机制中, 强调以高效的制度供给和开放的市场空间, 激发微观主体创新、创业、创造的潜能, 构建、塑造和强化我国经济长期稳定发展的新动力。

2015年12月召开的中央农村工作会议会议强调, 要着力加强农业供给侧结构性改革, 提高农业供给体系质量和效率, 使农产品供给数量充足、品种和质量契合消费者需要, 真正形成结构合理、保障有力的农产品有效供给。中央农村工作会议首次在农业领域提出“农业供给侧结构性改革”这一理念, 为2016年和“十三五”时期农业农村工作指明方向, 也引发了新一轮探讨“三农”问题的热情。

二、农村资源研究对农业供给侧结构改革具有重要意义

农村资源是指在特定的农村地域范围内可利用开发的资源, 是农村自然资源和农村社会

资源的总和。农村自然资源包括土地资源、森林资源、水资源、生态资源和矿产资源等，农村社会资源主要包括农村人力资源、农村文化资源。加强对农村资源的研究，对促进农业供给侧结构性改革意义重大。农村资源研究涉及经济学、环境科学、农业科学等领域，主要包括农村资源的整合与管理、农村资源的信息化、农村资源的配置与开发、农村资源与环境等问题，其中农村资源的资本化运作是农村资源研究的核心问题。在农业供给侧结构性改革实践中，各地应针对农村资源的特点，探索农村资源资产资本化的路径。以农村土地资源资本化为突破口，以农村人力资源资本化为核心，基于集体资产清查和确权深化农村集体产权制度改革，加强农村集体资产资本化制度建设和方式创新。农村资源资本化是一个市场推进的过程，是解决“三农”所有结构性矛盾的基础，应当以市场化推进农村资源资本化。

目前农业资源要素的特征表现为资本投入不足、土地零碎化、劳动力兼业化。对农业生产要素进行优化和合理配置，一是将巨大的沉睡的农村资源转变成实实在在的农村内部资本，这可以大大缓解新农村建设中的资本供需矛盾。当前农村资源固化现象严重，农村的土地资源、房产资源、企业资源和货币资源的商品化和市场化程度较低，资源流动严重不足，资源价值也未真正体现出来。农村资源改革的策略是加快进行商品化、市场化和资本化改革进程。农村的土地、农民的宅基地和农房、农民的劳动力和发明创造等物质或非物质的物品都是商品。资源的商品化、生产要素的商品化、资产的商品化是商品经济发展的前提条件，而成熟的商品经济又为市场经济铺平了前进的道路。二是培育新型职业农民提高农村劳动力水平。生产要素数量的有限性决定了农业生产的投入必须依靠质量的提升。配方施肥、病虫害综合防治、良种培育、卫星定位、现代化农业机械等先进农业技术的运用对农业的发展到了决定性作用；信息等非实体要素也有助于提高农业生产效率。所有技术的载体都离不开生产力的主体——农民。政府为了发展农业生产会千方百计增加农业生产要素供给。按照供需理论，农民对生产要素需求较小的话，供给太多也无济于事。而在新型农民出现后，问题将得以解决。有知识的农民对高质量生产要素的需求和使用将对要素供给者产生一个正反馈，引导供给增加，最终形成供求良性互动，促进现代农业持续增长。通过农村资源要素的改革，不断激活自然资源、存量资产、人力资本，促进农业生产增效、农民生活增收、农村生态增值。

三、创意农业研究给农业供给侧结构性改革的启示

创意农业起源于 20 世纪 90 年代后期。由于农业技术的创新发展、农业功能的拓展，观光农业、休闲农业、精致农业、生态农业等新的产业形态得到了快速发展。这些新兴业态通过创意将科技、人文要素融入农业生产，整合相关资源，拓展农业功能，将传统农业提升为

融生产、生活、生态为一体的现代农业。国外创意农业起步较早，主要有农产品创意、农田景观、农业节庆、农业主题公园、农业科技创意等类型，这些形式在发达国家大量存在。如：荷兰的郁金香、法国的薰衣草是花田景观的代表，农田艺术图案如英国的麦田怪圈、日本的稻田艺术、美国的玉米迷宫，等等。我国创意农业起步较晚，加强创意农业研究，以创意产业理论为基础，分析创意农业的内涵、外延、特征、理论支撑等理论问题以及国内创意农业的发展现状，促进创意农业的发展，以改变农业供给所面对的低端、劣质的农产品过剩，优质农产品、特色创意农产品缺乏的现状。

创意农业体现了科学与艺术的结合、精神与物质的融合，它以创意引领创新，与时俱进。创意农业发展是以可持续发展为长远目标，以体验消费为主要发展方式，以高科技为依托，采用产业融合模式多层次发展。因此，我国发展创意农业不仅需要政府通过立法、实施优惠政策、加大金融支持、加强专业人才培养等方式发挥主导作用，创意农业企业也应该从产品创意、品牌构建、产业化发展等方面提高创意农业市场竞争力。要创新农业科技供给，紧紧围绕“优质、生态、高产、高效、安全、创意”要求，坚持“特色特产、绿色精品、生态高效、错时错位、专业规模、优质优价、文化创意”发展定位，积极推进科技创新、经营机制创新，努力构建生态精品农业产业体系、生态循环农业体系和创意农业体系。要大力推进特色的生态精品创意农业发展，农业先进科学技术和生产模式得到广泛应用，生态精品创意农业发展与农产品有效供给得到有机融合；要培育一批质量保障、文化传承、功能多样的生态精品创意农产品与农业休闲养生产品，走出一条“生产标准化、产品精品化、经营产业化、发展绿色化”的生态精品创意农业发展道路。加强农业供给侧结构性改革应当以工业的理念，因地制宜开发特色生态精品创意农产品，一产注重传统特色产品开发，引进发展新兴产品，全面开展生态精品品种挖掘、种质资源保护与利用，二产注重生态精品农产品包装与初深加工，突出精美、独特、实用原则，高标准做好生态农产品的包装，加快发展农产品贮藏保鲜和冷藏运输，加快推进农产品精深加工，延伸农业产业链，提升农产品附加值，同时注重挖掘观光、休闲、旅游、采摘、垂钓文化教育等农业多种延伸功能，与美丽乡村建设有机结合，与园区同步规划设计、同步建设。应当突出创意农业特色，以自然生态、田园文化、农耕文明、民俗传统和乡土特色为基础，以休闲创意农庄、科技园区、采摘体验、观光游乐、农耕文化、市民农园、游船垂钓等模式为重点，培育叫得响、传得开、留得住的创意农业知名品牌，大力推动科技、人文等元素融入农业，发展农田艺术景观、阳台农艺等创意农业，鼓励在大城市郊区发展工厂化、立体化等高科技农业，提高本地鲜活农产品供应保障能力，鼓励发展农业生产租赁业务，积极探索农产品个性化定制服务、会展农业、农业众筹等新型业态，

扩大创意农业发展规模，提升产业整体素质和效益。

四、乡村建设研究与农业供给侧结构改革

纵观西方发达国家在城市化进入调整阶段以后，乡村建设日益受到重视。法国政府为振兴农村，修建了众多深入到农村和落后地区的公路和铁路，还在国家预算中专列了“农村发展整治基金”，拨出巨款对衰老的农村地区进行整顿、改造。美国自1968年国会通过“新城镇开发法”后又于80年代提出建设“都市化的村庄”。1984年，在马萨诸塞州成立“乡村中心”，研究农村在现代化进程中面临的威胁，致力于保护村镇原有的景观。日本在上世纪60年代以后乡村城市化迅速发展，农村地区人口外流情况严重。为了解决这一问题，政府制订了农村整备计划，先后出台了《町村合并法》、《过疏法》等一系列政策法规，以控制大城市的盲目发展，引导工业的合理分布，促进农村开发，在农村实现工业化和生活现代化。我国台湾地区的乡村建设起步较早。台湾农村社区建设经历了自1955年开始的台湾社区发展和1993年的台湾社区营造两个阶段。其中最具典型意义的是社区营造阶段相继出台的一系列计划：1993年提出建立台湾“生命共同体”的观念，1995年出台“社区总体营造计划”，2002年出台“新故乡社区营造计划”，2005年核定实施“健康社区六星计划”，2008年出台“新故乡社区营造第二期计划”。这些计划带动的台湾农村社区更新运动是在台湾农村社会转型下发生的。随着现代社会的发展，人们不断认识到农村不仅是农业生产粮食供应的空间，农村的自然绿地也是人们休憩的空间，是自然生态维护的场所。针对逐渐被现代化吞噬的农村社会，台湾地区出台一系列计划解决经济发展与资源保护之间的冲突。充分发挥行政性力量以及行业协会等民间组织在农村社区发展中的作用，依托当地资源，通过发展农村特色品牌来实现农村营造。其内容主要包括：维护改善具有历史意义及保存价值的居住环境；改善交通系统；整建老旧社区；改善农村环境品质；保存及使用古迹；保持生态环境等。

农业供给侧结构性改革必须注重乡村建设。目前国家加大了对农村基础设施建设的财政支持力度，建好、管好、护好、运营好农村基础设施，实现城乡差距显著缩小。健全农村基础设施投入长效机制，促进城乡基础设施互联互通、共建共享。加快推动城镇公共服务向农村延伸，开展农村人居环境整治行动和美丽宜居乡村建设，推进农村劳动力就业创业和农民工市民化，实施脱贫攻坚工程，坚决打赢脱贫攻坚战。在乡村建设研究中，乡村旅游的规划开发应当成为重要内容。大力发展乡村旅游经营，让农村资源就地转化为经营资本，农民就地从事经营活动，不失为破解当前城乡经济和地区经济的二元结构的有效途径。实践表明，对我国一些地区，特别是旅游资源丰富、不适宜大规模集约化工业发展的山区，可以通过旅游化的发展方式，绕开工业化，来解决地区社会经济发展的问题，这些地区发展工业，相对

于平原地区,不具有比较优势,而发展旅游,山区的丰富山地景观和旅游资源,与平原地区却形成了比较优势。通过旅游化发展,山区经济可以通过不成为沿海地区经济飞地的形式,获得社会经济的发展;通过旅游化发展,乡村的农民可以不通过进城务工的方式,获得资产性收入、经营性收入和劳动性工资收入;通过旅游化发展,使我国的农村保持固有的农村传统风貌,留得下传统的农耕文明,让人们记得住乡愁,成为新农村的特殊形式;通过旅游化发展,可使我国的农业通过旅游提升农业生产的附加值,壮大农业生产的能力,推动农业现代化发展。在加强农村基础设施建设的同时,还应当不断提高农村学前教育、乡村教师队伍等基本公共服务水平,将美丽乡村和农民幸福家园建设驶入快车道。加快补齐农业农村短板,必须坚持工业反哺农业、城市支持农村,促进城乡公共资源均衡配置、城乡要素平等交换,稳步提高城乡基本公共服务均等化水平。遵循乡村自身发展规律,体现农村特点,注重乡土味道,保留乡村风貌,努力建设农民幸福家园。

参考文献:

- [1]高潮.乡村城市化问题论略[J].小城镇建设,1999(6).
- [2]冯华.二十一世纪的热点——发展小城镇、推动城市化[M].北京:科学出版社,2000.
- [3]刘健哲.台湾之农村社区更新[J].台湾农业探索,2005(2).
- [4]冯树泉.国外农村建设的基本经验[J].科学社会主义,2006(1).
- [5]张一帆,王爱玲.创意农业的渊源及现实中的创新业态[M].北京:中国农业科学技术出版社,2010.
- [6]王东普.农村资源资本化问题研究[D].北京:中国人民大学硕士学位论文,2011.
- [7]张若琳.我国创意农业发展研究[D].北京:中国农业大学硕士学位论文,2012.
- [8]毛科军,于战平,曲福玲.中国农村资源资产市场化资本化研究[M].太原:山西经济出版社,2013.
- [9]周丽.文化创意产业与三次产业的融合发展研究[M].北京:企业管理出版社,2014.
- [10]贾康.供给侧改革的核心内涵是解放生产力[J].中国经济周刊,2015(49).
- [11]宋东升.区域创意农业发展研究 基于实证分析的路径探索[M].北京:光明日报出版社,2015.
- [12]郑风田.推进农业供给侧改革 建设美丽乡村——今年中央一号文件的四大亮点[J].价格理论与实践,2016(1).
- [13]章继刚.发展创意农业推进农业领域供给侧改革.<http://mt.sohu.com/20160124/n435673928.shtml>
- [14]张辉,岳燕祥.全域旅游的理性思考[J].旅游学刊,2016(9).

“1+X·Heaven&Earth&People” Mode for Professional Peasants’

Cultivation in BaoJi City

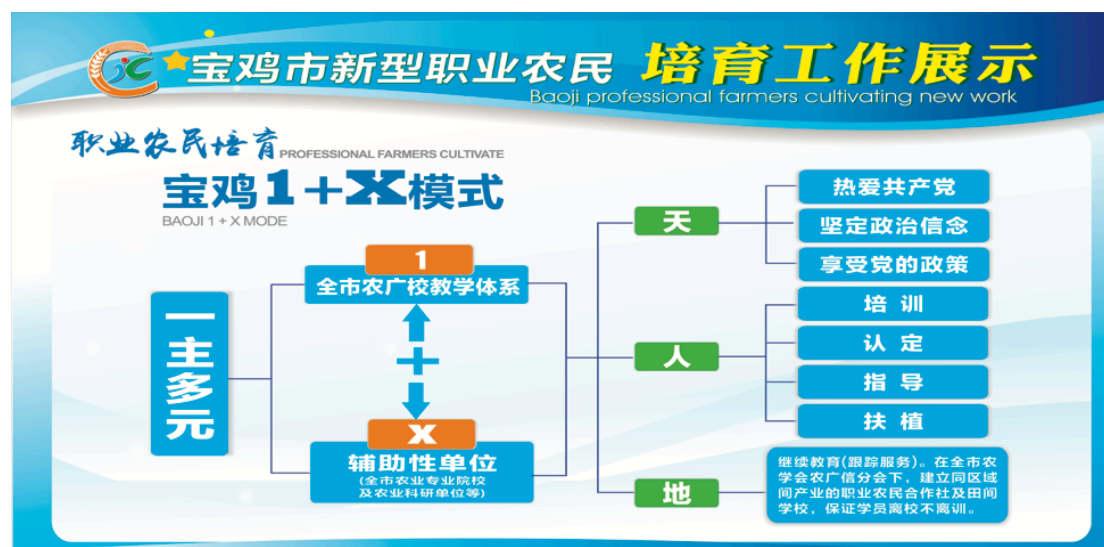
Yinquan Xi

(Center of Agricultural Promotion, information and Training in Baoji City of Shaanxi Province/Baoji Agricultural Broadcasting and Television School of Shaanxi Province, Baoji city of Shaanxi Province, 721006)

Abstract: Since the cultivation for the professional peasants in BaoJi was initiated, we have kept on doing the exploration, practice, perfection, enhancement and summary of a new mode named the “1+X·Heaven&Earth&People”. In this term, the “heaven” means all professional peasants should love the Communist Party and have a firm political belief in the bottom of heart, and also at the same time enjoy the benefits of the party policies. The word “earth” means we offered continuing education and follow-up service to the identified professional peasants. “people” means we need to complete the four stages including training, guidance, recognition and assistance for peasants. Over the past years, this mode, which have played a very important role in the cultivation for peasants, have received a remarkable effect and won recognition and praise from masses on a large scale.

Key Words: Baoji; Professional peasants; Cultivation; Mode

1. The “1+X·Heaven&Earth&People” Cultivation Mode for Professional Peasants in Baoji



English for the Chinese characters in the above picture:

宝鸡市新型职业农民培育工作展示: New-type Professional Peasants’ Cultivation Work in

Baoji

职业农民培育： Professional peasants' cultivation

宝鸡 1+X 模式： Baoji 1+X mode

一主多元： One main stem with many other branches

全市农广校教学体系： Teaching systems in the agricultural broadcast and television schools in Baoji City

辅助性单位： X: Supporting units (including all agricultural professional colleges and research institutions in the whole city)

天： Heaven 人： People 地： Earth

1.1 Mode Contents

In the “1+X·Heaven&Earth&People”, the “1” refers to all the teaching systems in the agricultural broadcast and television schools in Baoji city, while the “X ”includes the agricultural technology and peasant training institutions. For example, the agricultural colleges and universities, institutions for agriculture research and agricultural techniques popularizing, agricultural experts courtyards, agricultural science and technology parks, peasant specialized cooperatives, and the leading enterprises of agricultural industrialization,. The “heaven” means all professional peasants should love the Communist Party and have a firm political belief in the bottom of heart and at the same time can enjoy the benefits of the party policies. The word “earth” means we offered continuing education and follow-up service to the recognized professional peasants. Under the leading of the agriculture-broadcast-information branch of Baoji Agricultural Association, we need to set up professional peasants' cooperatives and field schools of same industries in same areas, so as to ensure students never disjoint their training when they leave school. “people” means we need to complete the whole procedures including training, guidance, identify and assistance for peasants.

1.2 Mode Features

1.2.1 It is under the guidance of the Agriculture Broadcast and Television Schools and has a clear main body;

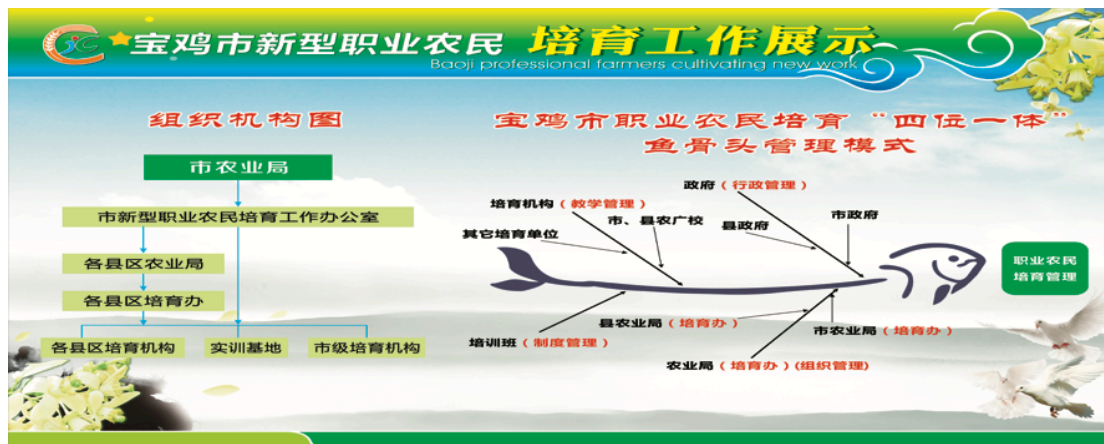
1.2.1 It is under the alliance of varies institutions, which will complements each other with their advantages;

1.2.3 Agriculture development is integrated with education and research; education is combined with production and research;

1.2.4 It has a clear target with a distinctive nuance;

1.2.5 It is a kind of alliance cultivation, which has a good overall effect;

1.2.6 Management including four levels (administration, organization, teaching process and institution) offers a norm cultivation.



宝鸡市新型职业农民培育工作展示：Exhibition of New-type Professional Peasants' Cultivation Work in Baoji

组织机构图：Organization Chart

市农业局：Baoji Agricultural Bureau

市新型职业农民培育工作办公室：Baoji New Style Profesional Peasants' Cultivation Office

各县区农业局：Agricultural Bureaus at County and District levels

各县区培育办：Cultivation Offices at County and District levels

各县区培育机构：Cultivation Institutions at County and District levels

实训基地：Training Bases

市级培育机构：Cultivation Institutions at City Level

宝鸡市职业农民培育“四位一体”鱼骨头管理模式：Four-in-one” Fish Bone Management Mode of Baoji Professional Peasants' Cultivation

其它培育机构：other cultivation institutions

培育机构（教学管理）：cultivation institution (teaching management)

市、县农广校：Agricultural Broadcasting and Television Schools at city and County levels;

县政府：County Governments

行政管理：Governments (administrations)

市政府：City government

培训班（培训制度）：training classes (system management)

县农业局（培育办）Agricultural Bureau at County level (cultivation offices)

农业局（培育办）（组织管理）：Agricultural Bureau (cultivation offices, organization and management)

市农业局（培育办）：Agricultural Bureau at city level (cultivation office)

职业农民培育管理：cultivation and management of professional peasants

1.3 Innovations about the Mode

1.3.1 It has offered a good solution to the problem who should be the cultivation beneficiary by aiming at fostering profession peasants with a secondary specialized professional qualification and thus building good nurturing systems;

1.3.2 It has organically combined the strength of varies parties, so that any peasants who cannot be taught or cannot receive a good teaching can be taught and can receive a good teaching, thus receiving a mutual effect like “1 +1> 2”;

1.3.3 It has changed the traditional closed education into a kind of modern and open schooling.

1.3.4 By taking the cultivation quality as the principle development line, it can call up all social forces that can be mobilized to jointly promote the cultivation enterprise when macro decisions were made. At the same time, it can integrate all education and training resources of the whole city in the microcosmic operation process. In this way, theoretical teachings and practical skills can be achieved simultaneously, with the focused teaching and decentralized guidance complementary.

1.3.5 With the purpose of assisting the profession peasants becoming rich through science and technology, the mode has promoted a kind of innovation in the field of peasants' education and built up a new road for the Professional Peasants' cultivation that is suitable for the local situation and having Chinese characteristics.

2. Strength Analysis on the “1+X·Heaven&Earth&People” Cultivation Mode for Professional Peasants in Baoji

2.1 About the “1”: There are one city school (one of the national top 100 demonstration schools) and 12 county-level agricultural schools in Baoji city, including 4 A-level agricultural broadcasting and television schools with 200 teaching staff are working in these schools, among whom, 21 hold a senior professional title and 40 hold middle professional title. Furthermore, 36 training bases have been set up. In this way, the “three-network” system, which refers to the heaven network (broadcasting, television and internet), the earth network (organization, teaching and management) and people network (teachers, students, systems) has begun to take shape. In addition, the Baoji Branch of Shaanxi Agricultural Broadcast and Television, which is the location of the office of the Professional Peasants'cultivation enterprise and featured by low cost but high efficiency, high capacity and coverage, and students who do not need to leave their land, has got great attentions from the governments at all levels and loved by professional peasants.

2.2 About the “X”: We now have a mufti-dimensional cooperation teaching system, which includes Baoji Vocational Technology College (Biological Engineering Department), Baoji Academy of Agricultural Sciences, Baoji Agricultural Technology Extension and Service Center (12 centers at County or District level), 24 agricultural experts courtyards, more than 120 agricultural science and technology parks, more than 2000 peasant cooperatives and more than 260 leading enterprises of agricultural industrialization, and a training system composed by 4 national experiment stations of Taibai Vegetable, Qishan sweet potatoes, Qinbao beef and Linyou Buer sheep and 5 experiment stations set up by the Northwest A&F University, covering Mei County's kiwi fruit, Qainyang apple, Taibai vegetable of high mountain, Long County's dry farming and Feng County's pepper.

3. Guarantees for the Running of the “1+X·Heaven&Earth&People” Cultivation Mode for Professional Peasants in Baoji

3.1 To select students through a strict screening process. We have four standards: 1. Age: from 18 to 55; 2. Education background: peasants graduated from middle schools are elementary-level professional peasants; peasants graduated from high schools are middle-level professional peasants, and those graduated from technical secondary schools and juniors colleges are high-level professional peasants; 3. Income: peasants with an income which is 5 times of the local average are elementary-level professional peasants; peasants with an income which is 10 times of the local average are middle-level professional peasants,

while those with an income which is 15 times of the local average are middle-level professional peasants are high-level professional peasants; 4. Occupation: main occupation of the selected peasants should be agriculture and 80% of their income should also come from agriculture. We will build up a back-up professional peasants database after a careful survey and select the below people as our students: rich and influential families of crop and animal productions, farmers possessing large pieces of land, workers from the agricultural enterprise, backbones from peasants' specialized cooperatives, rural members specialized in information, brokers in agricultural field, agricultural machinery drivers, epidemic prevention coordinator, sales man in agricultural materials, fruit tree clippers, especially the graduates from agricultural colleges and universities, the migrant workers returned home and demobilized soldiers with a good education background, an intensity desire for further study and starting new businesses, and working stabilities.

3.2 To build a teacher team. Teachers and students, as two sides of one coin, are indispensable. In the past, our teacher database only include professors and experts in universities, agricultural technology extension personnel and local experts, which was a "three in one" system. But now, we have been innovative and perfect the teacher database construction into a kind of "four in one" based on the requirements of professional farmers' cultivation, which means we have added some excellent professional farmers at the middle and high levels into the teacher team.

3.3 To enhance the student into the "heaven". The Communist Party have attached great importance to the professional peasants cultivation enterprise, which is a kind of strategic project for talents cultivation and reservation in modern and future agriculture of China. Therefore, we should not only relate to technology and people's quality education, but also should cover the political education. That is to say, we will cover the education of red revolution, traditional matters, ideal and belief, so as to ensure the "heaven" in the new mode.

3.4 To go down to the "earth". The Professional Peasants' cultivation enterprise is a multi-level and all-around systematical project. Therefore, for the recognized professional peasants with development potential, we will offer continuing education of "new ideas, new technologies and new thoughts" or follow-up service and set up professional peasant cooperatives and field schools in the same areas and industries, to ensure students never disjoint training when they leave school.

3.5 To strengthen the four stages in the cultivation

3.5.1 Training. After the cultivation mode was fixed, we should do the organization, recognition, guidance and assistance in classes.

3.5.1.1 Immobile classes. Teachers should give theoretical teachings and question answering in a fixed period of time in each teaching school.

3.5.1.2 Field classes. Students should be organized and go into the modern agricultural parks, leading enterprises of agricultural industrialization, agricultural experts courtyards, peasant cooperatives and experiment stations to receive the training on practical operations and skills.

3.5.1.3 Mobile classes. Teachers or experts will go to each schools and fields to offer skill trainings to students.

3.5.1.5 Air classes. Online teachings will be offered to the professional peasants by two-way voice and videos like distant education platforms for peasants, Wechat, QQ, Micro-class, and telephone.

The above four classes, accompanied by some other effective teaching methods like skills competition, discussions between students, on-scene observation, communications between students in different areas, special subject forum and paper writing, will inspire students' enthusiasm for studying and entrepreneurial spirit as well as enhancing their problem analyzing and problem-solving abilities.

3.5.2 Recognition of the quantification on obtaining two certificates. On the one hand, Agricultural Bureaus of Baoji city and Counties will give written examinations and interviews to the applicants by strictly following the requirements of the *Temporary Management Methods On Standards of Professional Peasants* and the standards of professional peasants. After that, the successful applicants, whose names will be shown on the agricultural information websites, will get a certificate. Until now, the recognition work will be finished. On the other hand, the Baoji Professional Peasants Cultivation Office and Agricultural Vocational Skills Recognition Institution will offer free authentication for all the recognized professional peasants in Baoji for their vocational skills and let them have a certificate on vocational skills.

3.5.3 Assistance and Guidance. In order to ensure the teaching quality and substantial results, we will implement a kind of “assistance by tutors” institution, according to which, teachers will deal with various difficulties and problems in the studying, production and business starting through face to face communication or by telephone, wechat and QQ, as well as assisting students to formulate plans for development and business starting and help them to make achievements.

3.5.4 Policies supports First of all, Baoji government has published the *Implementation Suggestions on Speeding up the Working Progress of Professional Peasants Cultivation*, based on which, the professional peasants cultivation work will be included into the economic development plans and a kind of working mechanism which can be stated as “government plans, agricultural sector takes the lead, relevant institutions cooperates, social force takes part in, peasants keeps the initiative in their own hands” will be adopted to fully implemented the cultivation work; Secondly, Baoji Agricultural Bureau cooperated with the Postal Savings Bank of Baoji and offered special bank services for professional peasants who wants to start a new business. And the bank will offer unsecured soft loans to the professional peasants of middle and high levels; And then, the cultivation office in Baoji set up a “baozhua” working group to carry out the work in each Counties and Districts. The term “baozhua” means each member in the group took charge of some counties and districts. The working group consists of four teams of supervision, the task of which is to supervise and guide each training institution, so as to normalize and scientize the cultivation work on a regular basis, and also organize the whole city to carry out cross check, thus achieving a kind of supervision effects in a fast way. Next, Baoji Agricultural Bureau published the Notice on Issuing Start-up Loan with Discounted Interest to Professional Peasants. Finally, we will employ the excellent professional peasants to assist other peasants by demonstrate themselves.

4. Achievements of the “1+X·Heaven&Earth&People” Cultivation Mode for Professional Peasants in Baoji

4.1 The Fengxiang County's sub-mode “ One Main Stem with Other Branches and Five-in-one” was rated as one of the top ten models by the Ministry of Agriculture and won the first prize in the Professional Peasants'cultivation assessment of the whole province.

4.2 The mode has won group winning prizes for two times in the first and second provincial professional peasants skills contest in succession in 2015 and 2016. In 2015, the total score ranks first with 11 types of work obtaining 5 first prize and 2 third prize in individual events; in 2016, except for the group winning prize, 6 students was reward the name of “Shaanxi province technical expert” and 10 were recognized as excellent competitors.

4.3 The top 10 well-off pacesetters will acted as benchmarks and demonstrations. Top 10 well-off pacesetters of professional peasants selection activity was hold and leaders from the Provincial Agriculture Department, the cultivation office, the provincial party committee and government were invited to take part in the awards ceremony to present the award to the top 10 pacesetters, who have become the benchmarks and demonstrations of the whole city. This activity has enhanced the cultivation work to a new height.

4.4 Mien show of professional peasants. More than 100 professional peasants from 12 Counties and Districts showed their talent and skills by dancing, singing, comedy playing, reading, musical instruments and other forms of performance, which highlighted the new image of professional peasants.

4.5 Teaching competitions were conducted. Teaching competitions are hold once a year, so that we can strengthen the team construction of teachers and enhance their teaching levels. Full-time and part-time teachers, who took the on-site competition, all played their best and maintained the best state, thus achieving excellent performances. These teachers played a basic role in the cultivation of professional peasants in the whole city.

4.6 The publicity effect is significant. Shaanxi TV, Shaanxi Radio Station, Baoji TV, and Baoji Radio Station have broadcast the cultivation work for many times. The “four seasons of agriculture” column of Baoji TV have reported 15 peasant models who started new business; Various network medias and newspapers including Baoji Daily reported the Professional Peasants'cultivation modes and the achievements made by these peasants.

4.7 The “1+X·Heaven&Earth&People” Cultivation Mode for Professional Peasants in Baoji gave a good solution to the two major troubled problems in the cultivation. We have build up a new mechanism of “three-in-one”in education, scientific research and promotion, which takes the agricultural radio and television schools as the main training body and agriculture technology extension institutions, leading enterprises, science and technology parks and cooperative economic organizations of specialized peasants as the supporting strength. Furthermore, a kind of new training system which can be described as “the government plans, the agricultural broadcast and television schools take the lead, cultivation is in multiple ways, operation is open with high efficiency and full energy”, thus realizing the expected objects, which can be stated as “ having clear main and supporting bodies, working independently, clear responsibilities, close cooperation and reliable quality”.

5. Suggestions on Policies

Although the “1+X·Heaven&Earth&People” Cultivation Mode for Professional Peasants in Baoji has obvious advantages, it still has a distance with the normalized educations with advanced teaching ideas. Therefore, we suggest the government should work out related policies, schemes and methods as soon as possible based on China's national situation by learning from overseas advanced experience and successful practices, by embracing the modern concept of “macro-education in opening large schools”. Therefore, the Professional Peasants'cultivation can be normalized in a scientific and well-educated way.

宝鸡市职业农民培育“1+X·天地人”模式

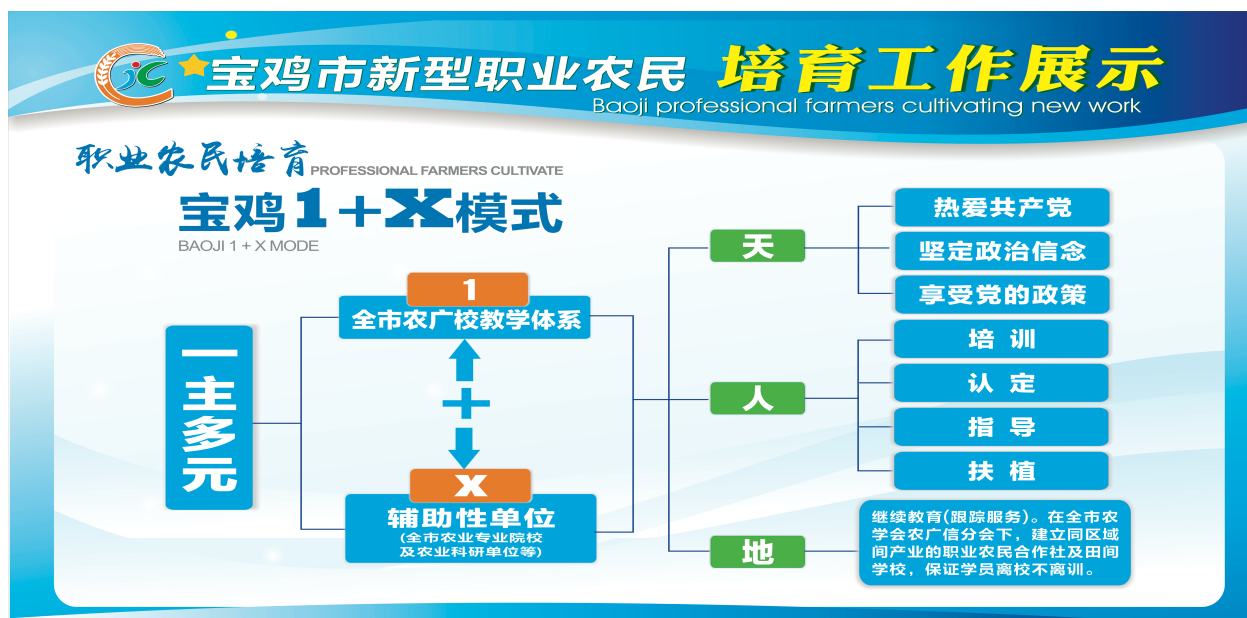
郝银全

(陕西省宝鸡市农业宣传信息培训中心/陕西省农业广播电视学校宝鸡市分校 陕西宝鸡, 721006)

摘要: 宝鸡市职业农民培育实施以来,我们不断探索,深入思考,大胆实践,精心完善,不断提升,认真总结具有科学性、操作性、复制性的职业农民培育“1+X·天地人”新模式。天,职业农民要热爱共产党、有坚定的政治信念、享受党的政策;地,对认定的职业农民开展继续教育或跟踪服务;人,完成“培训、指导、认定、帮扶”四大培育环节。多年来,宝鸡市职业农民培育“1+X·天地人·天地人”模式发挥了很大的作用,职业农民培育成效显著,赢得广泛认可与好评。

关键词: 宝鸡市 职业农民 培育 模式

一、宝鸡市职业农民培育“1+X·天地人”模式



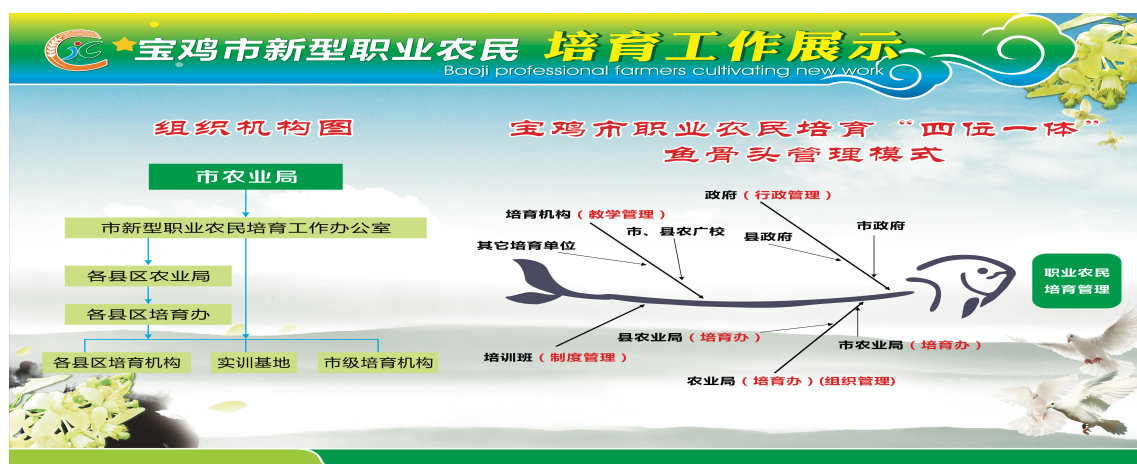
(一) 模式内容

宝鸡市职业农民培育“1+X·天地人”模式,“1”是指全市农业广播电视学校教学体系;“x”是指全市农业大专院校、农业研究与农技推广机构、农业专家大院、农业科技园区、农民专业合作社、农业产业化龙头企业等农业科技和农民培训职能单位;天,职业农民要热爱共产党、有坚定的政治信念、享受党的政策;地,对认定的职业农民开展继续教育或跟踪

服务，在全市农学会农广信分会下，建立同区域同产业的职业农民合作社或职业农民田间学校，保证学员离校不离训；人，完成“培训、指导、认定、帮扶”四大培育环节。

（二）模式特点

- 1、农广牵头，主体明确；
- 2、多方联合，优势互补；
- 3、农科教结合，产学研一体；
- 4、培育目标明确，层次清晰；
- 5、联合培育，整体效果好；
- 6、四级（行政、组织、教学、制度）管理，培育规范。



（三）模式创新

- 1、以培育具有农科中等专业学力以上职业农民为目标，构建培育体制，很好地解决培育谁的问题；
- 2、各方力量有机组合，使任何一家可能教不了、教不好的职业农民通过联合体能教了、能教好，收到“1+1>2”的互合效应；
- 3、革新传统的围墙内、封闭式、普通化教育为现代开放式办学；
- 4、培育三个层面政治信念、综合素质、专业技能。
- 5、以保证培育质量为主线，宏观决策上可以调动全市一切可以调动的社会力量共同促进职业农民培育大业，微观操作上可以按班依需整合全市教育培训资源，做到理论教学和实践技能并举，集中教学和分散指导互补；
- 6、以职业农民科技致富梦为追求，推动农民教育革新，走出一条适合宝鸡实际具有中国特色的职业农民培育之路。

二、宝鸡市职业农民培育“1+X·天地人”实力分析

(一)“1”宝鸡市有市级校一所(全国百强示范校),县区级农广校12所,其中A级校4所(千阳县农广校、眉县农广校、陈仓区农广校、陇县农广校),教职工200余人,其中高级职称21人,中级职称40人;实训基地36处;天网(广播、电视、互联网)、地网(组织网络、教学网络、管理网络)、人网(教师网络、学员网络、体系网络)“三网”聚合,初具规模。宝鸡市职业农民培育工作办公室设在市农广校。农广校以其独特的教育形式以及低投入、高效率、大容量、广覆盖和学员不离岗、不离乡等鲜明特点受到各级政府的重视支持和职业农民的喜爱。

(二)“x”宝鸡市现形成了宝鸡职业技术学院(生物工程系)、宝鸡市农业科学研究院、宝鸡市农业技术推广服务中心(12个县区农技中心)、24个农业专家大院、120多个农业科技园区、2000多个农民专业合作社、260多户农业产业化龙头企业的职业农民培育“x”多元协作教学体系;搭建了太白蔬菜、岐山甘薯、秦宝肉牛、麟游布尔羊4个国家级试验站、眉县猕猴桃、千阳苹果、太白高山蔬菜、陇县旱作农业、凤县花椒5个西农大试验站等实训基地体系。

三、宝鸡市职业农民培育“1+X·天地人”模式的运行保障

(一)严格遴选学员。严格按照职业农民四大标准(1年龄:18-55周岁;2学历:初级、中级、高级分别为初中、高中或中专、大专以上学历;3收入:初级、中级、高级分别为当地人均收入的5倍、10倍、15倍以上;4、从业:主要从事农业且收入的80%来源于农业),在全市细致普查摸底的基础上,建立后备职业农民基础数据库,精准选择道德素质高的种养大户、家庭农场主、农业企业工人、农民专业合作社骨干、农村信息员、经纪人、农机手、机防手、防疫员、(农资)营销员、(果树)修剪员等,特别是农科院校毕业生、返乡农民工、复转军人等文化基础好、学习愿望浓、经营规模大、创业意愿强、从业稳定性高的农村实用型人才。

(二)组建师资队伍。教师和学员是职业农民培育这枚硬币的两面,缺一不可。按照职业农民培育目标要求,大胆创新,健全“四位一体”教师库建设。在过去“高校专家教授、省市县农技推广人员、乡土专家“三位一体”教师库基础上,新增加了优秀的中、高级职业农民作为指导教师,实现了“四位一体”教师库建设。

(三)提升培育到“天”层。职业农民培育体现了我党对“三农”十分重视,是对现代农业和未来农业培养和储备人才的一项战略工程,所以职业农民培育不仅是技术、素质两大层面,更重要是政治层面的培育。因此,在培育的过程中对职业农民进行红色教育、传统教

育、理想信念教育等，确保“1+X·天地人”模式中的“天”层，是职业农民热爱共产党、有坚定的政治信念、能享受到党的政策温暖。

（四）下沉培育到“地”面。职业农民培育是多层次、全方位的系统工程。所以我们对认定后且具有发展潜力的职业农民开展“新理念、新技术、新思想”继续教育或跟踪服务，建立同区域同产业的职业农民合作社或职业农民田间学校，保证学员离校不离训。

（五）强化培育四大环节

1、培训。培育模式确立之后，随之而来的就是课堂组织培训、认定、指导、帮扶环节。

（1）固定课堂。组织教师在各个教学点对学员进行理论授课和集中答疑。

（2）田间课堂。组织学员在教师指导下，在现代农业园区、农业产业化龙头企业、农业专家大院、农民专业合作社、试验站等实训基地进行实训操作技能培训。

（3）流动课堂。组织教师或专家团将教学资源巡回送到教学点和田间地头对学员开展技能培训。

（4）空中课堂。利用职业农民远程教育平台、微信平台、QQ 平台，微课堂、农技宝、电话等双向音、视系统对学员开展网上辅导和在线教学，提高教学质量。

以上四大课堂教学方式再辅之以技能比武、学员讨论、现场观摩、异地交流、专题论坛、论文撰写等行之有效的教学方法，能极大地激发学员的学习热情和进取精神，提高学员分析问题与解决问题的能力 and 创业发展的能力。

2、“双证”资格认定。一方面根据《宝鸡市新型职业农民认定管理暂行办法》，经过宝鸡市、县农业局严格按照职业农民标准，对认定对象进行笔试和面试两个环节考核。确认合格者在市、县区农业信息网上公示，最后颁发证书，完成认定工作；另一方面由宝鸡市职业农民培育办公室和宝鸡市农业职业技能鉴定所联合对全市认定的职业农民进行职业技能免费鉴定，通过帮扶使其获得专业技能证书。

3、帮扶指导。为了保障教学质量和培育实效，对职业农民培育实行“导师帮扶”制度，按照教师对学员“1 对 5”方式进行帮扶，采取“面对面、手把手；电话；微信；QQ；农技宝”等形式解决学习、生产、创业中所遇到的形形色色的困难与问题，并协助制定发展计划、创业规划，帮助和支持其在农村经济、农业科技、示范带动上建功立业。

4、政策扶持。一是宝鸡市政府出台了《关于加快职业农民培育工作的实施意见》，将职业农民培育工作纳入各级政府农业农村经济发展规划，采取“政府统筹、农业部门牵头、相关部门配合、社会力量参与、农民自主自愿”的工作机制，将培育真正落实到位；二是市农业局积极联系邮政储蓄银行宝鸡市分行，协商支持职业农民创业金融服务政策，经过多次沟

通、协调，对认定的中高级职业农民无抵押、贴息贷款；三是市培育办成立了包抓工作小组，对全市各县区进行分片包抓，下设四个督查小组，监督指导各培训机构规范化、科学化、常态化的开展培育工作，并组织全市开展交叉检查，真正达到了“剑及履及”的监管效果；四是市农业局出台了《关于发放职业农民创业贷款贴息补助的通知》；五是对优秀的职业农民有偿聘请，让其帮扶、示范、带动其他职业农民发展。

四、宝鸡市职业农民培育“1+X·天地人”模式成效

（一）宝鸡市职业农民培育“1+X·天地人”模式之子模式“一主多元 五位一体”凤翔模式，被农业部评为十佳模式之一，并在全省职业农民培育模式评审中，凤翔模式获得一等奖。

（二）连续两届蝉联全省职业农民技能大赛团体优胜奖。2015 年全省第一届职业农民技能大赛，我市勇夺团体优胜奖总分第一，11 个工种取得了 5 个单项第一、2 个单项第三的好成绩；2016 年全省第二届职业农民技能大赛，获得了团体优胜奖，6 名学员荣获陕西省技术能手，10 名学员被省农业厅表彰为优秀选手。

（三）十佳致富标兵示范引领。在全市职业农民中开展了十佳职业农民致富标兵评选活动，并邀请了省农业厅、省培育办、市级党政四大班子领导参加了表彰大会，为十佳职业农民致富标兵颁奖，优秀职业农民成为全市职业农民的标杆和示范，这次活动把全市职业农民培育工作推上一个新的高度。

（四）职业农民风采展示。举办了全市职业农民风采展示，12 县区的 100 多名职业农民通过舞蹈、歌曲、小品、朗诵、乐器演奏等形式，展示了自己的才艺和技能，节目精彩纷呈，彰显了职业农民的新形象。

（五）举办教学能手竞赛活动。为了进一步加强职业农民教师队伍建设，全面提升教师专业技能水平，每年举办一次全市职业农民培育教学能手比赛。专兼职教师现场竞技，都发挥出了最好的水平，保持出了最佳的状态，取得了优异成绩，为全面完成职业农民培育任务，发挥了教学基础性作用。

（六）职业农民培育宣传效果显著。陕西电视台、陕西广播电台、宝鸡电视台、宝鸡广播电台多次宣传我市职业农民培育工作；宝鸡电视台《农业四季》栏目制作宣传 15 名职业农民创业典型；宝鸡日报等其他各类网络、媒体、报刊多次报道宣传我市职业农民培育模式及职业农民事迹。

（七）宝鸡市职业农民培育“1+X·天地人”模式很好的解决了困扰职业农民培育的体制和机制二大难题。建立以农业广播电视学校为主体，职业院校、职教中心为补充，农技推

广机构、龙头企业、科技园区、专合组织广泛参与协同配合的教育、科研、推广“三位一体”新体制，搭建起“政府统筹、农广牵头，多元培育、开放运行，高效灵活、充满活力”的职业农民培训新机制，实现了“主体明确、主辅清晰，各明其职、各负其责，紧密协作、质量可靠”的体制机制设计期望目标。

五、政策建议

宝鸡市职业农民培育“1+X·天地人”模式，虽具有明显的优越性，但纵观培育大势，与先进的培育理念、正规化的教育相比，还有一定差距，为此，建议结合我国国情，借鉴国外的先进经验和成功做法，树立开放式大学校办大教育的现代理念，尽快制定出台相关政策、方案、办法，使职业农民培育向正规化、科学化、学历化方向发展。

A brief discussion on Cultivation Pattern of Field School for Apple

Industry on New Professional Farmers

Chunsheng Zhang

Qianyang Agricultural broadcasting and Television School of Shaanxi Province, Qianyang
County of Shaanxi Province, 721100

1. Introduction of Pattern

The core content of the training pattern is combination of industry, education, and research. Industry consists of 11 modern agriculture parks, 16 66-ha demonstration orchards in Shuangmiaoyuan village in Zhangjiayuan town, a fruit-producing base of 240 orchards in Qianyang. Education means systematic training of new-type skilled farmers in 30 village teaching sites of Qianyang ABTS (Agricultural Broadcasting and Television School). Research depends on the 17-professors research team of Apple Exemplary Experiment Station of Northwest A&F University in Qianyang, which is mainly responsible for training plans, comparison of apple varieties, cultivation system. Apple Field College of Qianyang is in charge of training of new-type skilled farmers.

In Apple Field College, County Party secretary is as the honorary president, agricultural subprefect as the president, and with administrative office. The office is located in Qianyang ABTS, the president of Qianyang ABTS is as the office director.

2. Background of Pattern

Qianyang County is located in hilly-gully region of west part of dryland in north area of Weihe River.

2.1 With the large number of young adults in village going out to get jobs, like else places of China, issues become more prominent, such like elderly, women and primary-school agriculture. New labors in village have a strong will to be away from agriculture. Issues are going seriously which are lacking labors in key seasons, lacking professionals in modern agriculture, lacking labors when constructing new villages. There needs a large number of new-type skilled farmers who are skilled and good at orchard management.

2.2 Since 2011, modern agriculture companies like Haisheng Group, Huasheng Co., Dadi Fengtai Co. successively settled in Qianyang. They built the biggest M9-T337 rootstock breeding base, the biggest dwarf-rootstock apple demonstration orchards and orchard mechanization demonstration base in China.

2.3 In 2012, Apple Exemplary Experiment Station of Northwest A&F University was set up in Qianyang.

2.4 Qianyang ABTS built 30 teaching sites in villages with the criterion of containing classroom, tables, chairs, projector, audio amplifier, regulations, and being supervised.

2.5 In 2013, Qianyang established Apple Field College, with 25 government sectors, institutions and companies as members. Apple Field College relates to 30 villages and 11 modern agriculture orchards, with more than 3000 students.

2.6 In 2014, Qianyang ABTS began to be responsible to training of new-type skilled farmers with

skills of apple orchards management.

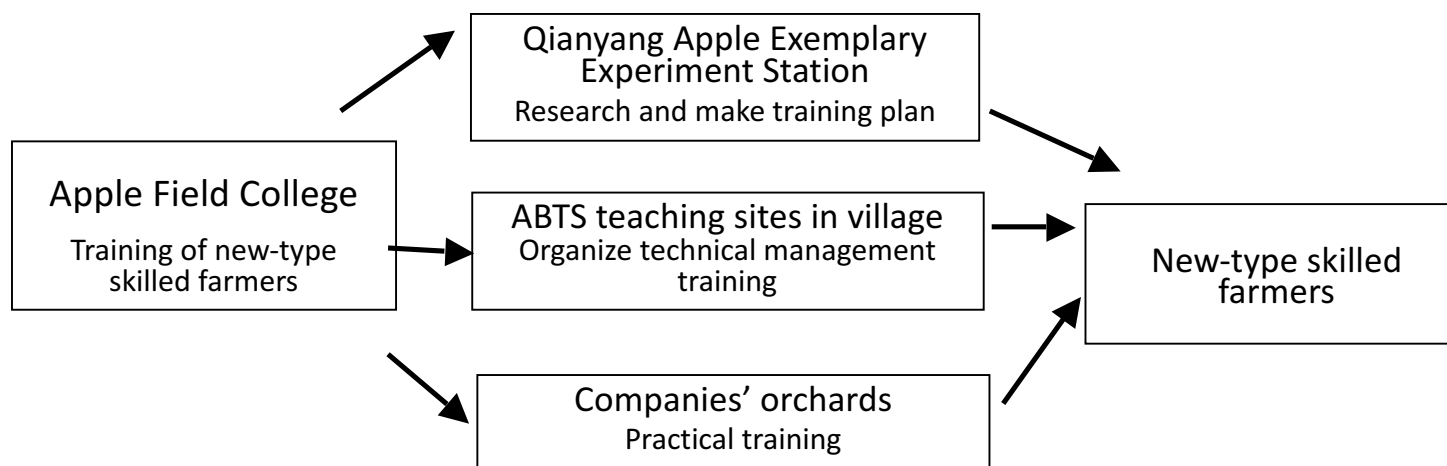
3. Operation mode of the pattern

3.1. Apple Field College is in charge of the training of new-type skilled farmers with combination of industry, education, and research. The college sets up 10 centers and 4 stations. Ten centers consist of expert consultation center, experiment center, graduate practice center, growers training center, international exchange center, dwarf rootstock breeding center, dwarf apple orchard growing technical center, orchard mechanization demonstration center, orchard eco-management center and organic orchard extension center. Four stations are Zhangjiayuan station, Nanzhai station, Caobi station and Cuijiatou station.

3.2. Agricultural Broadcasting and Television School is overall responsible of the training of new-type skilled farmers. There are six part of key task. First, it formulates practical teaching programs and teaches orchard technical management. Second, it teaches orchard practices and makes one-to-five guidance. Third, it opens mobile classes with supporting of agricultural through train. Fourth, it organizes Wechat groups to teach in the air classroom. Fifth, it organizes experts to compile teaching material and make teaching group. Sixth, it arranges training material and epurates training pattern to support government to make decisions.

3.3. Qianyang Apple Exemplary Experiment Station of Northwest A&F University is responsible of four research and development task. Firstly, comparison experiment of adaptability of apple trees all over of world and varieties. Secondly, comparison experiment of new apple training systems. Thirdly, deliberation of training pattern or programs of new-type professional farmers. Fourthly, training teachers of Apple Field College.

3.4. Skilled farmers work in orchards to learn techniques. 11 agriculture parks, 16 demonstration orchards and 240 small-scale orchards are not only high-quality apple growing base, but also practice base of new-type skilled farmers of Apple Field College.



Flow chart of training pattern

4. Innovation of the pattern

The pattern is one key center with multiple points, starting with high level and sophisticated skills. It starts with combination of industry, education, and research, and shows significant effect. Skilled farmers learn systematically in orchards and earn money in practice.

5. Safeguards of the pattern implementing

5.1. With strong organization as supporter.

County government sets up three groups to guarantee the implementation of new-type skilled-farmers training and formed the pattern of one key center with multiple points. First group is for science, technology, culture and education, county Party deputy secretary as leader, and 24 sectors participating in. Second group is for Qianyang Apple Field Collage, agricultural subprefect as the president, and 25 government sectors, institutions and companies as members. Third group is for new-type skilled-farmers training in Qianyang, agricultural subprefect as leader, agricultural director as deputy leader, 24 sectors participating in, and Qianyang ABTS responsible of training arrangement.

5.2. With professional teams as support.

There are three expert teams, which are 17-professor team of Qianyang Apple Exemplary Experiment Station, 35-graduate team of Haisheng Group, and assistant team of 50 intermediate-grade technicians of agricultural institution.

5.3. With preferential policy as safeguard.

In 2014, county government administrative office issued 124th Act, Supporting and awarding incentives of new-type skilled famers in Qianyang, consisting of 28 articles in 9 classes.

5.4. With superior training facility as basis.

ABTS built 30 teaching sites in villages, with enough facility and comfortable surroundings. The masses are willing to learn and gain greatly.

5.5. With advanced skills as a pharos.

The world-leading growing skills are the pharos of training pattern. These skills consist of building high-density orchards with knip trees and supporting system, using fertigation system, breeding grass between rows, and orchard mechanization.

6. Achievements of the pattern

6.1. From new pattern, we trained new farmers. Zhang Jun, a new-type skilled farmer of Yanjiacun village in Nanzhai town in Qianyang, built a 3.3-ha dwarf apple orchard with trellis system. His orchard was with high level and good management, and the capital of his fruit cooperative had already been over 3.8 million Yuan. Recently, he earned the award of China Agricultural Science and Education Foundation. Shi Xiaoming also built his 4-ha orchard, and led and helped other farmers to build 800 ha orchard. They all made difference in their villages.

6.2. From new pattern, we showed them the gate of obtaining wealth. 50 students of Hongfu fruit cooperative in Sanhe village table-grafted 5 million dwarf apple tree for Haisheng Group, worked in the sorting line and earned more than 1.5 million Yuan. Their incomes increased 35 thousand Yuan per hectare by adopting new methods in their orchards.

6.3. From new pattern, we built new relationship between cadres and the masses. Cadres and experts helped the masses learn new skills in orchards.

6.4 From new pattern, we welcomed visitors all over of China.

Since 2011, there are already more than 13 thousand visitors from more than 120 cities and counties of 10 provinces visiting and learning training experiences of Apple Field College and Qianyang pattern.

7. Discussion of training approaches of new-type skilled farmers

Our overall approaches have three dimensions. First, we want to make Apple Field College into farmers' heart, make them be students in their mind and behave like students. Second, we want to those trained farmers to help others using new skills and theories they learned. Third, we want to make more efforts to improve their general levels and make them distinct from old-type farmers.

浅谈“苹果田间大学”新型职业农民培育模式

张春生

(陕西省农业广播电视学校千阳县分校, 陕西宝鸡 721100)

摘要:“苹果田间大学”是一个理念上的大学, 因为她没有固定的校园, 没有固定的课堂, 没有豪华高档的实验室, 但是我们有海升、华圣、汇源、大地丰泰等现代农业园区给我们引进的国际一流的 M9-T337 自根砧矮化苗木, 立架格网式集约化苹果栽植模式; 有西北农林科技大学宝鸡千阳苹果试验站作技术支撑; 有千阳县农广校创办的 35 处村级教学点; 有 10 万亩自根砧密植集约化矮化果园作基地。所以说, 我们的“苹果田间大学”又是一所实实在在, 看得见, 摸得着, 操作性强的新型职业农民培育学校。

关键词: 浅谈、苹果田间大学、职业农民、培育模式

一、模式概述

千阳县“苹果田间大学”创办于 2013 年, 由县委书记任名誉校长, 主管农业的副县长任校长, “苹果田间大学”下设办公室, 办公室设在县农广校, 农广校校长任办公室主任。县委组织部、县委宣传部、县委农工部、县科协、县财政局、县发改局、县农业局、县水利局等 25 个部门和单位为成员单位。“苹果田间大学”培育职业农民的核心内容是产学研相结合。其中: “产”是指以海升、华圣、大地丰泰等 11 个现代农业园区、张家镇双庙塬村等 16 个千亩示范方, 全县 240 个 50 亩以上果业大户为核心的现代果业生产基地; “学”是指以县农广校在南寨镇三合村、张家塬镇晖川村等 35 个村创建的村级教学点为依托, 开展系统性的新型职业农民培育理论教学工作; “研”是指西农宝鸡千阳苹果试验站的 17 名专家教授组成的理论研究团队, 主要负责培训方案、品种对比、栽培模式等方面研制工作。千阳县“苹果田间大学”统领新型职业农民培育。

二、模式背景

千阳县地处渭北旱塬西部丘陵沟壑区, 是一个山区贫困农业县。

1. 随着农村青壮年劳动力大量外出务工, 千阳和全国一样, 老人农业、妇女农业、小学农业等问题日益凸出; 农村新生劳动力离农意愿强烈; 关键农时缺人手、现代农业缺人才、新农村建缺人力问题严重。现代农业急需一批有文化、懂技术、善经营、会管理的新型职

业农民队伍。

2、2011年以来海升、华圣、大地丰泰等现代涉农企业先后落户千阳，建成了全国最大的自根砧 M9-T337矮化苹果苗木基地、全国最大的立架格网式自根砧现代苹果示范园和全国果园机械化示范基地；

3、2012年西北农林科技大学在千阳成立了“西农宝鸡千阳苹果试验站”。

4、千阳县农广校按照六个有的标准（有教室、有桌凳、有投影、有专人管理、有扩音设备、有制度），建起了40多处村级教学点。

5、2013年千阳县创办了“苹果田间大学”，25个部门和单位为成员单位，涉及30个村、11个现代农业园区，有学员3000多名。

6、2014年起至今，千阳县农广校承担了苹果新型职业农民培育任务。

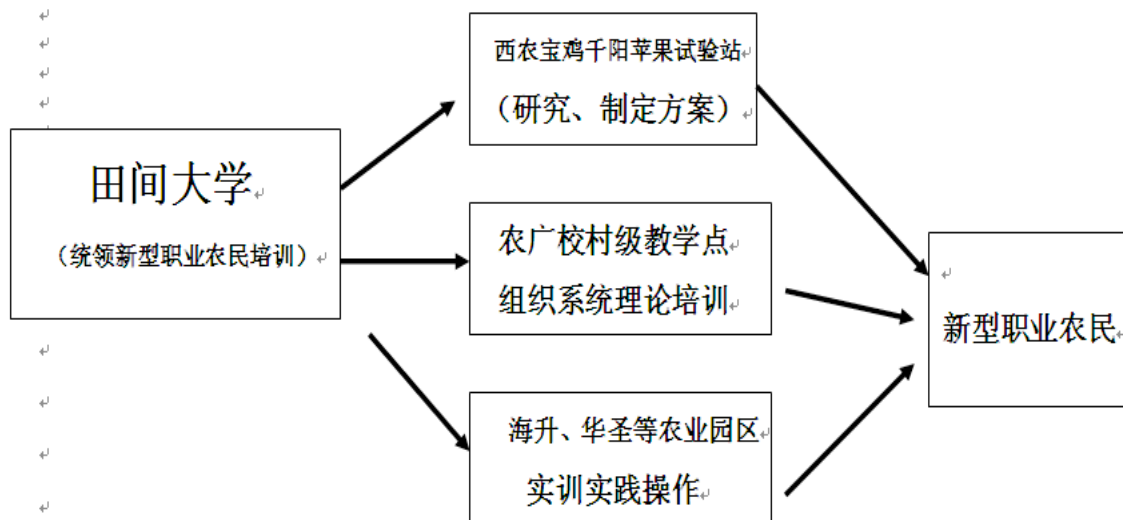
三、模式运作方式

（一）“苹果田间大学”统领“产学研”相结合的新型职业农民培育工作。“苹果田间大学”设置十个中心，四个站。十个中心分别是：专家会商中心、试验研发中心、研究生实习中心、果农务工培训中心、国际交流中心、自根砧苗木繁育中心、矮砧栽培技术中心、果园机械化展示中心、果园生态化管理中心、苹果有机生产推广中心；四个站分别是：张家塬站、南寨站、草碧站、崔家头站。

（二）农广校全面负责新型职业农民培育工作。一是对新型职业农民开展综合素质教育；二是制定具体培训教学方案，开设理论课堂；三是开设田间课堂，开展“一对五一带十”导师制帮扶指导；四是依托农业科技直通车，组建流动课堂，巡回指导；五是组建微信群，办好空中课堂；六是组织专业人员编写适合当地实际的培训教材，组建授课团队；七是总结整理培训资料，提炼培训模式，为政府决策提供依据。

（三）西农宝鸡千阳苹果试验站组织研发。一是中外苹果苗木适应性对比试验；二是苹果新品种适应性对比试验；三是国内外苹果最新栽植模式对比试验；四是适合千阳实际的新型职业农民培育模式或方案研讨；五是培训苹果田间大学师资。

（四）“苹果田间大学”学员新型职业农民进园务工学技术。11个示范园区，16个千亩示范方，240个50亩以上果园大户，既是优质苹果生产基地，也是“苹果田间大学”新型职业农民学员实训、实习的实训基地。



模式流程示意图

四、模式创新点

一主多元，形成合力；综合素质提高人称赞；高点起步、技术一流；产学研结合、收效显著；职业农民在课堂系统学习，在园区中成长，在实践中收益。

五、模式运行保障措施

1、有坚强的领导机构作后盾。一是县委成立了千阳县苹果田间大学领导小组，县委书记任名誉校长，分管农业的副县长任校长，25个部门和单位参与；二是成立了千阳县新型职业农民培育领导小组，由县政府主管农业的副县长任组长，农业局长任副组长，24个部门参与，县农广校统揽培训工作。使新型职业农民培育工作形成了“一主多元”的培训格局。

2、有强大的技术团队作依靠。一是西农宝鸡千阳苹果试验站17名专家团队；二是海升现代农业园区35名研究生指导团队；三是农业系统50名中级以上专业技术人员组成的辅导员团队。

3、有优惠的扶持政策作保障。县委、县政府以千政办发〔2014〕124号文件印发《千阳县新型职业农民扶持奖励办法》，共计9类28条。

4、有优越的培训环境作基础。农广校建起了40多个村级教学点，设施齐备，环境优雅，群众乐意来，留得住，安心学，收效好。

5、有先进的作业技术作引领。矮化自根砧大苗建园、立架格网式栽培、水肥一体高效

生产、果园行间生草覆盖、全程机械化操作等国际一流的种植技术，是新型职业农民培育的新航标。

六、模式效益

1、新模式培育了新农民。千阳县南寨镇闫家村新型职业农民张军，栽植立架格网式果园50亩，建园起点高，管理效果好。他的合作社资本已超过600万元。最近他又获得了中华农业科教基金会“风鹏行动·新型职业农民”资助项目奖励。新型职业农民师小明自己建园150亩，带动周边群众建立架格网式果园1.2万亩。他们都以崭新的风貌展现在新农村。

2、新模式打开了致富门。三合村鸿福果业合作社，苹果种植班的50名学员，为海升园区嫁接矮化自根砧苗500多万株，收入达150多万元，为园区分拣苹果6000多吨。采用新技术作务的果园，亩产值净增2000多元。

3、新模式建立了干群新关系。具体表现是：干部入了户，专家进了园，群众敢提问。

4、新模式迎来了四方客。据统计，自2011年以来，前来千阳参观学习千阳模式、“苹果田间大学”、新型职业农民培育经验的共计：10个省，120多个市县，1.3万多人次。同时使千阳县苹果全国驰名，走出国门。2015年“九三”阅兵大典，千阳县海升苹果作为国礼深受各国元首青睐。

七、对新型职业农民培育工作思路探讨

我们的总体思路是：一是把“苹果田间大学”办到农民的心灵深处，让学员心中有学校，意念之中是学生，行动、行为有规范。二是让新型职业农民的新知识、新技术反哺苹果田间大学每个学员，全面发挥“一带十”的带动作用。三是在新型职业农民的综合素质上再下工夫，使他们与传统的“老农民”有质的区别。

Research and Countermeasures on New type of professional farmer training

Xuejie Jiang

Bureau of Agriculture of Ju County of Shandong Province, Ju County, 276500

According to the strategic requirements of agriculture promotion through science-education, Agricultural enhancement by Talents, farming consolidation by new professional farmers. Ju county of Shandong province combining with the local reality, explores the Cultivation mode "Combination of school and society" and the "integration of three classes" to cultivate new farmers, having been training 1400 new professional farmers since 2014. A large number of educated, skilled, operated new farmers have been trained, which effectively promote the development of modern agriculture.

1. Characteristic pattern

1.1 School works together with social, build a breeding ground

"School-social combination", namely the county Agricultural Broadcasting and Television School (ABTS) combined with Farmers' Professional Co-operatives(FPC). As the implementation of the new type of professional farmers cultivating engineering unit, ABTS has the educational qualifications, mature experience and plenty of teaching equipment, facilities and teaching staff with the new professional farmers cultivating conditions; Farmers' Professional Cooperatives is the main body of new agricultural management with members eager to learn new technology and new ideas around home. These members are capable to accept new ideas, new technology and engaged in the industry with new technology.FPC can be used as a new pattern of professional farmers cultivate in the field of classroom and practical training base.

1.2 "Three-class integration" to improve the training level

"Three-class" is, namely, indoor class, field class and observation class out of town. "Integration" means mutual promotion, mutual penetration and mutual promotion of the three classes. "Three-class integration "means the skills students learn in indoor-class, together with the doubts and the problems they encountered, can be put into practice or solved lively in the field class. It can realize the organic combination of theory and practice. We organize students to study successful experience of typical industry which is high yield and efficiency in the surrounding areas, so that students can learn what they can't from the local. It'll cultivate students the ability of to learn advanced, to find the gap and to constant measures for improvement. And it can train students to become really new professional farmers with rich theoretical knowledge, strong practical experience and the open creative thought.

2. Pattern background

Juxian is a large agricultural county, with a total population of 1.1 million, 1.08 million mu of cultivated land and over 80 thousand agricultural populations; it has more than 38 thousand rural labor forces. Along with a large number of young migrant workers away from home, "who will farm?" has become a primary issue in the development of modern agriculture.

In recent years, with the development of the new type of professional farmers cultivating engineering, the gravity of farmer training center in Juxian transfers from the rural labor

training to professional cultivating. It emphasizes the cultivation and development of new type of agricultural management main body. The number of farmers' professional co-operatives has grown to 1944 so far, the family farm, 194. The number of Agriculture leading enterprises, of which the annual turnover is above 5 million yuan has grown to 154. Taking together all the present situation of agricultural development, we realize that the new agricultural management main body, especially the maturity of the farmers' professional co-operatives is capable on technology, management and management. And its planting and breeding are highly technical. Therefore, we determined the farmers' professional co-operatives as the county cooperation main body of agricultural broadcasting and television school to cultivate new professional farmers.

3. Main methods

Ju county is pursuing government-oriented policies and established the "social" and "three-class integration" cultivation mode by strengthening organization and leadership, integrating education resources as well as innovating mechanism.

3.1. To strengthen organization and leadership

To strengthen the new professional farmers cultivating engineering work of organizational leadership. My county established a leading group headed by engaged magistrate , which took the heads of other departments such as agriculture, finance, education, scientific technology and finance as the basal members to train the new professional farmers. This leading group consists of offices, and is responsible for the supervision and review of work methods, scheduling, etc.

3.2 the integration of education resources

We Strengthened the teaching facilities and infrastructure construction in Agricultural Broadcasting and Television School, actively built a field practice base that belongs to farmers' professional cooperatives. We also set up an education system named " the one main stem with many other branches" mainly in ABTS, with farmers' professional cooperatives as the training base. Colleges and universities involved in, this system is complemented by innovative local expert and local artist.

3.3 The school -social combination

Needs of industry, we explore a training model in the ABTS as training institutions, participated by farmers' professional co-operatives. In 2015, government of our county identified ABTS for new professional farmers training institutions, and select the grape greenhouse as the leading industry. To explore new effective ways to foster the professional farmers, we developed mainly in ABTS the cultivation work which is based on Jvxian xing-tai grape cultivation professional cooperatives. ABTS is responsible for indoor training and outdoor watching during the training links; Juxian xing-tai grape cultivation professional cooperatives know well about the status quo and needs of grasp industry in our county , to be responsible for the student organization, the selection, and to provide students with the field class and practice base, and provide some training teacher. It realized the organic combination of theory and practice, and effectively improved the students' theoretical level and practical skills, giving students samples to learn from.

3.4 "The integration of three classrooms"

To improve the new professional farmers cultivating engineering, we have changed the traditional single "indoor" classroom teaching mode. In the order of cultivating the leading industries, we have explored the cultivation mode of indoor classroom, farm classroom and go out to inspect the classroom field.

3.4.1 Indoor class: After choosing the greenhouse grapes, peaches and other leading industries, then according to the requirements of industry and farming seasons making training plans of the whole industry chain. We have formed a new type of professional farmers of cultivating teachers which is made of 34 people. Firstly, employing five well-known experts and scholars from scientific research institutions, colleges and universities. Secondly, choosing fifteen experts and local able persons who are familiar with the industry and rich in qualification and experience from this area. Thirdly, employing eleven family farmers and farmers' professional co-operatives management personnel. Fourthly, employing three experts who have a leading role in driving the modern agriculture demonstration zone in this industry. The above experts by the means of multimedia teaching, let the students know more about the industry both at home and abroad, advanced technology, advanced experience and the development trend of the high-tech learning professional knowledge to enhance the academic level.

3.4.2 Class 2, the field: We take "counselor + experts + farmers" mode of teaching. The county ABTS teachers as training instructors, play a role in a link between training experts and the farmers. They are the organizer of field-teaching, guidance and training. Some training experts provided by the practice base that belongs to farmers' professional co-operatives. They made specific instructions on content and operation of training. Based on the principle of convenience and proximity for students, we have classes not far from the students' living place, and near the field-class to save time on the road, which is convenient for students and save the travel fee. Students learn training skills in-indoor, their doubts, problems encountered can be solved on the training base in the "field" classroom through practice operation. It realized the organic combination of theory and practice.

3.4.3 Non-local Watching-class: To open the trainees' vision and make them learn the successful experience that is unacquirable from the local schools, we organize students to the surrounding areas in Pingdu Daze mountain to study the typical high production and efficiency, at the same time we control others' experience, find our own deficiencies and gaps between the industry and the insufficiency. We helped students learn the advanced, find the gap and the ability to improve their measures. We helped students to become really new professional farmers, who have rich theoretical knowledge, strong practical experience and the open innovative ideas.

4.Results

4.1 New agricultural management main body has grown rapidly

In the sending of the participant, 1944 farmers' professional cooperatives, together with 194 family farms, have been set up in the county. The number of leading agriculture enterprise, with annual sales income of over 5million yuan, has grown to 154. The founded farmers'

professional co-operatives have revenues of more than two billion yuan. 120000 families have been driven to gain revenue of totally more than one billion yuan.

4.2 Industrial scale expansion

Grape industry has grown from zero to a large-scale. The area is up to the present 5000 mu compared with 2000 mu before training. Due to replace the grape varieties and the application of new technology, the output per mu of greenhouse grape has increased to 15000 yuan, which effectively improved the level of industry.

4.3 A large number of outstanding talents have been trained.

Due to the combination of interior training and field-class and the combination of local experience and the surrounding typical cases, we have trained a large number of new professional farmers who are skilled and good at operation and management. This provides talent support for the development of modern agriculture.

新型职业农民培育工作研究与对策

蒋学杰

(山东省莒县农业局科技科 山东省莒县 276500)

按照“科教兴农、人才强农、新型职业农民固农”战略要求，山东省莒县结合本地实际，探索了“校社结合”、“三个课堂融合”的培育模式培育新型职业农民，2014 年以来共培训新型职业农民 1400 人，培养了一大批有文化、懂技术、会经营的新型职业农民队伍，有力地促进了现代农业的发展。

一、模式特征

(一) “校社结合”，筑牢培育阵地“校社结合”，即县级农业广播电视学校与农民专业合作社相结合。农广校作为新型职业农民培育工程的实施单位，有办学资质、成熟的办学经验，有充足的教学设备、设施和师资队伍，具备新型职业农民培育的条件；农民专业合作社作为新型农业经营主体，合作社成员渴望在家门口学到新技术、新理念，同时具备接受新理念、新技术的能力，所从事的产业具有新的技术含量，可作为新型职业农民培育的田间课堂和实训基地。

(二) “三个课堂融合”，提升培训层次

“三个课堂”，即室内课堂、田间课堂、外出观摩课堂。“融合”即三个课堂的相互促进、相互渗透、共同提升。“三个课堂融合”，就是学员在室内培训学到的技能、存在的疑惑、遇到的疑难问题，可以到实训基地通过“田间课堂”实习操作、现场解答疑难问题，实现了理论和实践的有机结合。为让学员学习从当地学不到的成功经验，我们组织学员到周边地区学习本产业成功的高产高效典型，培养学员学先进、找差距、定改进措施的能力，真正把学员培育成为具有丰富的理论知识、较强实践经验，又有开阔的创新思路的新型职业农民。

二、模式背景

莒县是农业大县，总人口 110 万人，耕地面积 108 万亩，农业人口 80 多万人，农村劳动力 38 多万人。随着大量青壮年农村劳动力外出务工，“谁来种地”问题成为成为现代农业发展的首要问题。

近几年来，随着新型职业农民培育工程的开展，莒县农民培训工作的重心开始由农村劳动力培训转移向职业化农民培育转变，同时注重新型农业经营主体的培育和发展，截至目前农民专业合作社发展到 1944 家，家庭农场 194 家。年经营额过 500 万元以上的农业龙头企业 154 家。综合农业发展现状，我们认识到，新型农业经营主体特别是成熟的农民专业合作社

社具备懂技术、会经营、善管理的条件，同时，具备较高技术含量的种、养业，为此，我们确定了农民专业合作社作为县农广校新型职业农民培育的合作主体。

三、主要做法

莒县以政府为导向，通过加强组织领导、整合教育资源、创新机制等做法确立了“校社结合”和“三个课堂融合”培育模式。

（一）加强组织领导

为强化新型职业农民培育工程工作的组织领导。我县成立由分管县长任组长，农业、财政、教育、科技、金融等部门主要负责同志为成员的新型职业农民培育工作领导小组，领导小组下设办公室，负责制定工作方案、进度安排、监督考核等。

（二）整合教育资源

强化了农广校教学设备、设施建设，积极构建农民专业合作社所属的田间实训基地，形成了以农广校为主阵地，农民专业合作社为实训基地，大专院校参与，具有创新意识的土专家、土能人为补充的“一主多元”教育体系。

（三）“校社结合”

围绕产业需求，我们探索出以县农广校为培训机构，农民专业合作社参与的培训模式。2015 年我县认定莒县农广校为新型职业农民培育机构，并选择温室葡萄作为主导产业。为探索新型职业农民培育的有效途径，我们以县农广校为主阵地，以莒县兴泰葡萄种植专业合作社为依托，开展培育工作。农广校负责室内培训、外出观摩环节等整个培训环节；莒县兴泰葡萄种植专业合作社熟悉、掌握我县葡萄产业的产业现状及需求，负责学员组织、遴选，提供学员实训所用的田间课堂、实训基地，并提供部分实训教师，实现了理论和实践的有机结合，有效提高了参训学员的理论水平和实践技能，使学员学有榜样、干有样板。

（四）“三个课堂融合”

为搞好新型职业农民培育工程，我们改变了传统的单一“室内课堂”教学模式，以培育主导产业为目标，探索了“室内课堂、田间课堂、外出观摩课堂”相结合的培育模式。

1、室内课堂：选准温室葡萄、桃等主导产业后，先根据产业需求和农时季节制定全产业链培训计划，组建了有 34 人组成的新型职业农民培育师资队伍。一是从科研机构、大专院校聘请知名专家、学者 5 名；二是从本区域选拔精通本产业，具有一定资质和丰富经验的专家和乡土能人 15 名；三是聘请家庭农场主和农民专业合作社经营管理人员 11 名；四是聘请对本产业有示范带动作用的现代农业示范区内的专家 3 名。以上专家通过多媒体授课，让学员更多的了解国外、国内本产业的先进技术、先进经验及发展趋势，学到高科技含量的专

业知识，有效提升了理论水平。

2、田间课堂：采取“辅导员+实训专家+参训农民”的教学模式，县农广校教师担任培训班的辅导员，起到联系实训专家、参训农民的纽带，是田间授课、指导与实训的组织者。部分实训专家由农民专业合作社所属的实训基地提供，具体讲解实训内容、指导实训操作。本着方便学员、就地就近的原则，选择离学员驻地近、离田间课堂近的地点办班，节省了学员路上耽误的时间，即方便了学员又节省了租车费用。学员在室内培训学到的技能、存在的疑惑、遇到的疑难问题，可以到实训基地通过“田间课堂”实习操作、现场解答疑难问题，实现了理论和实践的有机结合。

3、外出观摩课堂：为开阔参训学员视野、学习从当地学不到的成功经验，我们组织学员到周边地区平度市大泽山学习了葡萄高产高效典型，同时对照外地经验，查找自身从事本产业存在的差距和不足，培养学员学先进、找差距、定改进措施的能力，真正把学员培育成为具有丰富的理论知识、较强实践经验，又有开阔的创新思路的新型职业农民。

四、取得的成效

（一）新型农业经营主体数量迅速增加

在参训学员的带动下，全县农民专业合作社 1944 家，家庭农场 194 家，年销售收入 500 万元以上的农业龙头企业发展到 154 家，创办的农民专业合作社年总收入达到 20 多亿元，辐射带动 12 万户获得收入 10 余亿元。

（二）产业规模膨胀

葡萄产业实现了由零星种植到规模发展，面积由培训前的 2000 亩发展到目前的 5000 亩。由于更换了葡萄新品种，应用了新技术，温室葡萄亩产值增加 1.5 万元，有力提升了产业层次。

（三）培育了一大批优秀实用人才

由于采用室内培训与田间课堂相结合、本地经验与周边致富典型形结合的方式培训，培养了一大批懂技术、会经营、善管理的新型职业农民队伍，为现代农业发展提供人才支持。

The development of family farms and the nurturing of family farmers

Dapeng Hang, Lei Wan, Hui Chen

(Central Agricultural Broadcasting and Television School, Beijing, 100125)

Abstract: On the basis of presenting the overall development status of family farms and basic information of family farmers in China, the paper distills the experiences and practices of developing family farms, presents programs and plans for nurturing family farmers in China, analyses issues and difficulties faced in developing family farms, and recommends measures to meet the challenges.

Key words: Family farm, Development, Family farmers, Nurturing

Along with transfer of large number of rural youth and the middle-aged to urban areas, a trend of aging of rural labour force appeared in many areas of China. Who will till the land and who will pursue agricultural production in the decade or even decades to come have become an issue that needs imperative solution. Family farm featuring household operation and specialized farm production with appropriate scale is suitable to the context of China and to the characteristics of agricultural production, which is also well adapted to the current social and economic development of country, therefore, it is an effective force for the development of modern agriculture. The Chinese Government attaches great importance to and supports the development of new type of agricultural business including family farm. In 2013, the concept of “family farm” for the first time appeared in Document Number One of the Central Committee of the Chinese Communist Party. The “13th Five-year Plan for Economic and Social Development of the People’s Republic of China” emphasized that support will be rendered to the development of new types of agricultural business such as family farms. Localities have been actively exploring the models of new type of agricultural operations, including the realization of scale operation through land circulation, enhanced supports in terms of agricultural fiscal resources, financing and insurance. Family farm is becoming one of the prevailing models of agricultural operations in China.

I. Basic facts about family farm in China

1. Overall development status of family farm in China

(1) Number of family farms: according to nationwide survey of family farm development issued by the Ministry of Agriculture in 2013, there were 877,000 family farms in China by the end of 2012, with involved arable land area of 176 million mu or 13.4% of the contracted arable land area of country. The revenue of family farm operations nationwide was CNY 162 billion with an average of CNY 184,700 per farm. By the end of 2016, there were 29,000 family farms with annual revenue over CNY 1 million; 17,000 family farms had registered trademarks, 9,200 family farms obtained product quality certification; and a number of family farms had become the recognized production bases for exporting by large-scale leading agricultural enterprises. The proportion of family farms that have obtained quality certification of agricultural products was 1.5%¹; those obtained fiscal support fund accounted for 6.8% and secured loan support was 5.7%.

(2) Types of family farms: there are three types of crop farming, animal production and

¹ The percentages given below are from 2015 nationwide sample family farm monitoring data. In 2014, the Ministry of Agriculture launched the work of nationwide sample monitoring of family farm. About 3,000 family farms are selected from the family farms certified by agricultural administration at and above county level to be monitored by the rural development research institute of Chinese Academy of Social Sciences. Samples are from 31 provinces (autonomous regions and municipalities. With the random sampling principles, each province selects 2-3 sample counties and about 100 family farms to be monitored.

mixed operation of both crops and animals. Crop farming primarily focuses on grain production and animal production includes livestock and fishery. Looking at the nationwide data, family farms in crop production account for 63% while those featuring grain production account for 43.1% of the total number of family farms. The proportion of family farms of livestock production is 18.7% and fishery is 5.7%. About 8.8% of family farm engaged in both crop and animal production; other types of family farm account for 3.8%, including those that integrate primary, secondary and tertiary industries and leisure agriculture.

(3) Scale of family farms: family farms of grain production with arable land area ranging from 50 (including) to 500 mu make up the majority of the category, accounting for 91.5%; of which, farms with 50 (including) to 200 mu is 61.5%, 200 (including) to 500 mu 30%, 500 (including) to 1,000 mu 6.3% and over 1,000 mu only 2.2% of the total number of family farms of grain production.

(4) Labor, land and product marketing of family farms: the average number of labor of a family farm is 7, of which, the average of family member labor is 4.8 and employed year-round labor is 2.2. Among the arable land area cultivated by family farms, 69.4% is obtained through land circulation. Family farms with annual market value over CNY 100,000 is 33.9%, CNY 100,000 (including) to 500,000 is 44.1%, CNY 500,000 (including) to 1 million is 15% and over CNY 1 million is 7%.

2. Profile of family farmers

Gender of family farmers: male is 88.80% while female owners account for 11.20%. **Age of farm owners:** the average age is 45.77 years old, those below 40 (including) account for 25.90%, ranging from 41 to 50 account for 44.64%, and over 51 for 29.46%. **Education:** farm owners with middle school education account for 45.61% of the sample, those with senior high school, vocational school and vocational high school account for 37.07%, those with education of college and above account for 11.23%.

II. Experiences and practices of developing family farms

The development of family farms in China has gone through some stages already. In the 80's and 90's of the last century, some skilled farmers of crop farming through contracting and land circulation started specialized and scale production in agriculture, forming the basic features of family farms. Since 2000, pilots of family farms have carried out in Ningbo of Zhejiang Province, Songjiang of Shanghai and Yanbian of Jilin Province, and local governments have also explored the development of serials of policies for supporting and certification management of family farms. Large households of crop farming and animal production in Ningbo simultaneously or with the guidance of the government obtained industry and commerce registration for the operations, evolving their farm production into family farms. In 2007, Songjiang started to explore practices of transferring arable land of over tens of thousands of traditional farmer households to village collectives, then the government invested in the development of high standard base farmland, which is redistributed to over 1,000 villagers to start family farms. From 2011 to 2014, the financial institutions in Yanbian Prefecture through collateral loan and credit released over CNY 300 million of loan to family farms. The practices of fostering the development of family farms include the following four aspects:

1. The establishment of registration and certification system for family farms

Starting from 2014, the Ministry of Agriculture has been supervising localities to establish specific standards applicable to a county as well as catalogues of family farms, the industry and commerce administration has also issued relevant stipulations for the registration of family farms. Measures such as catalogue management and assessment of demonstration farms helped upgrade the operation and management of family farms. By the end of 2016, 30 provinces (autonomous regions and municipalities) had issued guiding opinions on supporting the development of family farms. There were 445,000 family farms (average land holding of operation is 215.1 mu) incorporated in the catalogue management of agricultural administration at and above county level, 18 provinces (autonomous regions and municipalities) had carried out activities of establishing demonstration family farms, and over 60,000 family farms had been certified at or above county level as demonstration family farms.

2. Fiscal support in agricultural domain to family farms

The Ministry of Finance and the Ministry of Agriculture issued the “*Guiding Opinions on Adjusting and Improving Three Types of Subsidies in Agriculture*”, which stated that starting for 2016, subsidy to improved crop varieties and animal breeds, direct subsidy to grain production and comprehensive subsidy to farm inputs, the so-called “three types of subsidies”, should be merged to establish agriculture-supporting and protecting subsidy, of which, subsidy to appropriate scale of grain production is used to support primarily new type of agricultural business such as family farms. According to incomplete statistics, fiscal funding used by localities in supporting family farms had reached CNY 1.38 billion by the end of 2016.

3. Strengthening financial and insurance services and socialized service in agriculture

In 2016, the Ministry of Finance, the Ministry of Agriculture and the China Banking Regulatory Commission jointly established the National Agricultural Guarantee Company in order to promote grain structure adjustment and agricultural operations of appropriate scale. The initial registered capital of the company is CNY 4 billion. Through establishing agricultural guarantee companies, releasing discounted loan, establishing hedging funds and expanding the scope of loan collateral, localities have strengthened financial and insurance services to agriculture. At the same time, through providing overall social services at multiple dimensions and levels, efforts have been made to promote the healthy development of family farms.

4. Establishment of talents training system

From 2014 to 2016, the Ministry of Agriculture had offered over 200 sessions of thematic training courses in total with the intake of over 16,000 persons. Efforts are being made to implement the “*Training Program of Modern Youth Family Farmers*”, including training and guidance provision, business initiation and incubation, policy support and follow-up service. Over 23,000 modern youth farm farmers have been trained through the program. Relying on the “*Program of Training of New Type of Professional Farmers*” and “*Program of Training of Model Skilled Workers in Rural Area*”, family farmers have been training in batches in different fields.

III. Nurturing of family farmers

As decision makers and organizers of family farms, the professional skills and comprehensive qualification of family farmers are the key factors that influence the development of family farms. In practice, governments at various levels cashed in the major buttressing role of CABTS’ as a specialized agency for training of new type of professional farmers and relied on the “*Program of Training of New Types of Professional Farmers*” and “*Program of Training of Model Skilled Workers of Rural Areas*” for intensified training of family farmers. Meanwhile, CABTS system implements vocational agricultural education focusing on farming-farmers and successors of agriculture, with the aim of nurturing skilled farmers who will be able to assume management and operation responsibilities of family farms.

1. Program of training new type of professional farmers

The Chinese Government attaches great importance to training of new type of professional farmers. Secretary General Xi Jinping pointed out that “*we need to train more new type of professional farmers who have passion in agriculture, understand technologies and are good at management and operation*”. In 2012, the Ministry of Agriculture launched the “*Program of Training of New Type of Professional*”. The operators of family farms are important component of professional farmers of agricultural production and operation. “*Program of Training of New Type of Professional*” targets at family farmers and focuses on the implementation of modern youth farm owner training program and rotation training program for new type of role models of agricultural management and operation.

(1) Modern Youth Farm Owner Training Program. Since 2015, the Ministry of Agriculture in association with the Ministry of Education and the Central Committee of the China Communist Youth League launched the “*Program of Training of Modern Youth Family Farmers*”, through which, a number of specialized large households, family farm operators, backbones of farmer cooperatives, undergraduates who returned to rural areas to start their own business, returned migrant farmer workers and veterans aging from 18 to 45 and with

certain basics of production and education of senior high school and above are selected each year to participate in the two-year training, incubation of business initiation, policy support activities, and one-year follow-up service is also provided. Funding allocation per person each year is no less than CNY 3,000. The purpose of the program is to nurture youth family farmers in the country who have strong capacity of business initiation with strong skills and can play the role of leadership. By the end of 2016, the program has trained 23,000 modern youth farmers nationwide.

(2) New Type Of Models of Agricultural Management and Operation. The Ministry of Agriculture since 2015 has been implementing nationwide the Rotation Training Plan for specialized large farmer households, family farm operators, leaders of farmer cooperatives and backbones of agro-enterprises. The plan envisages full coverage of targets in five years and training is provided to 1 million people each year. The contents of training focus on production and management knowledge and skills, meanwhile certification management, follow-up service and policy support are provided to new type of professional farmers. In the process of training, the combination of theories and practices is upheld and the modality of centralized training and on-spot coaching are adopted. With the development of farming sector as the starting point, trainees are required to uplift their production skills and operation and management skills. They need to go through centralized training, practice, study tour and practicum in the entire process of no less than one subsector.

2. Program for Training Model Skilled Workers in Rural Area

In 2006, the Ministry of Agriculture initiated the “*Program for Training Role Models of Practical Talents in Rural Areas*” nationwide, which targeted at family farm operators as one of its major audiences. In accordance with the requirement of “using real cases, practical experiences and plain language for training”, trainees are organized to stay in advanced model villages for one-week intensified training that includes four modules of experience sharing, thematic lecturing, on-spot training and exchange. Trainees are invited to visit demonstration family farms and outstanding family farmers are invited to share experiences with trainees. Courses in business initiation and development are offered. The lecturers would dig out cases of business initiation of the trainees for interactive lecturing. By far over 700 sessions of training courses have been offered with over 70,000 trainees of cooperative leaders, large households of crop and animal farming and operators of family farms. The program has also leveraged large scale training of provinces, autonomous regions and municipalities for family farmers.

3. Agricultural vocational education

Since 2015, CABTS has been working together with its nationwide system to offer a major in production and operation of family farms. The target audience is family farm operators with education of middle school and certain scale of production and operation, as well as those farming farmers, returned migrant farmer workers, veterans and successors of agriculture who are interested in setting up and operating family farms. The major of family farm production and operation includes sixes branches such as grain crop production, cash crop production and pig production. The major is associated with agronomy and flexible training scheme is adopted. Classroom teaching, distance education, skill training and on-job training are employed. Teaching modules include comprehensive qualification preparation, general agriculture, specialized skills and capacity building. The focus is to uplift the operation and management capacity and awareness of family farmers about quality and safety of agricultural products, ways of business initiation and development as well as the rationales of sustainable development. By 2016, CABTS together with its nationwide system has enrolled 24,464 students in the major of family farmers operation and management.

IV. Issues and difficulties faced in developing family farms

Since the development of family farms in China is still at the stage of exploration, trial and start-up, the following issues and difficulties in land circulation, financing and guarantee, qualification of farmers and socialized service deserve particular attention.

1. Difficulties in reaching appropriate scale

On one hand, due to the impact of macro environment, land circulation price has been increasing rapidly, which has affected the expansion of family farm. On the other hand, fragmentation of land has severely affected the upgrading of scale of family farms.

2. Difficulties in financing and insurance

The loan limit for family farms is very low with short maturity and high costs, and it is very difficult to access loan. Commercial insurance does not want involve in agricultural insurance that is perceived as high risk and high compensation rate. Products of policy insurance are very limited with poor design and low compensation rate.

3. Inadequate professional qualification of family farmers

Most family farmers are skilled farmers of crop farming with rich experiences in production but limited education, who lack knowledge and understanding about new varieties, techniques and equipment. Their capacity to collect information, make sound decisions in management, market their products and resist risks needs to be imperatively improved.

4. Low level of socialized service in agriculture

Socialized service system in rural China at present is yet to be well-established with limited coverage and inadequate overall service provision, which cannot suit the needs of agricultural production, particularly the development of family farms. The development of public service system lags behind with insufficient supply. Agricultural technological extension system and animal disease control system are yet to be fully established and multiple dimensional commercial service system is to be strengthened.

V. Recommendations

1. Promoting high-quality land to orderly transfer to family farms

The mechanism of price formation of land circulation needs to be improved to stabilize land circulation relationship. Localities with proper conditions are encouraged to consolidate funding from various sources to build high quality farmland in contiguous areas with good conditions of irrigation and drainage, and family farms should have the priority to rent such farmland. Family farms should be supported to implement land improvement, soil improvement and irrigation and drainage projects to develop a culture of farming and nurturing the land at the same time.

2. Improving talent training mechanism for family farms

Training of family farmers should be strengthened. A long and middle-term plan for training of family farmers should be developed and operators of family farms should be the focus of training of professional farmers and role models of practical talents of rural areas. Graduates of higher education institutions, returned migrant farmer workers, large households of agricultural machinery and brokers should be encouraged and invited to start up family farms. Government support to the nurturing of family farms should be improved and graduates of agricultural education institutions should be encouraged to work in family farms.

3. Improving targeted support policies

Central government finance should set up earmarked funding in support of the development of family farms to stabilize land circulation and improve infrastructure facilities of demonstration family farms. Land use policies for agricultural facilities for new type of operators of agriculture should be implemented to ensure that family farms have land to construct the needed storage and shelters for agricultural machineries. Through establishing agricultural guarantee companies at various levels, the difficulties of financing of family farms should be addressed. Insurance companies should be encouraged to develop products that suit the features of family farms.

4. Uplifting socialized services

Through government procurement, commissioning, incentive and bonus measures and bidding, commercial organizations should be guided to participate in public services in order to meet the demand of family farms for socialized services. Family farms should be guided and supported to establish family farm association and farmer cooperatives to provide whole range of services from production to marketing. Support of the socialized agricultural service system to family farms should be enhanced.

中国家庭农场发展与农场主培养

杭大鹏 万蕾 陈辉

(中央农业广播电视学校, 北京朝阳, 100125)

摘要: 本文在介绍中国家庭农场发展总体情况和家庭农场主基本情况的基础上, 梳理了发展家庭农场的经验与做法, 介绍中国培养家庭农场主的项目与计划, 分析当前家庭农场发展面临的问题和困难, 并提出对策建议。

关键词: 家庭农场 发展 农场主 培养

随着大批农村青壮年劳动力向城镇转移, 中国许多地区呈现出农业劳动力老龄化趋势。未来十几年、几十年谁来种地、谁来从事农业生产已成为迫切需要解决的问题。以家庭经营、专业务农、规模适度为基本特征的家庭农场, 适合中国国情, 符合农业生产特点, 契合经济社会发展阶段, 是发展现代农业的有生力量。中国政府部门高度关注并积极扶持家庭农场等新型农业经营主体发展, 2013 年“家庭农场”概念首次出现在中央 1 号文件; 国民经济和社会发展“十三五”规划强调, 要扶持发展家庭农场等新型经营主体。许多地区积极探索新型农业经营形式, 通过土地流转促进规模经营、加大涉农财政扶持和金融保险支持, 家庭农场正成为中国农业生产经营主要方式之一。

一、中国家庭农场基本情况

(一) 中国家庭农场发展总体情况。

1、**家庭农场发展数量。**据农业部 2013 年发布的全国家庭农场发展状况统计调查显示, 截止 2012 年底, 全国共有家庭农场 87.7 万个, 经营耕地面积达到 1.76 亿亩, 占全国承包耕地面积的 13.4%。全国家庭农场年经营总收入为 1620 亿元, 平均每个家庭农场为 18.47 万元。2016 年底, 年销售收入超过 100 万元的家庭农场达到 2.9 万个, 拥有注册商标的家庭农场达到 1.7 万个, 通过农产品质量认证的家庭农场超过 9200 个, 一批家庭农场还成为大型龙头企业出口备案基地。家庭农场通过农产品质量认证的比例为 1.5%¹; 获得财政扶持

¹以下百分比数据来源于 2015 年全国家庭农场典型监测数据。2014 年农业部启动了全国家庭农场典型监测工作, 从县级以上农业部门认定的家庭农场中选择 3000 个左右的家庭农场, 由中国社会科学院农村发展研究所的监测团队进行跟踪监测。监测农场样本覆盖全国 31 个省(区、市)。在随机分层抽样总原则指导下, 各省选择 2~3 个样本县共约 100 个家庭农场进行监测。

资金的比例为 6.8%；获得贷款支持的比例为 5.7%。

2、家庭农场经营类型。主要分为种植业、养殖业以及种养结合型，种植业主要包括粮食产业，养殖业包括畜牧业和渔业。从全国范围来看，种植业家庭农场占全部家庭农场的 63%，而种植业中的粮食类家庭农场占到全部家庭农场的 43.1%。畜牧家庭农场占比 18.7%，渔业家庭农场占比 5.7%。种养结合家庭农场占比 8.8%。其他类型的家庭农场占比 3.8%，主要包括融合农业一、二、三产和发展休闲农业的家庭农场。

3、家庭农场经营规模。50（含）~500 亩规模的粮食类家庭农场占了绝大部分，比例高达 91.5%。其中 50（含）~200 亩规模的占 61.5%，200（含）~500 亩规模的占 30%，500（含）~1000 亩规模的粮食类家庭农场占比 6.3%；1000 亩以上规模的占比仅有 2.2%。

4、家庭农场劳动力、土地及农产品销售。家庭农场平均劳动力为 7 人。其中，家庭成员劳动力平均 4.8 人，常年雇工劳动力 2.2 人。家庭农场经营的耕地中，69.4%的土地是通过流转而来。年销售农产品总值在 10 万元以下的占比为 33.9%，10 万（含）~50 万元的占比为 44.1%，50 万（含）~100 万元的占比为 15%，100 万元及以上的占比为 7%。

（二）家庭农场主基本情况。农场主性别。88.80%的家庭农场主为男性，11.20%的家庭农场主为女性。**农场主年龄。**平均年龄为 45.77 岁，年龄在 40 岁（含）以下的占 25.90%；年龄在 41~50 之间的占 44.64%；年龄在 51 岁以上的占 29.46%。**受教育程度。**农场主受教育程度为初中的占样本总数的 45.61%，高中、中专、职高的占 37.07%，大专及以上学历的农场主占 11.23%。

二、发展家庭农场的经验与做法

家庭农场在中国发展已有一段时期，上世纪八、九十年代，一些种田能手通过承包和流转土地从事专业化、规模化生产，具备了家庭农场的基本特征。2000 年以后，浙江宁波、上海松江、吉林延边等地陆续开展家庭农场试点，当地政府也探索制定了一系列家庭农场认定管理和扶持发展政策。宁波的种养大户自发或在政府引导下，将经营行为进行工商注册登记，演变成家庭农场。2007 年起，松江开始实践将几万户传统农户的耕地流转 to 村集体，然后由政府出资整治成高标准基本农田，再发包给 1000 多户本村村民兴办家庭农场。2011 至 2014 年，延边州金融机构利用抵押贷款、信用贷款等为农场提供贷款 3 亿多元。发展家庭农场的做法，主要包括四个方面：

（一）建立家庭农场注册登记和认定制度。2014 年起，农业部指导各地以县为单位明确家庭农场具体标准并建立名录，工商部门也就家庭农场注册登记做出相关规定。各地各部门通过开展名录管理、评定示范农场等措施，提升家庭农场经营管理水平。截至 2016 年底，

全国已有 30 个省（区、市）下发了扶持家庭农场发展的指导意见，在县级以上农业部门纳入名录管理的家庭农场达 44.5 万个（平均经营土地面积 215.1 亩），18 个省（区、市）开展了示范家庭农场创建活动，认定县级以上示范家庭农场近 6 万户。

（二）涉农财政补贴向家庭农场倾斜。财政部、农业部印发《关于调整完善农业三项补贴政策的指导意见》，从 2016 年起，农作物良种补贴、种粮农民直接补贴和农资综合补贴等农业“三项补贴”合并为农业支持保护补贴，其中用于粮食适度规模经营的补贴资金，支持对象重点向家庭农场等新型农业经营主体倾斜。据不完全统计，截至 2016 年底，各地扶持家庭农场发展的财政资金已超过 13.8 亿元。

（三）加强金融保险服务和农业社会化服务。2016 年财政部、农业部、银监会共同组建的国家农业信贷担保公司，推动粮食结构调整和农业适度规模经营。公司初始注册资本金 40 亿元。各地也通过成立农业担保公司、发放贷款补贴、设立风险防范基金、扩大贷款抵押范围等方式，加强对家庭农场的金融保险服务。同时，通过提供多元化、多层次、全方位的社会化服务，促进家庭农场健康发展。

（四）建立人才培育制度。2014 年至 2016 年，农业部累计举办 200 余期专题培训班，培训人次超过 1.6 万人次；积极实施“现代青年农场主培养计划”，开展培训指导、创业孵化、政策扶持和跟踪服务，累计培育现代青年农场主 2.3 万名。各地依托新型职业农民培育工程和农村实用人才带头人培训计划等培训资源，分类分批培训家庭农场经营者。

三、家庭农场主的培育

家庭农场主作为家庭农场生产经营的决策者和组织者，其职业技能和综合素质是影响家庭农场发展的关键因素。具体实践中，各级政府充分发挥农业广播电视学校新型职业农民培育专门机构的主体支撑作用，依托新型职业农民培育工程和农村实用人才带头人培训计划，大力培育家庭农场主。同时，全国农业广播电视学校体系重点面向务农农民和农业后继者实施中等农业职业教育，培养胜任家庭农场经营管理的职业农民。

（一）新型职业农民培育工程。中国政府高度重视新型职业农民培育工作，习近平总书记指出，“要就地培养更多爱农业、懂技术、善经营的新型职业农民”。2012 年农业部启动实施新型职业农民培育工程。家庭农场经营者是生产经营型职业农民的重要组成部分，新型职业农民培育工程针对家庭农场主，主要实施了现代青年农场主培养计划和新型农业经营主体带头人轮训计划。

1、现代青年农场主培育计划。2015 年起，农业部会同教育部、共青团中央启动实施了现代青年农场主培养计划，每年在全国遴选具有一定产业基础和高中及以上学历，年龄在

18 至 45 周岁的专业大户、家庭农场经营者、农民合作社骨干、返乡创业大学生、返乡农民工和退伍军人等培育对象,通过两年培训指导、创业孵化、政策扶持和一年的后期跟踪服务,人均培育经费每年不少于 3000 元,力争在全国培育形成一支创业能力强、技能水平高、带动作用大的青年农场主队伍。截至 2016 年底,全国培训现代青年农场主 2.3 万名。

2、新型农业经营主体带头人轮训计划。农业部自 2015 年起组织在全国实施新型经营主体带头人轮训计划,以专业大户、家庭农场经营者、农民合作社带头人和农业企业骨干为主要对象,利用 5 年时间轮训一遍,每年培训 100 万人,重点培训生产技能和经营管理知识,并开展新型职业农民认定管理、跟踪服务和政策扶持。在培训过程中,坚持理论与实践相结合,集中培训与现场实训相结合,采取“一点两线、全程分段”的培育模式,以产业发展为立足点,以生产技能和经营管理能力提升为主线,在不少于一个产业全过程周期内,分阶段组织集中培训、实训实习、参观考察和生产实践。

(二)农村实用人才带头人培训计划。从 2006 年开始,农业部在全国范围内开展了以家庭农场经营者为主要培训对象之一的农村实用人才带头人示范培训。培训按照“用典型案例教学,用实践经验教学,用通俗语言教学”的要求,组织家庭农场经营者到先进典型村,接受为期一周的强化培训。培训设有经验传授、专题讲座、现场教学、研讨交流等四个板块,重点组织学员参观示范家庭农场,邀请优秀家庭农场主现身说法;开设创业兴业课程,由授课教师挖掘学员的创业案例开展情景互动教学。目前已累计举办培训班 700 余期,培训了合作社负责人、种养大户、家庭农场经营者 7 万余名,同时带动了各省区市大规模开展家庭农场经营者培训。

(三)中等农业职业教育。中央农业广播电视学校自 2015 年起组织全国农业广播电视学校体系开办家庭农场生产经营专业,招生具有初中以上文化程度,具备一定生产经营规模的家庭农场经营者,以及有意开办家庭农场的务农农民、返乡农民工、复转军人和农业后继者。家庭农场生产经营专业包括粮食作物生产、经济作物生产、生猪养殖等 6 个专业方向,以农学结合、弹性学制为办学模式;以课堂教学、远程教学、技能实训和岗位实践相结合为教学形式;以综合素养课、农业通识课、专业技能课、能力拓展课为教学模块。着重培养提升家庭农场主的经营管理能力、农产品质量安全意识、创业兴业手段、可持续发展理念等综合素质。截至 2016 年,中央农业广播电视学校指导全国农业广播电视学校体系家庭农场生产经营专业招生 24464 人。

四、当前家庭农场发展面临的问题和困难

由于中国家庭农场发展尚处于摸索、试点和起步阶段,在土地流转、融资担保、农场主

素质、社会化服务等方面还存在以下问题和困难。

（一）适度规模难。一方面，受宏观环境影响，近几年土地流转价格快速上涨，制约了家庭农场经营规模的扩大。另一方面，土地细碎化严重影响家庭农场经营规模的提升。

（二）融资保险难。家庭农场贷款额度低、期限短，融资成本较高，获得贷款难度大。商业性保险不愿介入高风险性、高赔付率的农业保险，政策性保险险种较少、产品设计不够合理、补偿标准过低。

（三）家庭农场主职业素养不高。家庭农场主大多是农村的种田能手、致富能人，生产经验比较丰富，但是文化程度普遍不高，对于新品种、新技术和新装备缺乏必要的认识和了解，信息采集能力、决策管理能力、产品营销能力、抗风险能力非常有限。

（四）农业社会化服务水平低。目前中国农业社会化服务体系尚不健全，覆盖率不够高，总体服务水平较低，还不能适应农业生产特别是家庭农场发展的需要。公益性服务体系建设滞后、有效供给不足，农技推广、动植物疫病防控体系还不够健全，多元化经营性服务体系格局尚待强化。

五、对策建议

（一）引导优质土地有序流向家庭农场。完善土地流转价格形成机制，稳定土地流转关系。鼓励有条件的地方整合各类项目资金，建设连片成方、旱涝保收的优质农田，优先流转给示范家庭农场。支持家庭农场承担土地整理、土壤改良、小农水建设等农田基建项目，引导其种地养地。

（二）完善家庭农场人才培育机制。加大家庭农场经营者的培育力度，制订家庭农场经营者中长期培训计划，将家庭农场经营者作为职业农民培育和农村实用人才带头人培训的重点。鼓励吸引大中专院校毕业生、返乡农民工、农机大户、市场经纪人等兴办家庭农场。完善政府对家庭农场培育的支持，鼓励农职院校毕业生到家庭农场就业创业。

（三）健全针对性扶持政策。中央财政设立家庭农场发展专项扶持措施，扶持示范家庭农场稳定流转土地、改善基础设施。落实新型经营主体农业设施用地政策，确保家庭农场有地方建设必需的仓储、农机库棚等基础设施。通过建立各级农业担保公司，解决家庭农场融资难题。鼓励保险机构针对家庭农场特点，创设综合保险等险种。

（四）提高社会化服务水平。采取政府订购、定向委托、奖励补助、招投标等方式，引导经营性组织参与公益性服务，满足家庭农场对社会化服务的需求。积极引导和扶持家庭农场组建家庭农场协会和农民合作社，为家庭农场提供产前、产中、产后服务。强化农业社会化服务体系对家庭农场支持力度。

Exploration of a Pilot Program for Farmer Online Learning¹

² **Yao Li Fanghong Li**

China Central Agricultural Broadcasting and Television School,
Beijing Chaoyang, 100125

Hong Ding Zhanxiang Yu Yonghong Li

Huairou Branch, Beijing Agricultural Broadcasting and Television School,
Beijing Huairou, 101400

Tieying Yin Yahong Lu

Yanqing Branch, Beijing Agricultural Broadcasting and Television School,
Beijing Yanqing, 102100

Yaohui Xu Yuan Yuan

Haimen Branch, Jiangsu Agricultural Broadcasting and Television School,
Jiangsu Haimen, 226100

Jinkui Teng Qinqin Chen

Rudong Branch, Jiangsu Agricultural Broadcasting and Television School,
Jiangsu Nantong, 226400

Gang Wang

Sanmenxia Branch, Henan Agricultural Broadcasting and Television School,
Henan Sanmenxia, 472000

Wentao Shao Xiaoli Sun Linxu Gao

Laizhou Branch, Shandong Agricultural Broadcasting and Television School,
Shandong Laizhou, 261400

Cheng Wang Xiaojie Lian

Fuyang Branch, Anhui Agricultural Broadcasting and Television School,
Anhui Fuyang, 236000

Abstract: From 2015 to 2016, China Central Agricultural Broadcasting and Television School (hereinafter referred to as CABTS) commissioned 7 branch Agricultural Broadcasting and Television Schools (hereinafter referred to as ABTS) at prefecture and county level to launch online learning pilot programs specific for the modules developed by each. The modules used for pilot programs include the bilingual online learning modules co-developed by CABTS and American Distance Education Consortium (hereinafter referred to as ADEC), as well as the online learning modules independently developed by the branch ABTSs at prefecture and county level. In this article, the author introduced the basic information of farmers who engaged in the pilot programs; analyzed their learning time distribution, their learning outcome, and to what degree they recognized and accepted online learning; summarized what has to be improved for module design development; raised the challenge and the countermeasures for online learning expansion and extension by ABTS.

¹ This report is finished based on ABTSs' reports on online learning pilot.

² Sequence of schools is based on the regional administrative division.

Keywords: New professional farmer, online learning module, online learning pilot program

I. Background

In April 2008, CABTS and ADEC which was led by Oregon State University signed for the first time a MOU on bilateral cooperation. In order to promote in-depth cooperation, supplement and complete the content for bilateral cooperation, CABTS and ADEC signed another two MOUs on bilateral cooperation in 2012 and 2015 respectively. In the past several years, the two sides centering on the content of cooperation defined in the MOUs, carried out a series of practical cooperation with remarkable achievements, in the fields of teachers training, academic study and exchange, co-production of TV education programs, online learning module development, online learning pilot program, joint organization of international conference etc. ADEC had appointed many professors from Oregon State University, New Mexico State University, University of Virginia and Pennsylvania University to train the frontline teachers for ABTS. By training more than 200 frontline teachers on the concept of online teaching and application of Storyline software, CABTS and ADEC jointly developed 12 bilingual online learning modules. Meanwhile 13 branch ABTSs from Hebei, Jiangsu, Anhui, Shandong, Henan and etc. were commissioned to independently accomplish the development of 36 online learning modules which focus on the local leading industry and farmers' actual needs. In order to examine the feasibility of modules, improve the design and development of online learning module, effectively organize leaning content and learning activities, have a better idea of how farmers accept and recognize online learning, as well as explore online learning, CABTS from 2015 to 2016 commissioned 7 branch ABTSs to conduct online learning pilot programs for some bilingual modules and their independently developed modules.

II. Basic information of online learning pilot program

A total of 7 ABTSs were selected for online learning pilot program, of which two were prefecture level, and five were county level. The 7 schools respectively conducted online learning pilot on self-developed modules (Table 1). Among them, 4 schools also participated in the bilingual module online learning pilot, with each school selecting two modules suitable for the local needs from the seven bilingual modules for the pilot (Table 2).

Table 1: Pilot schools for independent modules and module names

Pilot school	Module name
Huairou Branch, Beijing Agricultural Broadcasting and Television School	Module pilot: Changing pumpkin into golden melon
Yanqing Branch, Beijing Agricultural Broadcasting and Television School	Module pilot: Preparation and use of lime sulfur mixture

Haimen Branch, Jiangsu Provincial Agricultural Broadcasting and Television School	Module pilot: Vegetable plug seedling technology
Rudong Branch, Jiangsu Provincial Agricultural Broadcasting and Television School	Module pilot: Tray dry-seedling technique for machine transplanted rice
Laizhou Branch, Shandong Provincial Agricultural Broadcasting and Television School	Module pilot: Identification and control of corn borer
	Module pilot: Florescence pollination for apple tree
Sanmenxia Branch, Henan Provincial Agricultural Broadcasting and Television School	Module pilot: Combating pest with insects
	Module pilot: Cultivation techniques of summer shii-take under woods
Fuyang Branch, Anhui Provincial Agricultural Broadcasting and Television School	Module pilot: Silkworm breeding technology

Table 2: Pilot schools for bilingual modules and module names

Pilot school	Module name
Haimen Branch, Jiangsu Provincial Agricultural Broadcasting and Television School	Module pilot: Use of herbicides
	Module pilot: Irrigation
Rudong Branch, Jiangsu Provincial Agricultural Broadcasting and Television School	Module pilot: Use of herbicides
	Module pilot: Irrigation
Fuyang Branch, Anhui Provincial Agricultural Broadcasting and Television School	Module pilot: Use of herbicides
	Module pilot: Seed germination
Laizhou Branch, Shandong Provincial Agricultural Broadcasting and Television School	Module pilot: Use of herbicides
	Module pilot: Sexual reproduction of plants

Without online learning management system (LMS) in ABTSs, farmers' online learning is conducted in two ways: saving the module to the computer to learn, or uploading the module

to the local ABTS website for farmers to learn. Interactions between teachers and farmer learners, as well as among learners are carried out through face to face meeting, QQ group, WeChat group or mobile text messages.

In order to fully understand the situation of online learning pilot program and evaluate the effect of farmers' engagement in online learning, we designed the *Online Learning Record Form* and the *Online Learning Evaluation Form*. The *Online Learning Record Form* is mainly used to master the basic information of learners, their business, their online learning time, duration, and etc., including questions of when do they start to learn and how long do they learn and etc. The *Online Learning Evaluation Form* is mainly used to understand the learners' recognition and acceptance of online learning methods, and their suggestions for the module design, learning contents, learning activities and so on. Because it is the first attempt to let farmers conduct the online learning, the design of the evaluation form is relatively simple. As the pilot program progresses further later, more quantitative and qualitative evaluation will be added to the evaluation form.

III. Analysis of online learning pilot program

1. Basic information of learners in the online learning pilot program

"Online learning" is a new thing, so the approaches taken by each pilot school in determining the farmers participating in the online learning pilot program are not always the same, however, there is an overall requirement, namely, the farmers participating in the online learning pilot program can register voluntarily, and shall have a certain computer operation skills.

According to the statistics information in the *Online Learning Record Form*, from 2015 to 2016, there were totally 224 farmer learners of different ages and education background, and from different agricultural segments participating in the online learning pilot program. As for the age distribution, there were 50 learners younger than 30 years old, 94 learners in the age between 30 and 45, 78 learners in the age from 45 to 60, and two learners older than 60 (figure 1). In terms of education backgrounds, there were 4 learners with primary school education, 73 with junior middle school education, 104 with senior middle school and polytechnic school education, 20 with junior college education, 21 undergraduates, and 1 master graduate (figure 2). With regard to the segment the farmers from, there were 50 learners in crop cultivation, 49 in orchards planting, 45 in edible fungus cultivation, 28 in vegetable growing, 25 in corn cultivation, 25 in silkworm breeding, 1 in livestock and 1 in aquaculture (figure 3).

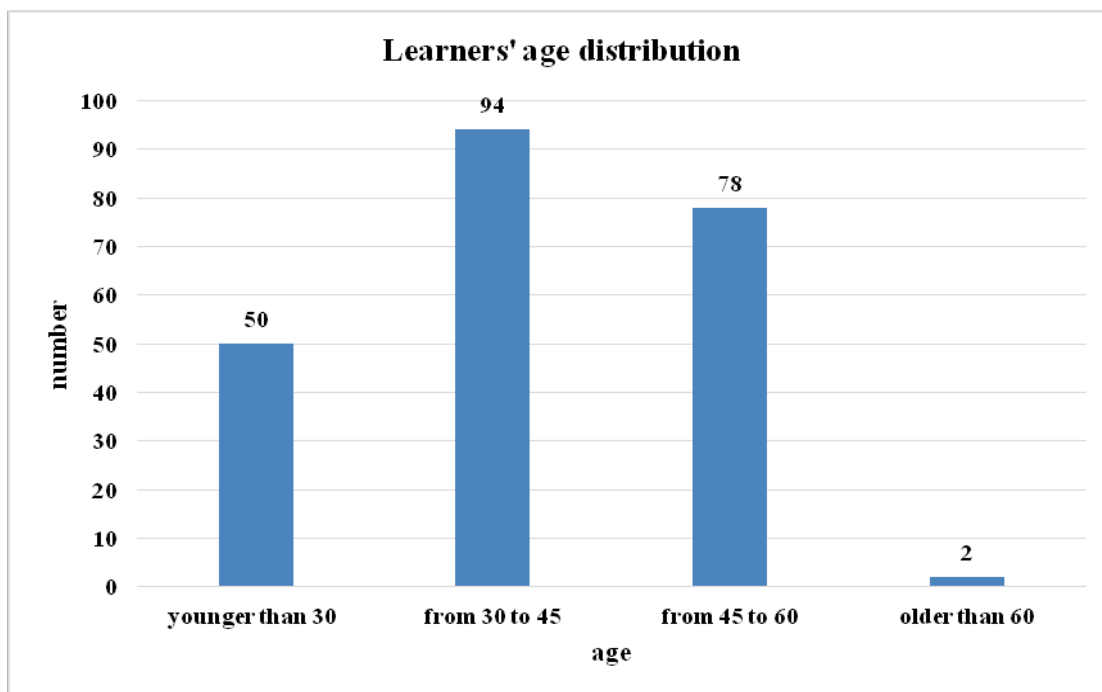


Figure 1: Learner's Age Distribution

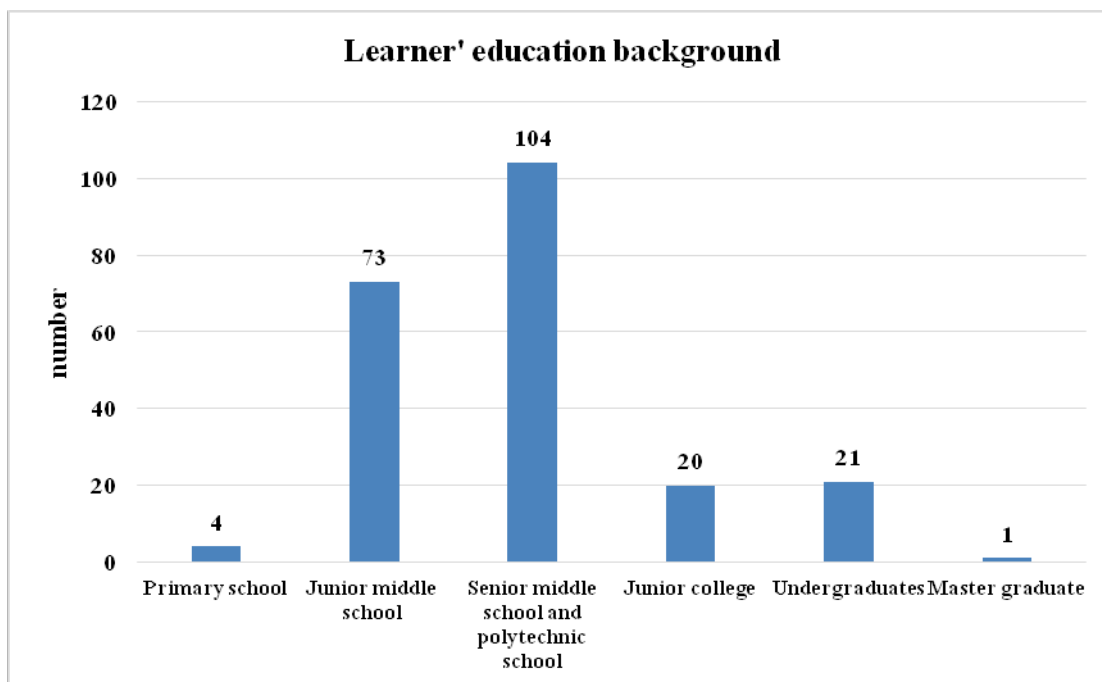


Figure 2: Learner's Education Background

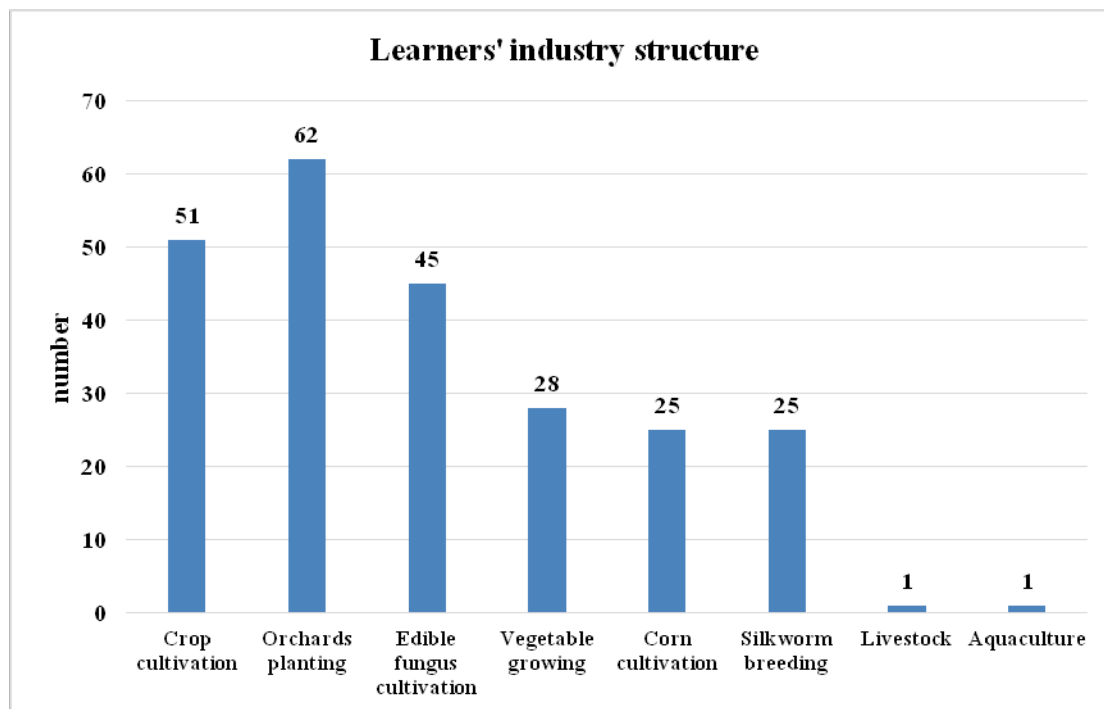


Figure 3: Learner's Industry Structure

The information shows that most of the learners participating in the online learning are new professional farmers around the country. Compared with ordinary farmers, they are young, with the young and middle-aged under the age of 45 accounting for 64%; they have relatively good education backgrounds, those with senior middle school education and above accounting for 65%, they are basically qualified for participating in online learning; and they all have certain knowledge and experience of specific segment, and generally they all have smart phones and computers, have the hardware condition to take part in online learning. These new professional farmers will be the main participants in the online learning in future.

2. Online learning time

It can be seen from the learning time recorded by farmers in the *Online Learning Record Form* that the farmers' learning time is not fixed, but 71% of the farmers concentrate on the online learning before 8 am and after 6 pm (figure 4). These are the relatively idle time for farmer learners. Compared with the intensive training in classroom, these two periods are more suitable for online learning for farmers, and the instructor can also put online discussion in this duration.

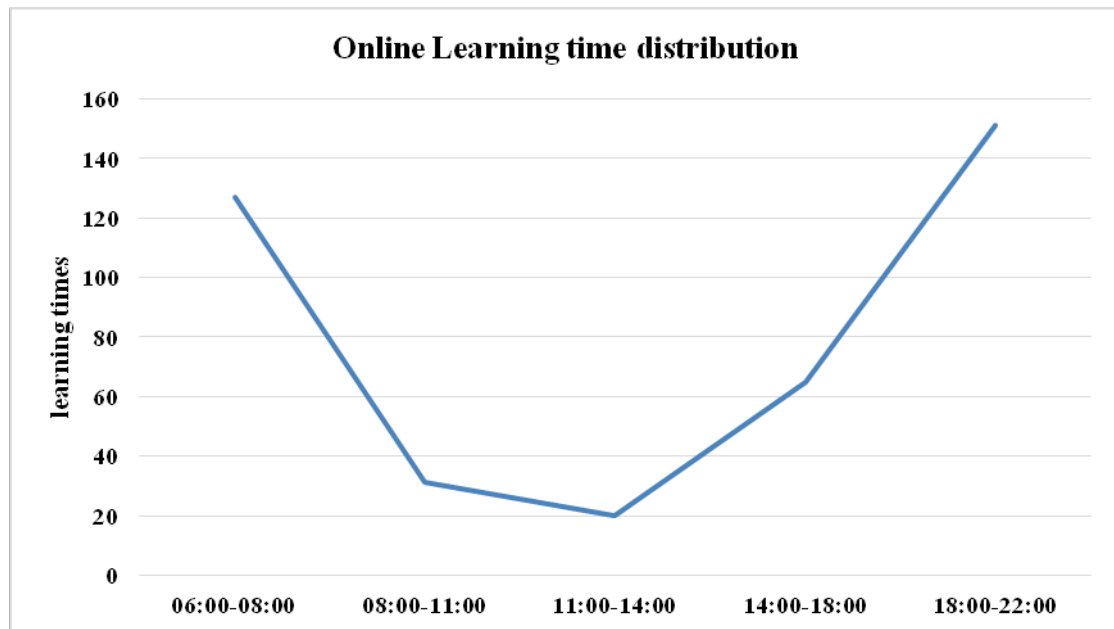


Figure 4: Time distribution of Online Learning

In addition, in each time, the study duration of farmers is also different. With comparatively less contents, the bilingual learning module has simple page, easy for operation. The duration of learning each time ranges from 5 minutes the shortest to 30 minutes the longest. The learning duration of 85% farmers is between 10 and 30 minutes (figure 5). It took two to four times to complete learning of a module. For the farmers who can hardly concentrate on learning in a long duration, autonomous online learning is obviously the best way.

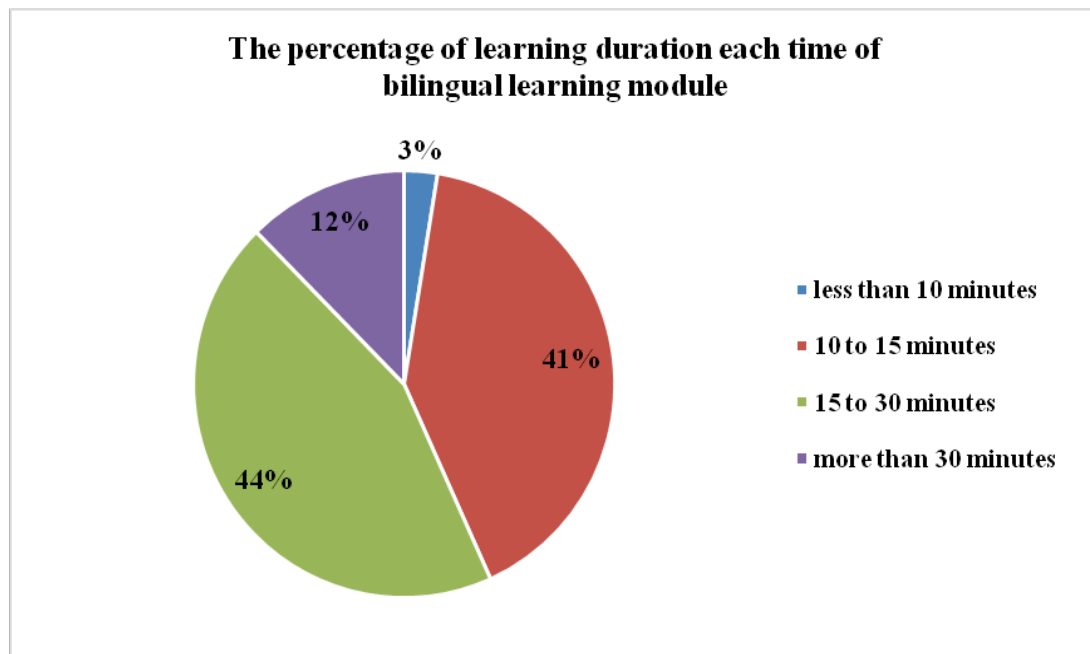


Figure 5: The Percentage of learning Duratin Eaching Time of Bilingual Learning Module

While for the independently developed learning module, because the module contains rich videos and quizzes, the learning duration each time is significantly longer than that of the bilingual learning module, with 71% of the farmers learning duration each time ranging from 30 to 60 minutes and one module requiring the farmers five to eight times to complete learning (figure 6). Since the contents of the independently developed learning module closely center on the necessary knowledge and skills needed by the local leading industries, some farmers will repeatedly learn the same content in the module at different times, and the overall learning duration is longer, the total learning times is more than that of the bilingual learning module.

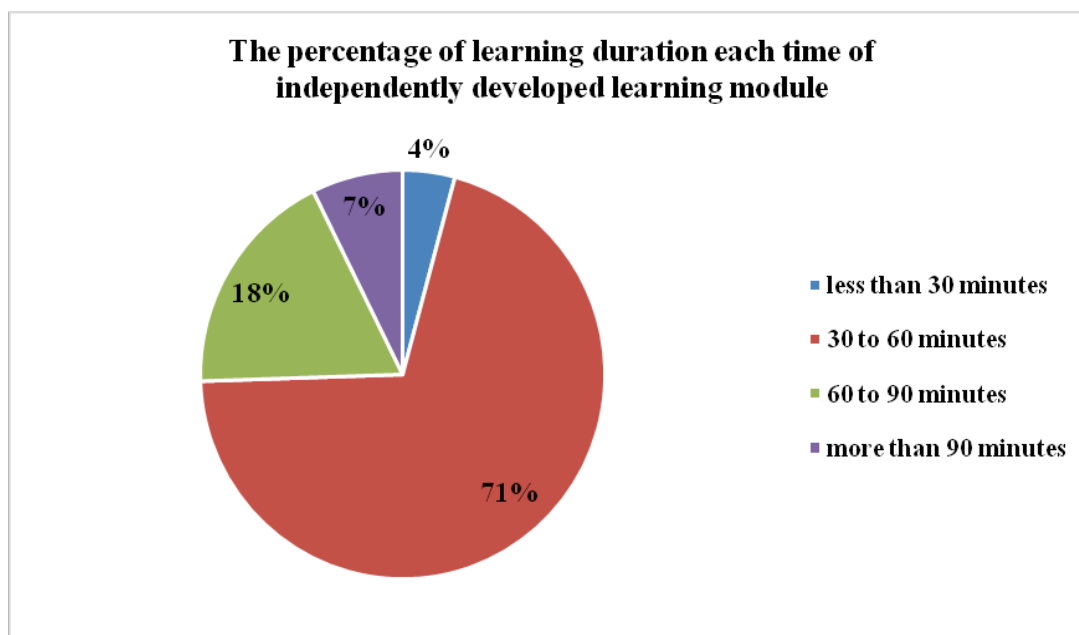


Figure 6: The Percentage of Online Learning Each Time of Independently Developed Learning Module

3. Farmers' Evaluation of Online Learning

Compared with the traditional teaching, farmers engaged in the online learning pilot program highly recognize the online learning method as it takes Internet as carrier and learners-centered. Firstly, the online learning better utilizes network, new media and other tools to overcome time and spatial constraints, and it is easy for learners to use the idle time to study autonomously, decide their own learning progress, more motivated and no longer puzzled by lack of time for intensive training. Secondly, with interactive learning and feedback assessment added, the online learning module has flexible learning style and good interaction, the farmers have to learn while keeping thinking, and interact with the course content before entering the next step of learning, hence effectively improve the learning enthusiasm of farmers. Thirdly, the contents of the online learning module have strong pertinence and closely center around the new technology and new knowledge required by the development of local leading industries, farmers can choose their own learning content according to demand rather than being forced to accept "cramming" training. Some other farmers also believe that this kind of learning is on a higher level than the regular online learning only with text and video information, for the new online learning can offer online

guidance by teachers and online peer discussion, so learners can repeatedly learn the part that they don't understand, and can also do quizzes to evaluate their own outcomes after learning, therefore it is worthy of promotion for training of new professional farmers.

4. Farmers' evaluation of online learning modules

1) Bilingual online learning module

Advantages: The module has comprehensive contents, strong practicability, easily understood. Both graphics and text are applied to explain, more attractive to learners than simply text interpretation, especially the process of showing knowledge points in the form of animation is more vivid. The module design is novel, with simple and easily operable interface, comparatively good color comfort, and strong interaction. Even a person who is not good at computer can complete the study as per the instruction.

Disadvantages: The analysis of answer for questions in testing section is insufficient. It's suggested that more detailed explanation can be provided to facilitate learners to better understand and master the knowledge. Due to the linear structure of the module, learners who can't finish the learning at the first time will have to start from the very beginning in the second time. It's suggested to change to non-linear structure, add navigation tips on the page for learners to easily and quickly access to their wanted knowledge point.

2) Independently developed online learning module

Advantages: Simple module interface design and clear navigation which enable the farmer learners to quickly find the knowledge points they need to learn, and return to the module navigation and the course navigation at any time during learning quickly and conveniently. With comprehensive and strongly practical content, the modules are in line with the current production needs of new professional farmers. Key technologies in the module are coupled with video illustration and expert tips for key points. Related links for important knowledge points in the module make learning easier and helps understanding more knowledge.

Disadvantages: Due to too much content in the module, some farmers learn a dozen times to complete the entire module. It's recommended to divide the super large module into several sub-modules, with each sub-module as an independent knowledge point for learning. There are too many long videos in the module which are not conducive for learners to focus their attention and more interested in learning. It's recommended to more briefly introduce knowledge point in the module, use more animation and less long videos, to motivate farmer learners more interested in online learning.

5. Evaluation of online learning effect

According to result of feedback from the test of online learning module, most farmers completed the online learning relatively well and passed the test. According to survey, the farmers' satisfaction rate is over 95%. Through the communication between farmers and the online guidance offered by teachers, farmers have gradually adapted to the new learning methods and environment, gradually mastered the correct learning methods, and personally experienced the simple and convenient, vivid, interesting and lively characteristics and

advantages of online learning. They are inspired to learn actively.

Through the online learning pilot program, we have understood the farmers' needs of online learning, further understood where needs to be improved in design and application of the online learning module, accumulated experience for development of online learning module and future online learning.

IV. Challenges of current online learning

1. Lack of teachers for large-scale development of online learning module

At present, there are only dozens of teachers in ABTSs that are capable of undertaking the development of online learning module, the number of module developed is very limited, which doesn't fit the needs of online learning courses for cultivating new professional farmers in China. It is necessary to enlarge team for online learning module development through training, let more professional teachers who understand theories, have rich practice experience, and are good at development to join in the team for online learning module development, to constantly improve the level of online teaching, have the online teaching theoretical knowledge complemented with the technical guidance of face-to-face teaching, and establish a high-level online teaching faculty with sufficient members.

2. Farmers can't fully adapt to online learning

Online learning is relatively new for farmer learners, some of them may not be fully adapted to it or not used to active learning. Therefore, in the interactive phase of the learning, the instructor should guide the farmer learners to gradually adapt to the new learning methods, track their learning progress, so as to let farmers understand their learning goals, to inspire them to be interested in learning and achieve learning outcomes.

3. Lack of template for developing online learning module

Online learning modules are all designed from scratch without existing template for use. Some modules that are completed can be used as template, but a series of modules have not formed yet, therefore, the pace of module development is relatively slow. In the future module development, templates with more easily operable interface can be designed according to needs of farmer learners, which can not only greatly speed up the module development, but also help learners' more familiar with the online learning module interface, so as to adapt to the online learning method in a faster and better way.

V. Schools engaged in online learning module development and online learning pilot programs

1. Huairou Branch, Beijing Agricultural Broadcasting and Television School, China
2. Yanqing Branch, Beijing Agricultural Broadcasting and Television School, China
3. Hebei Provincial Agricultural Broadcasting and Television School, China
4. Shijiazhuang Municipal Agricultural Broadcasting and Television School, Hebei Province, China
5. Fengnan Branch, Hebei Provincial Agricultural Broadcasting and Television School, China
6. Chengde Branch, Hebei Provincial Agricultural Broadcasting and Television School, China

7. Qian'an Municipal Agricultural Broadcasting and Television School, Hebei Province, China
8. Tongzhou District Branch, Jiangsu Provincial Agricultural Broadcasting and Television School, China
9. Haimen Branch, Jiangsu Provincial Agricultural Broadcasting and Television School, China
10. Rudong Branch, Jiangsu Provincial Agricultural Broadcasting and Television School, China
11. Fuyang Branch, Anhui Provincial Agricultural Broadcasting and Television School, China
12. Laizhou Branch, Shandong Provincial Agricultural Broadcasting and Television School, China
13. Sanmenxia Branch, Henan Provincial Agricultural Broadcasting and Television School, China

农民在线学习试点探索¹

²李 瑶 李方红

(中央农业广播电视学校, 北京 朝阳 100125)

丁 红 于占香 李永红

(北京市农广校怀柔分校, 北京 怀柔 101400)

尹铁英 鲁亚红

(北京市农广校延庆分校, 北京 延庆 102100)

徐耀辉 袁 媛

(江苏省农广校海门分校, 江苏 海门 226100)

滕金奎 陈琴琴

(江苏省农广校如东分校, 江苏 南通 226400)

王 刚

(河南省农广校三门峡分校, 河南 三门峡 472000)

邵文涛 孙小莉 高林旭

(山东省农广校莱州分校, 山东 莱州 261400)

王 成 连小杰

(安徽省农广校阜阳分校, 安徽 阜阳 236000)

摘要: 2015-2016 年, 中央农业广播电视学校委托 7 所基层农广校对所开发的模块进行了在线学习试点, 试点的模块包括中央农广校与美国远程教育联盟(ADEC)合作开发的双语在线学习模块和基层农广校独立开发的在线学习模块。本文介绍了参与试点的农民学员的基本情况; 分析了他们学习时间的分布和学习效果, 以及他们对在线学习的认可和接受程度; 总结了模块设计开发需要改进的方面; 提出了农广校扩大和推广在线学习所面临的挑战对策。

关键字: 新型职业农民; 在线学习模块; 在线学习试点

一、背景

2008 年 4 月, 中央农业广播电视学校(以下简称中央农广校)与俄勒冈州立大学带领下的美国远程教育联盟(ADEC)首次签署了双边合作谅解备忘录。为了推动合作的深入展开, 补充完善双边合作内容, 中央农广校与 ADEC 先后于 2012 年和 2015 年签署了两次新的双边合作谅解备忘录。几年来, 双方围绕备忘录中确定的合作内容在师资培训、学术交流与、电视教育节目合作制片、在线学习模块开发、在线学习试点、合作举办国际研讨会等开展了一系列务实合作, 取得显著成效。ADEC 先后选派多名俄勒冈州立大学、新墨西哥州立大学、美国西弗吉尼亚大学和宾夕法尼亚州立大学的教授为农广校体系一线教师开展师资培训。通

¹ 本报告基于各校在线学习试点报告完成。

² 单位排序按地区行政区划。

过对 200 余名基层教师培训在线教学理念和 Storyline 软件应用，中央农广校与 ADEC 合作开发了 12 个双语在线学习模块，同时委托河北、江苏、安徽、山东、河南等 13 所基层农广校围绕当地主导产业和农民实际需求，独立开发完成了 36 个在线学习模块。为进一步检验模块的适用性，完善在线学习模块的设计开发，有效地组织学习内容和学习活动，掌握农民对在线学习的接受程度和认可度，探索在线学习 2015-2016 年中央农广校委托了 7 所基层农广校对部分双语模块和独立开发模块进行了在线学习试点。

二、在线学习试点基本情况

本次在线学习试点，我们共选择了 7 所农广校，其中 2 所地级校，5 所县级校。这 7 个农广校分别对自行开发的模块进行了在线学习试点（表 1）。其中，有 4 所学校还参与了双语模块的在线学习试点，每所学校从 7 个双语模块中选择 2 个适合当地需求的模块进行试点（表 2）。

表 1：独立模块试点学校及模块名称

试点学校	模块名称
北京市农广校怀柔区分校	“倭瓜变金瓜”模块试点
北京市农广校延庆分校	“石硫合剂的熬制与使用”模块试点
江苏省农广校海门分校	“蔬菜穴盘育苗技术”模块试点
江苏省农广校如东县分校	“机插稻软盘旱育秧技术”模块试点
山东省农广校莱州分校	“玉米螟的识别与防治”模块试点
	“苹果树的花期授粉”模块试点
河南省农广校三门峡分校	“以虫治虫”模块试点
	“夏香菇林下栽培技术”模块试点
安徽省农广校阜阳分校	“桑蚕养殖技术”模块试点

表 2：双语模块的试点学校及模块名称

试点学校	模块名称
江苏农广校海门分校	“除草剂的使用”模块试点
	“灌溉”模块试点
江苏农广校如东分校	“除草剂的使用”模块试点
	“灌溉”模块试点
安徽省农广校阜阳分校	“除草剂的使用”模块试点
	“种子的萌发”模块试点
山东农广校莱州分校	“除草剂的使用”模块试点
	“植物的有性繁殖”模块试点

由于农广校还没有在线学习管理平台（LMS），农民通过两种方式进行在线学习，一种方式是把模块存到电脑中学习，另一种方式是把模块上载到当地农广校网站上供农民学习。教师与农民学员、学员与学员之间则通过面对面、QQ 群、微信群或手机短信进行互动。

为全面了解在线学习试点情况，评价农民参与在线学习的效果，我们设计了《在线学习记录表》和《在线学习评价表》。《在线学习情况记录表》主要掌握学习者的基本信息、从事的产业、在线学习的时间、时长等包括几点学习学多长时间等。《在线学习评价表》主要是了解学习者在线学习方式的认可和接受程度，对模块的设计、学习内容和学习活动的建议等。因为是第一次让农民进行在线学习的尝试，评价表设计的比较简单，以后随着试点的深入，会增加更多定量和定性的评价。

三、在线学习试点情况分析

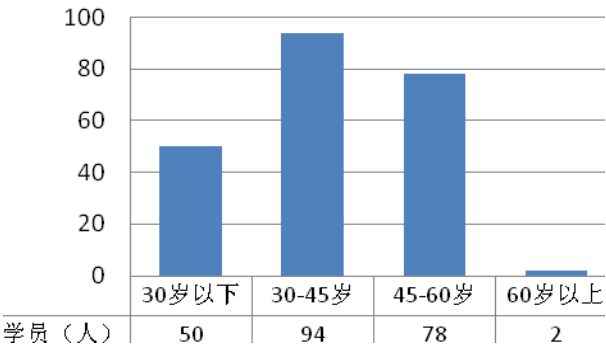
（一）试点学员的基本情况

“在线学习”是新鲜事物，所以在确定参与在线学习试点的农民时，各试点校的做法不尽相同，但有个总体要求，就是参加在线学习试点的人自愿报名，应具备一定的计算机操作能力。

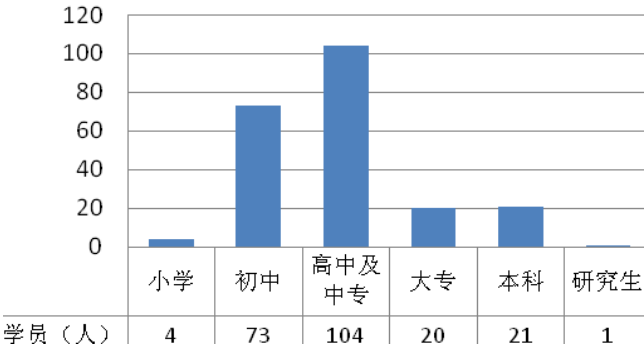
《在线学习记录表》农民学员信息统计显示，2015-2016 年，不同年龄、不同文化水平、不同产业的农民共计 224 人参加了在线学习试点。从年龄分布看，年龄在 30 岁以下的有 50

人，30-45 岁的有 94 人，45-60 岁的有 78 人，60 岁以上的有 2 人。从受教育程度看，小学文化的有 4 人，初中文化的有 73 人，高中及中专文化的有 104 人，大专文化的有 20 人，本科生 21 人，研究生 1 人。从这些农民学员所从事的产业看，粮食种植的有 50 人，果树种植的有 49 人，食用菌栽培的有 45 人，蔬菜种植的有 28 人，玉米种植的有 25 人，桑蚕养殖的有 25 人，畜牧和水产各 1 人。

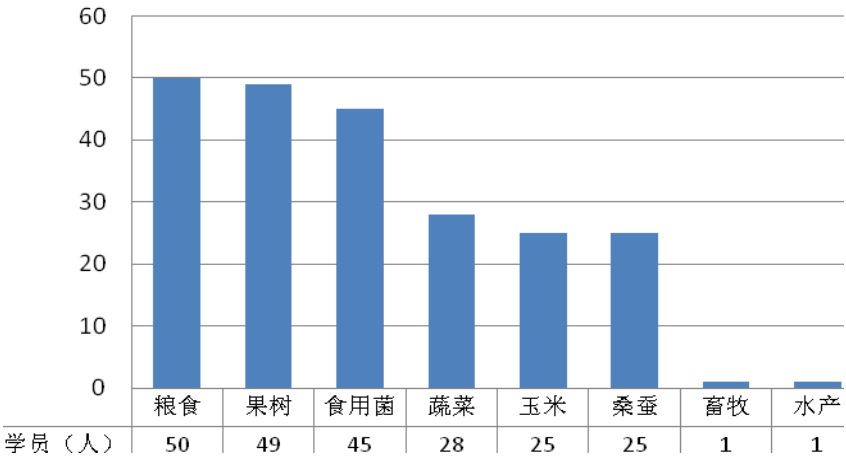
学员年龄分布图



学员文化层次图



学员产业结构图

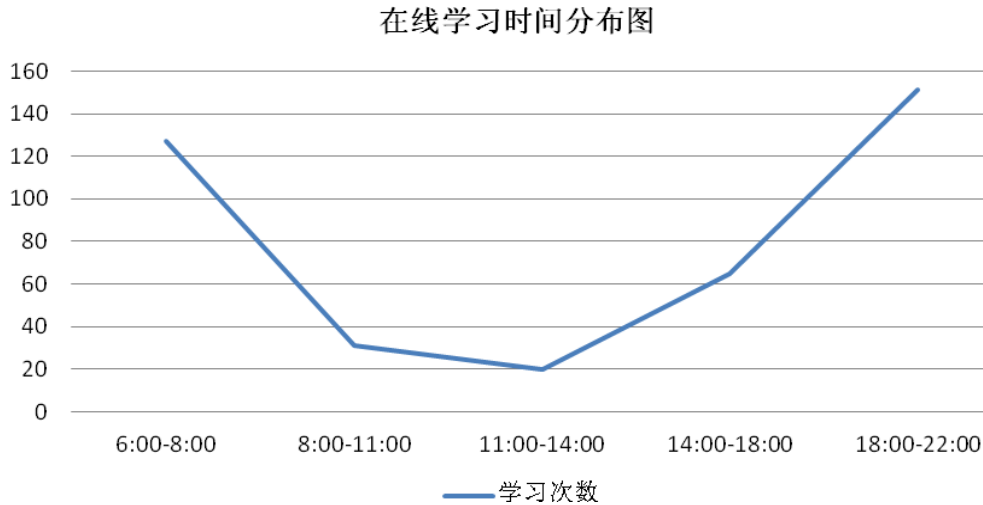


信息显示，参加在线学习的学员大部分为各地的新型职业农民，相对普通农民，他们年纪较轻，45 岁以下的中青年劳动力占 64%；文化素质相对较高，高中学历及以上的占 65%，具备参加在线学习的基本素质；均有一定的产业基础，普遍拥有智能手机和电脑，具备参加在线学习的硬件条件。这些新型职业农民将是今后在线学习的主要参与者。

（二）在线学习的时间

通过《在线学习情况记录表》中农民记录的学习时间可以看出，农民的学习时间不固定，但是 71%的农民集中在早上 8 点之前和晚上 6 点以后进行在线学习，可见这段时间是农民学员相对较空闲的时间。比起课堂集中培训，这两个时间段更适合开展在线学习，而指导教

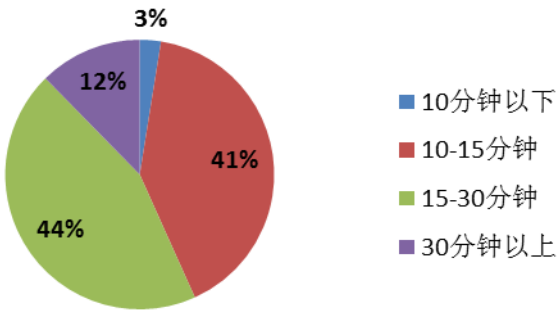
师也可把在线专题讨论放在这段时间。



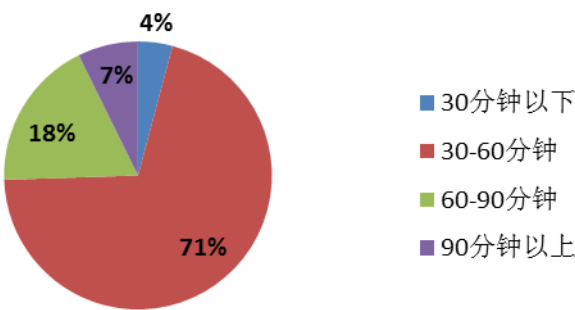
此外，农民单次学习的时长也各不相同，双语学习模块由于模块内容相对较少，模块页面简洁，容易操作，农民学习最短的只有 5 分钟，最长的也只有半小时左右，85%的农民集中在 10-30 分钟，一个模块需要分 2-4 次可以学完。对于这些很难集中下来长时间学习的农民，自主在线学习很显然是最好的学习方式。

而独立开发的学习模块，由于模块内容包含丰富的视频和课后测试题，单次学习时长明显长于双语学习模块，71%的农民集中在 30-60 分钟，且一个模块需要分 5-8 次才能学完，由于独立开发的学习模块内容紧紧围绕当地主导产业发展所需的知识和技能，因此部分农民会对模块的同一内容在不同时间反复学习，整体学习时间较长，学习总次数多于双语学习模块。

**双语学习模块
单次学习时长占比图**



**独立开发学习模块
单次学习时长占比图**



（三）农民对在线学习方式评价

与传统教学方式相比，参加在线学习试点的农民高度认可这种以互联网为载体，以学习者为中心的在线学习方式。一是在线学习更好地运用了网络、新媒体等工具，克服了时间与地域的限制，便于利用农闲时间自主学习，自己决定学习进度，增加了学习的主动性，解决了没时间参加集中培训的困扰；二是在线学习模块中加入了互动学习与反馈评估，学习方式灵活，交互性好，农民必须通过思考参与学习并与课程内容互动才能进入下一步的学习，有效提高了农民学习的积极性；三是在线学习模块内容紧紧围绕当地主导产业发展所需的新技术和新知识，具有较强的针对性，农民可根据需求，自主选择学习内容，而不是被强迫接受“填鸭式”培训。还有的农民认为，这种学习方式比常规的网上学习文字视频资料更上一个层次，有教师线上指导，有同行线上讨论，不懂的地方可反复学，学习结束后还可以通过测试评价自己的学习成果，值得在新型职业农民培训中推广使用。

（四）农民对在线学习模块评价

1、双语在线学习模块

优点：模块内容全面，实用性强，通俗易懂，以图文并茂的形式来讲解，比单纯的文字解说更能吸引学员的兴趣，特别是用动画的形式表现知识点的过程更加形象生动；模块设计新颖，界面简单易操作，色彩舒适度较好，交互性强，不会电脑的人也可以根据提示完成学习。

缺点：测试环节农民回答问题后，答案分析较少，建议提供较为详细的解答，便于学员更好的理解和掌握知识点；模块是线性结构，学员一次学不完第二次必须从头开始，建议改成非线性结构的模块，页面添加导航提示，便于快速查找想要学习的知识点。

2、独立开发的在线学习模块

优点：模块设计界面简单、导航清晰，界面能让农民学员快速找到自己需要学习的知识点，并可在学习过程中随时返回至模块导航和课程导航，方便快捷；模块内容全面，实用性强，符合现阶段新型职业农民的生产需求，模块中的关键技术都配以视频讲解，技术注意点也有专家提示；模块中重要的知识点还有相关链接，方便学习和了解更多的知识。

缺点：模块内容过于庞大，有的农民学了十几次才能学完整个模块的内容，建议把过大的模块分成几个子模块，每个子模块作为一个独立的知识点来学习；模块中存在较多长视频，不利于集中学员的注意力和增加学习兴趣，建议缩短模块的知识点介绍，多用动画，少用长视频，激发农民学员对在线学习的兴趣。

（五）在线学习效果评价

从在线学习模块的测试反馈结果来看，绝大部分农民较好的完成了在线学习，通过了测试，据调查，农民的满意率达 95%以上。通过农民间的交流及教师的在线指导，农民逐渐适应了新的学习方式和学习环境，逐步掌握了正确的学习方法，亲身体会到了在线学习简单便捷、生动形象、趣味活泼的特点和优势，激发了学员的学习积极性。

通过在线学习试点工作的开展，使我们了解了农民对在线学习的需求，也进一步了解了在线学习模块在设计与应用中需要改进和完善的地方，为今后在线学习模块的开发和在线学习的开展积累了经验。

四、当前在线学习面临的挑战

（一）大规模开发在线学习模块师资力量不足

目前，农广校体系能够承担在线学习模块开发的教师只有几十位，开发的模块数量有限，与我国新型职业农民培育对在线学习课程的需求不相适应。还应通过培训，进一步扩大在线学习模块开发师资团队，让更多懂理论、会实践、善开发的专业教师加入到在线学习模块开发队伍中，不断提高在线教学水平，使在线教学的理论知识与面对面教学的技术指导互为补充，建立一支数量充足的高水平在线教学师资队伍。

（二）农民还不能完全适应在线学习方式

在线学习对农民学员来说还比较新鲜，有些人可能还并不完全适应，还不习惯主动学习。因此，在模块的互动讨论阶段，指导教师应指导帮助农民逐渐适应新的学习方式，跟踪其学习进度，让农民应该了解自己的学习目标，激发他们的学习兴趣，达到学习效果。

（三）缺少在线学习模块开发模板

在线学习模块都是从零开始设计，没有现成的模板可以用，已开发完成的模块虽然有一些可作为模板，但尚未形成系列，因此，模块开发速度较慢。在今后的模块开发中，可根据农民学员需求，设计出更方便操作的界面模板，这不仅可以大大提高模块开发速度，还能提高学员对在线学习模块界面的熟悉度，更快更好的适应在线学习方式。

五、参与在线学习模块开发和在线学习试点的学校

- 1、北京市农广校怀柔区分校
- 2、北京市农广校延庆分校
- 3、河北省农广校
- 4、河北省石家庄市农广校
- 5、河北省农广校丰南分校
- 6、河北省农广校承德市分校

- 7、河北省迁安市农广校
- 8、江苏省农广校通州区分校
- 9、江苏省农广校海门市分校
- 10、江苏省农广校如东县分校
- 11、安徽省农广校阜阳分校
- 12、山东省农广校莱州分校
- 13、河南省农广校三门峡分校

Practice & Probe of University-Based Agricultural Extension

Wang Huajun

Research Institute for New Rural Development

Anhui Agricultural University

The university-based agricultural extension started very early in many countries abroad. At present, China's rapid development of it has attracted more and more ministries' attention. It is an important task for our agricultural extension workers to learn and learn from the successful experiences of foreign countries, summarize and popularize the domestic good practice, and actively explore new ways of university-based agricultural extension. This article will talk about some ideas about how to do a good job in university-based agricultural extension work, for the reference of those who are working in the related fields.

1 Inspiration of university-based extension in America

As early as 1866, British Cambridge University and Oxford University began the university technology extension services. The United States in 1914 promulgated the "Smith - Lever Act", established the agricultural extension system of agricultural universities. The implementation mode of the US agricultural extension combines agricultural education, research and extension on the basis of state universities. The representative works were: County Instructor with Farmers' Association written by MCBurrit in 1922, American Rural and Agricultural Extension by Ednund des Bnmner and Yang Suobao in 1949, Innovation and Diffusion by Rogers Bech in 1963 and so on. Many scholars have carried out research on the US university-based extension mode and the inspiration includes the following aspects. The first is the social feature. American university-based extension is regulated by the law, and the cooperative extension is implemented on the basis of the three Acts which are the "Morrill Land-Grant College Act", "Hatch Act" and "Smith Lever Act". It is stipulated that for the state university's agricultural school, the organization management within the scope of the

state agricultural extension work must be done. The experiment station must be established in the regional agricultural center area, and the extension station must be set up in the county. The second is the public welfare. The law stipulates that American university-based extension funds are guaranteed by the federal government and state governments. Extension workers are educators as well as service providers, and there are a large number of volunteers involved in the extension. The third is the diversity. The American university-based extension content is diverse. Based on the farm and community, the agricultural science and technology services, domestic service, youth “4H” service (head, hand, heart, health), natural resources and rural development and many other services are carried out. The extension methods are diverse, too. The extensive use of monitoring network, extension network, "3S" technology, land use and disaster prevention and mitigation technology, as well as TV columns, community exchanges are worth learning. The fourth is the independence. The US state university-based extension work is of independence. The school of agriculture of a state university is the management and business division for state agricultural technology extension. The head of the agricultural school is also the director of the state agricultural technology extension center, the director of the regional experiment station (center) and the extension staff of the county extension station are appointed by the director.

2 Present Situation of university-based agricultural extension in China

In order to promote the agricultural science and technology innovation in colleges and universities, to establish a new model of agricultural science and technology extension service in colleges and universities, to improve the ability and level of colleges and universities to serve the new socialist countryside construction and local economic and social development, in April 2012, the Ministry of Education and the Ministry of Science and Technology jointly approved China Agricultural university and other 9 universities to establish the “Research Institute for New Rural Development” and carry out "University-Based Extension System" pilot work.

Over the past few years, the pilot work on the agricultural technology extension to

promote the transformation of scientific and technological achievements to serve the local economy has achieved remarkable results. China Agricultural University's "Small Courtyard of Science and Technology", Northwest A & F University's "pilot demonstration station", Nanjing Agricultural University's "Nannongyinong" mobile APP etc. are very distinctive. The following is a brief introduction to the results of the Research Institute for New Rural Development of Anhui Agricultural University. Anhui Agricultural University, to promote the structural reform of the regional agricultural supply side as the direction, explores the formation of "One-Station (regional agricultural comprehensive experiment station), One-Alliance (new type cooperation alliance jointly built by university and county), One-Center (agricultural extension service center jointly built by university and county)". The new mode jointly built by university and county combines altogether the administration, industry, university, research and extension. On the foundation of the new mode integrating research and development, administration, extension and business entity, eight permanent regional comprehensive experiment stations have been built. Oriented by the industry chain, technology chain, service chain, capital chain, value chain, the technological innovation plus industrial demand collaboration is formed. Both the expert team and the extension team work with concerted efforts. The experts stay at the experiment station and the extension personnel enter the farm and farmer's house. The long-term mechanism with integration of innovation, demonstration and extension is taking shape. Several transitions have been achieved including those from a single technology extension to an integrated one (integrating four functions including personnel training, scientific and technological innovation, social services and business incubation) changes; from self-built, self-using, self-managing to cooperation, coordination, co-management and sharing; from the individual work to the team and systematic operation; the system of combat changes; from the service for the key aspects of

the agricultural industry to the service for whole agricultural industry service chain; from technical support to support plus guidance. A new university-based extension mode with the close combination of production, education and research, with the integration of teaching, research and extension has taken shape, facilitating the establishment of the China-US University-based Agricultural Extension Alliance.

We should also keep sober-minded and see that in terms of the university-based agricultural extension system, a new thing, its exploration and improvement are still in the process or on the way, and there are still contradictions and problems to be resolved. For example, the functions and responsibilities do not match, China's colleges and universities shoulder the five missions of personnel training, scientific research, social service, cultural heritage innovation and international exchange and cooperation. Although the relevant documents clearly put forward that "higher education is an important part of public welfare promotion", in practice the effectiveness of university service society is not put into the performance appraisal of colleges and universities. And for a long time the phenomenon of "function without duty" is there. The mechanism of joint construction has not yet formed. For colleges and universities, research institutes, government departments, enterprises, farmers and so on, there are many explorations ahead as to how to cooperate with each other to achieve extension, to integrate all kinds of resources to coordinate, to form an integration mechanism with close combination of administration, industry, university, research and application. There still exist instability of capital support channel. The construction mode needs to be explored and so on.

3 Thoughts on the university-based agricultural extension in China

The construction of a new university-based extension service mode is not only the realistic need of developing a new socialist countryside and modern agriculture, but also the

need of improving the agricultural quality and efficiency and increasing the farmers' income during the period of development transformation. There may not be completely unified mode of reference in various local conditions, which requires different departments to strengthen interactions and to learn from each other for the exploration of new ways and new initiatives to construct a new extension system.

(1) Important functions for university-based extension

The experimental work in recent years has proved that university-based agricultural extension can effectively combine the innovation sources with the demands for production technology, and can promote the effectiveness of extension efforts. The agricultural administrative departments in our country all have a large number of agricultural extension systems and working teams, but the "Agricultural Technology Promotion Law of People's Republic of China" does not have its clear and definite items for the encouragement and support of universities in their participation in agricultural technology extension. And therefore the paper suggests the establishment of relevant laws and regulations to further clarify the responsibilities, rights and duties of universities to enjoy the personnel, financial and material support in their participation in the agricultural extension. At the same time, agricultural universities, according to concerned regulations, shall lean towards on the promotion experts and extension workers for their performance fully affirmed in the year-end assessment, to promote their enthusiasm and creativity into full play.

(2) Construction of experiment stations near the farmers

The masses make history. Many plant genetic mutations were discovered by farmers, and many of mechanical prototypes were designed by farmers, which were later improved by scientists to form new varieties of equipment. The urgent need of farmers spawned the birth of new technologies. The experiment station is different from the agricultural science and

technology demonstration garden. It is a science and technology school for farmers, an important platform for farmers to recognize and popularize new varieties, new technologies and new equipment. The construction of the experiment station in the county makes it easier for farmers to receive technical guidance and services, to solve more practical problems in their production, so that farmers can get more benefits. Under the new situation, the experiment station should play a greater role in agricultural technology demonstration, in farmers training and communication and in online learning, should be a platform for crop pest forecasting, meteorological disaster forecasting and consulting, and should be the base for public service, quality education, health education.

(3) More services to agriculture, rural areas and farmers

At present, the scale, marketization and informatization of agricultural production in our country are not developed enough, so it is more urgent to enlarge the university's extension services for "agriculture, rural areas, farmers". The services have to rely on various types of experiment stations from agricultural production to the whole industry chain to provide technical support for farmers, including agricultural production technology, marketing knowledge and brand creation ability. Full play must be given to technological advantages of agricultural universities to strengthen environmental governance and ecology protection in rural development, to help farmers develop small towns of characteristics, smart agriculture and creative agriculture, to promote agricultural modernization by informatization and industrialization, to eventually help farmers increase their income.

(4) Establishment of a long-term mechanism for university-based agricultural extension

The "University-Based Agricultural Extension" must be included in the central and provincial government budget to eventually form the financial support system combining government investment, finance, insurance, enterprises and business entities (farmers),

donations and other forms of investment to support agricultural universities to establish permanent agricultural extension stations in the heartland of leading agricultural regions and form as soon as possible a university agricultural extension service system featuring "pluralistic, open and efficient". Strengthen the collaborative efforts between universities and local governments, enterprises, farmers to promote the establishment of new extension mechanism with research institutes, enterprises, government departments and new types of business entities in good cooperation. Introduce market-oriented mechanisms by the principle of co-construction and sharing, and strengthen the organic integration between the level-2 colleges, local agricultural technology departments and experiment stations, and gradually improve the social management service system in combination of public welfare and marketization

大学农业推广模式的实践与探索

王华君 安徽农业大学新农村发展研究院

大学农业推广,在国外许多国家开展很早,目前,我国发展迅速,受到越来越多的部委重视。学习与借鉴国外的成功经验,总结与推广国内好的做法,积极探索大学农业推广新模式新方法新成效是我们高校农业推广工作者的重要任务。本文就做好大学农业推广工作谈几点想法,仅供广大同仁参考。

一、 美国大学推广的启示

早在 1866 年,英国剑桥大学和牛津大学就开始大学技术推广服务,美国在 1914 年颁布了《史密斯-利弗法》(Smith-Lever Act),确立了农业院校农业推广制度。美国实行的是以州立大学为依托,农业教育、科研、推广有机结合的推广模式。代表作有:1922 年美国马立士(M. C. Burrit)撰写的《县指导员与农民协会》、1949 年布鲁奈(Edmund des Bnmner)和杨索宝合著《美国农村与农业推广》,1963 年罗杰斯(Rogers Bech)著的《创新与扩散》等。

许多学者对美国大学推广进行了研究,给我们的启示包括以下几点:一是社会性,美国大学推广是法律规定的,合作推广是在《赠地法》、《汉奇法案》、《史密斯-利弗法》三个法案通过的基础上实施的。并规定州立大学农学院必须承担州范围内农业推广的组织管理工作,必须在区域农业中心区建立试验站,在县成立推广站。二是公益性,法律规定美国大学推广经费由联邦政府和各州政府给予保障。推广人员是一个教育者与服务者的角色,参与推广的还有大量的志愿者。三是多样性,美国大学推广内容是丰富多样的立足农场与社区开展农业科技服务、家政服务、青年“4H”服务(健脑、健手、健心、健身)、自然资源开发和农村地区开发等多项服务。推广方法也是多样的,大量使用监测网、推广网,“3S”技术、土地利用与防灾减灾技术,还有电视专栏、社区交流都值得借鉴。四是独立性,美国州立大学推广工作

具有独立性，州立大学农学院是州农业技术推广的管理部门与业务部门。农学院院长兼任州农业技术推广中心主任，区域试验站（中心）主任及县推广站推广人员都由农学院院长聘任。

二、我国大学农业推广的现状

为推进高等学校农业科技创新，建立大学农业科技推广服务新模式，提高高等学校服务社会主义新农村建设和地方经济社会发展的能力和水平，2012年4月，教育部、科技部联合批准了中国农业大学等10所高校建立“新农村发展研究院”并开展“大学推广体系”试点工作。

几年来，试点工作对农业技术推广、促进科技成果的转化、服务地方经济都取得了明显成效，如中国农业大学“科技小院”、西北农林科技大学“试验示范站”、南京农业大学“南农易农”手机APP等都很有特色。下面介绍安徽农业大学新农村发展研究院取得的成果：安徽农业大学以推进区域农业供给侧结构性改革为方向，探索形成了以“一站（区域性的农业综合试验站）一盟（校县同建的新型产学研合作联盟）一中心（校县共建的农业推广服务中心）为重点的政产学研推紧密结合校县共建模式，与将研发主体、行政主体、推广主体、经营主体紧密地结合在一起的“四体融合”的新型农技推广服务模式，建立了8个永久性区域综合试验站。围绕产业链、技术链、服务链、资金链、价值链，形成技术创新与产业需求协同，专家团队与推广团队无缝对接，学科专家常驻试验站，推广人员深入农场农户，创新、示范、推广一体化等长效机制。实现了由单一的技术推广向“四能统一”（人才培养、科技创新、社会服务、创业孵化四大功能）的转变；由自建、自用、自管向共商、共建、共享、共管转变；由单兵作

战向团队作战、体系作战的转变；由服务农业产业的关键环节向服务农业全产业链的转变；由技术支撑向支撑、引领并重的转变。初步形成了，产学研紧密结合、教科推多位一体的新型大学推广体系，同时也推动了中美大学农业推广联盟的成立。

我们也应该看到，大学农业推广体系作为新生事物，其探索完善还需要一个过程，还存在着一些矛盾和问题需要化解决。如职能与职责不匹配，我国高等学校肩负着人才培养、科学研究、社会服务、文化传承创新与国际交流合作的五大使命职能，虽然有关文件明确提出“高等学校是公益性推广的重要组成部分”，但是，实践中没有将高校服务社会的成效纳入高校绩效考核之中，长期处于“有职能无职责”的状况。共建机制尚未形成，高等学校、科研院所、政府部门、企业、农民等如何相互协同，共同推动，整合各类资源，协调各方行动，形成政产学研用紧密结合的共建机制还需进一步探索。资金支持渠道不稳，建设模式亟须探索等等。

三、对我国大学农业推广的思考

构建以大学为依托的新型推广服务模式，既是发展现代农业、建设社会主义新农村的现实需要，更是转型发展时期农业提质增效，农民增收的需要。各地情况不同、条件不一，不可能有完全统一模式借鉴、运用，需要各级部门加强互动、交流，共同探索创新大学推广体系的新途径、新举措，才能做到相互鉴戒，相得益彰，共同发展。

（一）赋予农业高校推广的重要职能

近几年的试点证明，大学农业推广能有效的将创新源头与生产技术需求相结合，有力促进了农业推广的实效。由于我国农业行政管理部门有一套农业推广体系和大批农业技术推广队伍，虽然《中华人民共和国农业技术推广法》中有鼓励与支持有关学校参与农业技术推广，但没有明确高校推广的职责，建议有关法律法规中进一步明确高校特别是农业高校在农业推广的作用与地位，让农业高校依法参与推广、依法履行职责、依法享有人、财、物更多的支持。同时农业高校依法依规对推广专家及推广工作者的绩效给予充分的肯定，在年终考核与职务、职称晋升中给予更多的倾向，让广大推广人积极性与创造性得到充分的发挥。

（二）把试验站建在农民身边

人民群众创造历史。许多植物的基因突变是农民发现的，许多设备的雏形是农民设计的，由于农民的发现与设计，经过科学家提炼发展形成新的品种与新的装备。农民的迫切需要催生了新技术的诞生。试验站不同于农业科技示范园，它是农民的科技学校，是农民认识与推广人员展示新品种、新技术、新装备的重要平台。把试验站建在县，有利于农民近距离接受技术指导与各种服务，解决农民更多的生产实际问题，让农民得到更多的实惠。新形势下，试验站应该发挥更多的作用，试验站应该发挥农业技术推广示范的功能，作为农民科技培训、学习交流的场所，成为网上学习与作物病虫害预测预报、气象灾害预报等咨询的平台，成为公共服务、素质教育、健康教育的基地。

（三）给予“三农”更多的服务

目前，我国农业生产规模化、市场化与信息化程度还不够，

加大大学推广服务地方“农业、农村、农业”更加迫切。要依托各类试验站在农业生产全产业链上为农民提供技术支持，不但教他们农业生产技术还有教他们市场营销知识与品牌创建能力，发挥农业高校技术优势，在农村发展上加强环境治理与保护生态的技术服务，帮助农民发展特色小村小镇，发展休闲观光农业、智慧农业与创意农业，以信息化、产业化促进农业现代化，帮助农民增产增收。

（四）建立大学农业推广的长效机制

将“大学推广体系”纳入中央和省级政府预算，形成政府投入为主，金融、保险、企业、经营主体（农场主）以及捐资等投入相结合的经费支持体系，重点支持农业大学在区域农业主导产业中心地带建立永久性的农技推广综合试验示范站、特色产业示范基地和分布式的推广站，尽快形成“多元、开放、高效”的大学农业推广服务体系。加大校地、校企、校农等协同推动力度，建立高等学校、科研院所、政府部门、合作企业与农业新型经营主体等协作协调的“政产学研用”紧密结合的新机制。按照共建共享原则，引入市场化机制，加强二级学院、地方农技部门与试验站的有机融合，逐步完善公益性与市场化相结合的社会化管理服务体系。

Role and Opportunity of Agricultural Colleges and Universities in the Cultivation of New Professional Farmers

Anhui Agricultural University Ru-hai He, Hua-bin Wang, Sun Peng

E-mail address: ruhaihe@ahau.edu.cn

Abstract: Agricultural colleges and universities play an important role in the cultivation of new professional farmers, including the accurate implementation of system policies, the effective promotion of agricultural technologies, the widespread dissemination of scientific and technological information, and the evaluation of professional abilities. In the training of new professional farmers, agricultural institutions are expected to give full play to their own advantages and take efforts to establish training systems, improve training modes, set up training teams which will enhance the cultivation function, take lead in the professional direction to guide the relevant planning, accelerate the popularization of agricultural technologies through the innovation of promotion modes, and build up a demonstration base which will drive the development of agriculture, rural areas and farmers.

Key words: professional farmers, agricultural colleges and universities, role, opportunity

1. Introduction

New professional farmers refer to agricultural employees residing in rural areas or towns who take agricultural production, management or service as their main occupation and have agricultural earnings as their main source of income. These new professional farmers are expected to master scientific and cultural literacies, modern agricultural production skills and a strong management capacity; they will play an increasingly significant role in the demonstration and promotion of China's modern agricultural technologies and in the development of Chinese modern agriculture^[1]. Government departments and social organizations in China have attached great importance to the cultivation of new professional farmers; according to China's "13th Five-year Plan" For New Professional Farmers Development, the total number of new professional farmers in China will exceed 20 million by 2020. Agricultural colleges and universities, due to their inherent advantages in science and technology, professionals and information resources, are serving an irreplaceable role in the cultivation of these farmers.

2. Advantages of Agricultural Institutions in the Cultivation of New Professional Farmers

2.1 Complete Facilities and Teaching Places

Compared with other training institutions, agricultural colleges and universities have unique advantages in facilities and teaching resource in the cultivation of new professional farmers. They are equipped with such well-conditioned facilities as teaching venues, student activity centers, logistics service centers and social service centers, all of which can facilitate the learning and living of the trainees as well as the trainee management. In addition, these institutions are normally established with a large number of experimental and practical teaching bases, capable of timely meeting actual needs in practical teaching of new

professional farmers^[2].

2.2 Abundant Faculties and Professionals

Agricultural colleges and universities are known for a great variety of experts and teachers in the broad specialty of agriculture, who can become the core team in the cultivation of new professional farmers. Apart from the mastery on the frontier theories and advanced technologies, they have long been committed to field trials and to the promotion of agricultural science and technology at the front line, and have developed a direct and thorough understanding of the current situation of rural production, which enables them to attain a rational grasp on rural economic development. Thus, in the cultivation of new professional farmer, they are able to exert a more accurate control on the cultivation direction.

2.3 Exclusive Technological Promotion and Scientific Innovation

In terms of agricultural technology popularization and scientific research innovation, agricultural colleges and universities have gained special advantages. Promotion of agricultural technologies and scientific research and innovation are also the main tasks of agricultural colleges and universities for their own development; while compared with other training institutions, they are equipped with a more complete promotion system for agricultural technologies; regarding agricultural scientific innovation and achievement transformation, they also enjoy an unmatched edge over training institutions, and are considered as the main force in the regard^[3]. Agricultural colleges and universities, by relying on the agricultural sectors at different levels, realize the implementation of new agricultural technologies, new varieties and new processes, which can apply the results to the production practice; and these exclusive promotion modes and technological innovations are more closely and practically linked to the farmers' production activities and contribute to the improvement of agricultural productivity and the acceleration of rural economic development.

2.4 Advanced Network and Information Technology

Agricultural colleges and universities are the source of advanced network technology, agricultural science and technology information, most of which is first-hand one obtained by experts and professors through numerous field visits and rural researches, and has higher practicability, advancement and reliability in nature. Through information integration, agricultural colleges and universities can provide high-quality information services for the new professional farmers and improve their ability to use information in production^[4]. The remote trainings, like a live classroom, and other advanced network information technologies developed in agricultural institutions, can be employed to timely provide agricultural information to farmers, enrich the farmers' knowledge system and build a fast and practical network information resources platform for them.

3. Role of Agricultural Colleges and Universities in the Cultivation of New Professional Farmers

3.1 Accurate Implementers of Policies and Systems

Policies and systems are regarded as the driving force in the development of new professional farmers. Agricultural colleges and universities can accurately grasp the direction of current agricultural policies and systems in light of their own practical experience, avoiding the detours that may be made by the farmers, and guide them to correctly seize state policies^[5]. Anhui Agricultural University, in line with relevant state policies and in close collaboration with Anhui Provincial League Committee and Winall Hi-tech Seed Co., Ltd., initiated bold

innovations and took lead in launching a Youth Farmers Class and encouraging the participation of undergraduates into the practice and training of agricultural production techniques and management capability, which, based on both provincial and national situations, was oriented to serve the grassroots in agriculture and lay a solid foundation in the cultivation of young farmers demanded by modern agriculture. Through the practice, AAU succeeded in exploring a road to cultivate new professional farmers with its own characteristics.

3.2 Effective Promoters of Agricultural Technologies

With their highly qualified innovation teams, advanced technological equipment, solid scientific research foundation, and constant cultivation of new varieties, new agricultural technologies and new processes, agricultural institutions provide technical supports for the cultivation of new professional farmers and for the development of modern rural economy. The promotion of advanced agricultural technologies is urgently demanded by new professional farmers, in which agricultural institutions serve as a bridge or tie and have made significant contributions to such promotion^[6]. A large number of agricultural scientific research achievements have been popularized and applied in the process, resulting in improved rural productivity. AAU, in its practice, with its construction of the Institute of New Rural Development, AAU as a platform, has created a new mode for the promotion of agricultural science and technology featuring “One-Station-One-League-and-One-Center”, which has changed the conventional modes that relied service provision on agricultural science and technology projects and innovated the training programs for the personnel responsible for the spread of agricultural science and technology and accumulated the experiences in deepening comprehensive reforms in rural areas, building up socialized service system of the new agriculture and speeding up relevant personnel training in the new phase and in the new period.

3.3 Effective Disseminator of Scientific and Technological Information

Agricultural colleges and universities have a good collection of expertise, professionals and experts and are rich in agriculture-related information. Through the integration of resources and information, they can apply the scientific and technological information to farmers training and education, which may improve their cooperative consciousness and professional quality. Most agricultural schools, as being far from rural areas, may remain detached from farmers' production line; there is little chance for farmers to have a closely one-to-one contact with technical personnel. In view of the situation, agricultural colleges and universities may play an important role in remote service system, information consulting service, and online course resources. Such measures can enable a wide dissemination of agricultural expertise and skills, as well as an upgrade of farmers' scientific and technological literacies and professional skills.

3.4 Assessor of Professional Competence

In the cultivation of new professional farmers, the quality of cultivation is related to the improvement of farmers' professionalism. At present, as there is no complete evaluation system for the quality of farmers' cultivation, there is a need to establish relevant quality standards and evaluation norms. Agricultural colleges and universities have already established a complete standard and system for integrated evaluation of their undergraduates over the years, which may be used as a reference in designing and implementing qualitative

and quantitative evaluations of the quality of the trainings for new professional farmers^[7]. They may include professional skills and expertise assessment targeted at the trainees, strict control on the issuance of professional skill certificate, correct assessment of professional capability and the improvement of training quality.

4. Opportunities of Agricultural Colleges and Universities in the Cultivation of New Professional Farmers

4.1 Institution of Training Systems and Improvement of Training Modes

Agricultural colleges and universities, based on actual needs from modern agriculture and the cultivation of new professional farmers, may make efforts to build up a training system which will be wide in coverage, well-targeted and sound in practical application. For course setup, theories are preferably linked with practice and indoor learning with outdoor operations, while considerations are also given to actual or potential problems encountered by the farmers; corresponding courses are to be set up in accordance with real needs in farmers' production; the compilation of training materials may not only focus on the practical techniques in agricultural production, but also take into account farmers' education background so as to make teaching materials accessible^[8]. In terms of teaching methods, centralized teaching is to be combined with grassroots training, which, specifically, involves the teachings during free seasons and the training in busy days, following the service-to-doorway principle. In addition, agricultural colleges and universities may also optimize the remote service system, which consists of updated online teachings and training continuity.

4.2 Establishment of Cultivation Team and Enhancement of Cultivation Function

Agricultural colleges and universities can make full use of their teachers and experts to build up a "double-type" training team and offer theoretical and practical trainings tailored for farmers based on different needs. The trainers, with their abundant classroom teaching experience, can comprehensively explain theories and technologies needed in the agricultural production process, and relying on rich experiment means and first-line practical experience, provide the farmers precise guidance on the issues that matter in production activities^[9]. Such efforts can be proved contributive to the improvement in theoretical knowledge, scientific and technological level, practical operation, management ability, other comprehensive quality and to the growth in the transformation efficiency of agricultural scientific and technological achievements.

4.3 Leadership in Professional Orientation and Guidance for Professional Planning

Farmers' enthusiasm and confidence in the training is the key to the cultivation of new professional farmers. Agricultural colleges and universities may play a leading role in the development of farmers' professional career, which will be based on their free will and in the clarification of farmers' development and goal. Agricultural institutions, through the cooperation with enterprises, can launch the trainings for professional development planning, which will enable a deeper understanding on organizational and operational modes of agricultural enterprises and on position setup, and assist the trainees to locate their interests and target at developmental direction. Through the trainings, trainees are expected to improve their experience in operation and management, and gain the capability to run a farm. In addition, agricultural institutions, through the certificate issuance to the trainees who have fulfilled the assessment, can encourage them to organize agricultural production purposefully and confidently.

4.4 Innovation in Promotion Modes and Acceleration of Technological Promotion

The promotion of agricultural technologies can exploit potential productivity in the agricultural production and play a driving role in the cultivation of new professional farmers. The innovations in promotion modes not only require agricultural colleges and universities to apply existing agricultural technologies to agricultural production activities, but also realize the close integration among politics, production, learning, research and promotion, so as to provide technical guarantee for regional agricultural development. Through the cooperation in industry-university-research program, agricultural institutions can institute a chief-expert system, which will focus on tackling key technologies in agricultural production and carry out subsequent demonstration and promotion. Also, technical trainings and consulting services can be organized for farmers,, professionals with farming skills who are also good at management and operation are to be cultivated; the demonstration role of an agricultural institution is to be developed, which may be centered on regionally featured agriculture, the transformation and application of technological achievements, and the facilitation of the organic combination between scientific research and production, integration and demonstration, and training and promotion^[10]. Anhui Agriculture University, after the establishment of its Institute of New Rural Development, which is among first ten institutes of its type ever approved by the state, has actively explored the construction of a AAU-based new system for agricultural technology promotion, which may serve as an example in point, has received the affirmation from the Chinese Ministry of Science and Technology, the Chinese Ministry of Agriculture and Anhui Provincial Government.

4.5 Setting-up of Demonstration Bases and the Development of Agriculture, Rural Areas and Farmers

The establishment of a demonstration base is an important measure for agricultural universities and colleges to promote good breeds, good methods and good policies and to solve the “last-mile issue” in agricultural technologies^[11]. It can provide, more comprehensively, services to local agriculture and enable farmers to learn professional skills “at a closer distance”. For instance, Anhui Agricultural University, by making full use of its edges in multi-discipline and multifunction and relying on Anhui’s natural resources, agricultural production status, and its own conditions and needs, has set up eight, moderate-scale, integrated experiment stations, which integrate scientific and technological demonstration, achievement promotion and transformation, farmers’ technique incubation, and students’ internship and entrepreneurship; so far, the practice has achieved fairly good results, effectively spurred the incubation and transfer of technological achievements and promoted the fast development of agriculture, rural areas and farmers.

5. References

- [1] Jian-fu Ma. The role and role of the government in the cultivation of new professional farmers[J]. China Vocational and technical education , 2016(18):64-68.
- [2] Hong-mei Shen, You-guang Huo, Guo-xian Zhang. Research on the cultivation mechanism of new type of professional farmers -- Based on the view of agricultural modernization[J]. Modern economic discussion, 2014(1):65-69.
- [3] Shuang-qiong Zeng. Exploration on teaching methods of new type vocational peasant training[J]. Modern rural science and technology, 2017(3):79-80.
- [4] Hong-wei Li, Du Fang, Xi-hua Qu. Study on the influencing factors of new

vocational farmers' Cultivation Based on Analytic Hierarchy Process[J]. China Labour, 2016(4):32-36.

[5] Li-shuai Xie. Analysis of the ways to cultivate new type of professional farmers in Agricultural Universities -- Taking Hunan Agricultural University as an example[J]. Agricultural Education Research, 2015(4):12-14.

[6] Guo-wei He. The dilemma and path choice of cultivating new type professional farmers in Higher Vocational Colleges[J]. Adult Education, 2016, 36(11):52-56.

[7] Fan-zun Meng. Countermeasures of cultivating new type of professional farmers in Agricultural Universities[J]. Chinese Agricultural Education, 2016(6):45-49.

[8] Xiao-xu Wang, Zhang Liang. Mode analysis of cultivating new type of professional farmers in Agricultural Universities[J]. Chinese Agricultural Education, 2015(5):29-33.

[9] Li Peng Tie-liang Wang, Xi-qing Yue, etl. Analysis of the role of higher agricultural colleges and universities in cultivating new type of professional farmers[J]. Agricultural science and technology management, 2014, 33(1):80-82.

[10] Ren-yu Liu. Research on new training mode of professional farmers[D]. Sichuan Agricultural University, 2014.

[11] Li-mei Liu, Liu Chao. Relying on local agricultural colleges and universities to promote the cultivation of new professional farmers -- Taking Qinhuangdao as an example[J]. China Adult education, 2016(20):158-160.

新型职业农民培育中农业院校的角色与作为

安徽农业大学 何如海 王华斌 孙 鹏

摘要：农业院校在新型职业农民培育中担负着制度政策的精准落实、农业技术的有效推广、科技信息的广泛传播、职业能力的评价鉴定等重要角色。在新型职业农民培育的过程中，农业院校要充分发挥自身的优势，构建培育体系，完善培训模式；打造培育队伍，增强培育功能；引领职业方向，指导职业规划；创新推广模式，加快农技推广；建立示范基地，推动三农发展。

关键词：职业农民；农业院校；角色；作为

新型职业农民是指以农业生产、经营或服务作为主要职业，并以农业收入作为主要生活来源，居住在农村或集镇的农业从业人员。新型职业农民应必须具有较高的科学文化素质、掌握一定的现代农业生产技能、具备较强的经营管理能力，他们在我国现代农业技术推广与现代农业发展中的示范效应与推广作用日趋明显^[1]。我国政府部门和社会机构一直特别重视新型职业农民培育，“十三五”全国新型职业农民培育发展规划提出到2020年全国新型职业农民总量超过2000万人。农业院校具有科技、人才和信息资源方面的先天优势，在新型职业农民培育过程中具有不可替代的作用。

一、农业院校在新型职业农民培育中的优势

（1）完善的硬件条件与教学场所

与其它培训机构相比，农业院校在培育新型职业农民的过程中，具有独特的硬件设备与教学资源优势。农业院校环境优越的教学活动场地、学生活动中心、后勤服务中心和社会服务中心等完善的硬件条件，在新型职业农民培育的过程中既方便学员的学习、生活，也方便对学员进行管理。同时农业院校还具有大量农业方面的试验室与实践教学基地，可以适时满足新型职业农民培育中实践教学环节的实际需求^[2]。

（2）雄厚的师资力量与专业人才

农业院校拥有农业方面的各类专家与师资力量，是新型职业农民培育过程中的核心队伍。他们掌握现代农业科学技术发展的前沿理论与高新技术，他们长期在农村生产一线开展田间试验与农业科技推广工作，对农村的生产现状有着直接与深入的了解，对农村经济发展有着更为理性的认识。在新型职业农民培育的过程中他们更能精准地把控培育方向。

（3）专有的农技推广与科研创新

农业院校在农业技术推广与科研创新方面具有独特的优势。农技推广与科研创新是农业院校自身发展的主要任务，与其它培训机构相比农业院校拥有完善的农技推广体系，农业方面科研创新与成果转化是其它培训机构所无法比拟的，是农业科研创新的主力军^[3]。农业院校通过依托各级农技推广部门，实现了对农业新技术、新品种、新工艺的科研推广，使这些成果有效的运用到农业生产实践活动当中，这些专有的农技推广模式与科研创新更能贴近农民的生产活动，提高了农业生产力，促进了农村经济发展。

（4）发达的网络技术与信息技术

农业院校拥有先进的网络技术以及大量的农业科技信息。这些信息大多数都是农业院校的专家教授通过大量农业方面田间试验的成果与农村调研的一手资料，实用性、先进性与可靠性较高。通过对信息整合后，可以为新型职业农民在生产过程中提供优质的信息服务，提高农民的信息利用能力^[4]。农业院校发达的网络信息技术通过直播课堂等远程化培训，能及时的为农民提供有关农业方面的信息，丰富农民的知识体系，为农民构筑了一个快捷实用的网络信息资源平台。

二、农业院校在新型职业农民培育中的角色

（1）政策制度的精准落实者

政策与制度是新型职业农民发展的推动力。农业院校能根据自身的实践经验准确的把握现阶段农业方面政策制度的方向，避免新型职业农民走弯路，引导新型职业农民准确的把握国家的政策方针^[5]。安徽农业大学依据国家相关政策，紧密联合团省委、安徽荃银高科种业股份有限公司从安徽省情和中国国情出发，大胆创新，在全国率先开展青年农场主班，鼓励本校大学生参与农业生产技能与管理能力的实践与培训，服务于农业基层，为培育现代农业需要的青年农场主打下了坚实的基础，摸索出一条具有安徽农业大学特色的新型职业农民培育之路。

（2）农业技术的有效推广者

农业院校凭借其高素质的创新队伍，先进的技术设备，坚实的科研基础，不断培育出农业新品种、农业新技术与新工艺，为培育新型职业农民和发展现代农村经济提供了技术支撑。先进农业技术的推广是发展新型职业农民的迫切需求，农业院校在此过程中起到了桥梁和纽带的作用，为农业技术的推广做出了巨大的贡献^[6]。大量的农业科研成果在培育新型职业农民的过程中得到了推广与应用，促进了农村生产力的提升。安徽农业大学利用新农村发展研究院的建设平台，打造了“一站一盟一中心”的高校农业科技推广新模式，改变了依据农业科技项目提供服务的传统方式，创新了农业科技推广人才培养模式，为新时期新阶段深化农村综合改革、健全新型农业社会化服务体系、加快农业科技推广人才培养积累了经验。

（3）科技信息的广泛传播者

农业院校是知识、人才、专家的汇集地，同时具有丰富的与农业相关的科学技术与信息。农业院校通过对科技资源与信息进行整合后将这些科技信息运用到农民培训与教育过程中，实现了农民的合作意识与专业素养的提高。大多数农业院校距离农村较远，与农民的生产线结合可能不够紧密，农民与专业技术人员一对一接触的机会少。针对这一问题，农业院校在远程服务系统、信息咨询服务、网络课程资源等方面发挥了重要的作用。这些举措使得农业院校在农业方面的专业知识与技能得到了广泛的传播，农民的科技文化水平与职业技能得到了提高。

（4）职业能力的评价鉴定者

新型职业农民培育的过程中，培育的质量关系到农民的专业技能与专业知识能否得到有效的提高。目前还没有完整的农民培育质量的评价体系，因此建立相关培育质量标准与评价规范至关重要。农业院校对在校学生进行综合评价的评价标准与评价体系已比较完善，对新型职业农民的培育质量也可根据多年对在校学生进行综合评价经验进行定性定量评价的设计与实施^[7]。包括对接受培训的农民进行专业技能考核以及专业知识的测评，严格把关职业技能证书的发放，准确鉴定职业能力，提高培育质量。

三、农业院校在新型职业农民培育中的作为

（1）构建培育体系，完善培训模式

农业院校应根据现代农业与新型职业农民培育的实际需求，构建覆盖面广、针对性好、实用性强的培训体系。课程的设置要理论与实际、室内与室外相结合，应充分考虑农民在生产过程已经遇到或可能遇到的实际问题，根据农民生产中的实际需求设置相对应的课程^[8]。在培训教材编写过程中，不仅需要把握农业生产中的实用技术，还应该考虑到农民的受教育程度，尽量使教材通俗易懂。授课方式上应该采用集中授课与基层培训相结合，在农民生产闲暇时间集中授课，在农民忙碌季节进行基层培训，做到“服务到家”的原则。农业院校还应优化远程服务系统，网络课堂应做到及时更新，保证培训的连续性。

（2）打造培育队伍，增强培育功能

农业院校应当充分利用校内教师与专家，打造一支“双师型”培育队伍，根据不同需求

所制定的培训方案对农民进行理论与实践方面的培训。培训教师利用丰富的课堂教学经验,全面讲解农业生产过程中所需的农业科技理论知识和先进技术。同时利用丰富的试验手段和大量的一线实践经验,对农民生产活动中需要注意的事项进行精准指导^[9]。进一步提高广大新型职业农民的理论知识、科技水平、实践操作、管理能力与综合素质,全面提高了农业科技成果的转化效率。

(3) 引领职业方向, 指导职业规划

农民在培训过程中的积极性与信心是培育新型职业农民的关键,农业院校应根据农民自身意愿引导其制定自己的职业发展规划,明确他们自身的发展与目标。农业院校可以通过与企业间的合作对学员进行职业发展规划方面的培训,让学员对农业企业的组织运行模式与相关的岗位设置有更深层次的了解,帮助学员找到兴趣,找准从事农业的发展方向。学员也可通过培训提升自身的经营管理经验,使自身达到农场管理者的水准。同时,农业院校对通过考核的学员发放证书,鼓励学员有目的、有信心从事相应的农业生产活动。

(4) 创新推广模式, 加快农技推广

农业技术的推广可以发挥农业生产活动过程中的潜在生产力,对培育新型职业农民起到推动的作用。创新农技推广模式不仅要求农业院校把已有的农业技术推广应用到农业生产活动中去,还要体现政、产、学、研、推之间的紧密结合,为区域产业发展提供技术保障。农业院校通过产学研合作,实行产业项目首席专家制,对农业生产方面关键技术进行研究攻关,攻关完成以后进行示范推广^[10]。对农民开展技术培训和咨询服务,培养懂技术、善经营、会管理的人才,发挥农业院校的示范带动作用,围绕地方特色产业,转化应用农业科技成果,促进科研与生产,集成与示范,培训与推广的有机结合。安徽农业大学获批成为全国首批十所建设新农村发展研究院的高校之一以来,积极探索构建以大学为依托的新型农技推广体系,就是一个很好的范例,得到了科技部、农业部、省委省政府的充分肯定。

(5) 建立示范基地, 推动三农发展

示范基地的建立是农业院校推广良种良法良策、解决农业科技“最后一公里问题”的重要举措,能够更全面地服务地方农业,农民能更近距离的学习到农业方面的专业技能^[11]。例如,安徽农业大学充分利用学校多学科、多功能的优势和特色根据安徽省不同区域自然资源禀赋以及农业产业发展状况,结合学校现有基础和发展需要,与地方政府合作共同建设 8 个具有适度规模、集科研示范、成果推广转化、农民技术孵化以及学生实习创业为一体的综合试验站,目前已经取得了很好的效果,有效地加快农业科技成果的孵化与转移,全面推动了三农的快速发展。

参考文献

- [1] 马建富. 新型职业农民培育中政府的角色及作为[J]. 中国职业技术教育, 2016(18):64-68.
- [2] 沈红梅, 霍有光, 张国献. 新型职业农民培育机制研究——基于农业现代化视阈[J]. 现代经济探讨, 2014(1):65-69.
- [3] 曾双琼. 新型职业农民培训的教学方法探索[J]. 现代农村科技, 2017(3):79-80.
- [4] 李宏伟, 杜芳, 屈锡华. 基于层次分析法的新型职业农民培育影响因素研究[J]. 中国劳动, 2016(4):32-36.
- [5] 解李帅. 高等农业院校培育新型职业农民的途径探析——以湖南农业大学为例[J]. 农业教育研究, 2015(4):12-14.
- [6] 何国伟. 高职院校培育新型职业农民之困境及路径选择[J]. 成人教育, 2016, 36(11):52-56.
- [7] 孟凡遵. 农业院校培育新型职业农民的对策研究[J]. 中国农业教育, 2016(6):45-49.

- [8] 王晓旭, 张亮. 农业院校培育新型职业农民模式分析[J]. 中国农业教育, 2015(5):29-33.
- [9] 李澎, 王铁良, 岳喜庆,等. 浅析高等农业院校在培育新型职业农民中的作用[J]. 农业科技管理, 2014, 33(1):80-82.
- [10] 刘人瑜. 新型职业农民培训模式研究[D]. 四川农业大学, 2014.
- [11] 刘丽梅, 刘超. 依托地方农业高校推进新型职业农民培育——以秦皇岛为例[J]. 中国成人教育, 2016(20):158-160.

Research on Marketing Strategies of China Small Ecological Farms

Shuangxi Xiao

Anhui Agricultural University

Abstract: China small ecological farms faced many marketing problems, such as fluctuating target consumers, lacking products, higher prices and shorting of main channels. The reasons of these problems are asymmetric information, scattering farm, shorting of ecological idea etc. Finally, the paper give the countermeasures based on the cases study, which include promotion of ecological ideas, farm cluster development, using the new media and build the main marketing channels and so on.

Key Words: Small; Ecological Farm; Marketing

1.introduction

Ecological agriculture is the direction of China agriculture development. a group of students graduated from Anhui agriculture university build many small ecological farm in Anhui province. But they face many marketing problems, such as unstable customers, not rich agricultural products, higher price etc. If these problems can't be solved, which will affect the development of ecological agriculture, and will restrict young students employment. The paper design a plan to solve these marketing problems based on lots of survey.

Many researcher do related researches on the farm marketing problems. Some researchers think the brand is the main factor which decide the marketing. Zhang Sifei (2008) , Dong Xiaodong (2017) all considered shorting of brand is core reason of marketing failure. Yuan Yuqin (2010) pointed out that agriculture industrialization is successful in Congming City because of brand building. Some researchers agree that the asymmetric information is the common reason for hard marketing in high quality agricultural products. So many researcher put forward the "society management to solve it, such as the

third party certification and PGS. But it is still high cost for the small farms. So this model is not suitable in China. Some researcher point out that the O2O is the new and useful model to promote small farm marketing. Wang Yanru, Mei Jia etc. (2014) analyzed the advantage of O2O by empirical research that O2O is more easy to abstract young consumers.

From all the researches mentioned above, the problems of ecological small farm is still not defined and the marketing methods are mainly suitable for big company farm. The paper analyze the main problems and design effective and efficient marketing strategy for ecological small farm.

2.the situation and problems of China small ecological farm

2.1 Marketing status of small eco-farm in China

There are about 400 small ecological farm in China according to record of CSA conference. The investors of these farm are real estate developers, financial companies and high-tech enterprises, such as China Net Ease US Qualcomm. The Eco-farm investment quotas range from millions to tens of millions. The products of Eco-farm are vegetables, some are fruit farm and ranch. Most farms are comprehensive which will be the profitable farm in the future.

2.2 the main marketing problems of China small Eco-farm

2.2.1 low profit and unstable customers

Generally, the farm's target customers are not stable, 20% of target customers will run off every year. Because of small scale, the total profit are very low. The Eco-farm would be defective within three years, and get balanced in 3-5 years, and get stable profit after five years. Dushu farm in Hefei City is still defective in it's third year, Gumi farm get balanced in it's fourth year which has get 500 families as it's target consumers. Qinmu farm has got high and stable profit in it's eighth year. Also, few excellent farms can make a profit in the second year, such as the Qiyue farm in Huangshan area, which was created in 2016 and be profitable in 2017.

2.2.2 not stable production and not rich products

As a CSA farm, it will provide all the vegetables for its consumers, but the farm's production is not stable, and can't provide all the products the consumer family needs. So, the contradiction becomes more and more serious. For example, the Jinguo farm sends vegetables to consumer families in Hefei city twice a week, 6 jin each time. Because of diseases of vegetables, the pepper, bean, etc. are all died. So Jinguo mainly sends celery to all of the families. Just two weeks, all the families complain about the celery, they really eat enough. Same as Jinguo, Beijing Small Donkey farm has the same problem with Jinguo, which sends the consumer family carrots every time during two months. The families tell the farm their children are even sick of carrots now.

2.2.3 the price is higher than consumer's expectation

Now, the price of ecological vegetables in Beijing is 20-25 Yuan per jin, and 8-12 Yuan in Hefei. But the ordinary vegetable prices are just 3-6 Yuan in the supermarket and 2-4 Yuan in small markets generally. According to the survey in Hefei in 2015, most families hope the ecological vegetables are about 5 Yuan per jin. The price obstructs more than 60% of consumers from buying ecological products.

2.2.4 short of main marketing channel

Now, the main ecological products are sent to the families in the city directly, using the CSA model. So, most farms have their own cars and drivers to do this and cause heavy costs. The supermarket and exclusive stores are the main channels of agricultural products in China now. But all the trials selling ecological agricultural products in them are failed because of the trust problems.

3. the main reasons of China small farm marketing problems

3.1 asymmetric information

The reason why consumers do not trust ecological agricultural products is the asymmetric information. If the consumers do not know the quality of agricultural products, they will not pay high prices, and even doubt the ecological products and abandon them. This caused the fluctuation of target consumers. Though the third certification can provide more information for consumers, but which can not cover all the small ecological farms. Because most China

farm are small, the asymmetric information restricts in fact the whole development of ecological agriculture in China.

3.2 scattered development of eco-farm

China's ecological agriculture development is typical market spontaneous behavior, and it's layout is random and scattered, individually grow around some big city and in some good environment area. It is the individual development cause the contradiction of limit provision and demand diversification. Moreover, the individual development also improve the cost of factors, such as fertilizer, distribution and labor. The high cost promote the price, and make it higher than the expectation of consumers.

3.3 consumer shorting of ecological awareness

Some consumers think the price of ecological agricultural products is too high, not only because the real higher cost of ecological products, but also related to the ecological awareness. The ecological products not only protect the environment but also improve the health of consumers. If the public consider the environment and health cost, the price of ecological products is not high. Besides this, the ecological agriculture also can provide lots of employment for young students. The social benefits are very high. If consumers or government can calculate all this benefits, the higher price is worthy. Take my family as a example, I order the ecological(organic standard) vegetable from Gumi farm. They send my family twice a week, 6 Jin every time, 8 Yuan per Jin. So my family just pay 384 yuan for the vegetable. Some time, we go out for travel and eat out, so the real cost are just 300 yuan per month for all the organic vegetables. All my family members agree that this is a proper price. Taken together, the integrated cost of ecological agriculture is affordable for most families in Hefei City, also in other big cities.

4. the marketing strategies for China small farm

4.1 strengthen the promotion of ecological ideas

The research institutes should go on doing research on the benefits on ecological agriculture, and point out the disadvantages of petro-chemical agriculture. Then, the

government and the **mainstream media should strengthen the promotion of ecological ideas. If the public really understand the benefits of ecological agriculture, they will accept the higher price of small ecological farm. So the farms can get stable consumers and higher profit.**

4.2 Promote cluster development of small ecological farms

The scattered development of small eco-farm cause the higher cost and fewer product categories, which results the dissatisfaction of most consumers. So, encourage the cluster development of small ecological farms can solve the two problems. If different farms develop together, they can make some useful recycle between different farms, such as the planting farms can provide the straw for ranches as the feed, and the ranches can provide the manures to the planting farms as excellent organic fertilizer. So the cost of all farms can be decreased. At the same time, the farms in a region can provide more varieties products for the families in city, not improve the distribution cost due to the cluster. If the small farms can make co-operative, the management and distribution costs will be reduced more.

4.3 use the regional public brand and new media to promote the small farms' brand

The small farms' marketing are very hard because their weak economic strength. Brand is very useful in marketing, but it need lots of money. So, the local government can make the strong regional public brand , and all the small farms certificated by local government can use the public brand on their packages together with own brand. So the public brand will make the farms' brand more famous and accepted by common consumers. Also, the small farms can use the new free media, such as the Weibo(like Twiter, Weixin(like Introgram) and Weidian (like Amazon),which will reduce the promotion cost sharply.

4.4 create new marketing channels for eco-agricultural products

Continue developing farmer's market, where farmers meet directly with urban consumers. This is an unique marketing channel for eco-agricultural products and can build trust relationship between city consumers and rural farmers. Then, the O2O and exclusive store will be build to distribute ecological products. At last, perform a high efficient and low cast main channel for all the ecological farms.

5.conclusions

China's small ecological farm is in its early stages of development. Although there are many problems in marketing, it has great potential for development. After the popularization of ecological ideas, the development of eco-farm clustering and the improvement of brand building, the main problems faced by the small eco-farms can be effectively solved. The development of Chinese ecological agriculture mainly depend on those small ecological farms. They not only can solve the problems of China's food safety, also can improve China's agricultural competitiveness, and boost beautiful rural construction. At last, the overall development of eco-farms can help to the final realization of **moderately prosperous society** building in China

References :

- [1] Wang yuanyuan. Analysis of regional agricultural product marketing model based on e-commerce. Business economics research, 2017 (3) : 81-83.
- [2] Zhang li. Innovative research on Internet + agricultural product marketing model. Chinese business theory, 2017 (5) : 98-99.
- [3] Li weipeng, Deng xiaogang, Tang yousheng. Zhongxie. Chinese characteristics of CSA safe agricultural road for example of Shennong pastoral mode. Guangdong science and technology, 2017, 26 (4) : 68-70.
- [4] Shuping. Ecological trust: a new perspective on the sustainable development of agriculture. Journal of Shandong youth political college, 2015, 31 (5) : 65-69.
- [5] Zhang le. Organic agriculture: the establishment of ecological trust is fundamental. China famous brand, 2015 (13) : 60-62.
- [6] Sun jian,Li chongguang. On the innovation and development of agricultural marketing channel organization [J]. Agricultural science and technology management, 2003 (4) : 12.

- [7] Xie Kaimu. The application of experiential marketing in agricultural products [J]. Journal of China agricultural university (social science edition), 2004 (2) : 26.
- [8] Xu bang, Wu yingyi, Yi ma et al. Research on organic agricultural development in Guangzhou [J]. Modern agricultural technology, 2014 (24) : 18.
- [9] Yuan yuan, Yuan yongming, Lu jianfei. The pattern of organic agricultural development in Baoying county,Jiangsu province [J].Jiangsu agricultural science, 2015 (4) : 26-29.
- [10] Hu huaping. Evolution and development of agricultural products marketing channels: [master's thesis]. Huazhong agricultural university, 2011.
- [11] Wang Aihu. Economic analysis of regional public brands in agricultural products: a reputation based signal breakdown model [J]. Business economics and management, 2012 (11) : 1523.
- [12] Wen tiejun, Dong xiaodan, Shi yan. Transformation and policy orientation of China's agricultural development direction: based on the perspective of international comparative research [J]. China agricultural information, 2011, (02).
- [13] Gao tan, Wang yuhua, Li baoming, Chen gang. Research on organic agriculture in typical areas of Shijiazhuang, hebei [J]. Agricultural machinery research, 2011, (09) : 15-17

中国小型生态农场营销策略研究

Research on Marketing Strategies of China Small Ecological Farms

肖双喜

安徽农业大学经济管理学院

摘 要

中国小型生态农场在营销方面遇到了顾客不稳定、产品不丰富、价格偏高、缺乏主渠道等一系列问题。分析表明, 这些问题产生的主要原因来自于生态农产品营销过程中的信息不对称、农场分散化发展以及消费者缺乏生态理念等。最后, 文章结合部分农场发展案例, 指出强化生态理念宣传, 小型生态农场集群化发展, 善于利用现代新媒体, 创建新型生态农产品营销渠道是解决上述营销问题的主要措施。

关键词：小型 生态农场 营销

Abstract

China small ecological farms faced many marketing problems, such as fluctuating target consumers, lacking products, higher prices and shorting of main channels. The reasons of these problems are asymmetric information, scattering farm, shorting of ecological idea etc. Finally, the paper give the countermeasures based on the cases study, which include promotion of ecological ideas, farm cluster development, using the new media and build the main marketing channels and so on.

Key Words: Small; Ecological Farm; Marketing

1.引言

生态农业是中国农业发展的方向。以安徽农业大学为代表的农业院校毕业的一批年轻学生建立了一批小型的生态农场。但是这批小农场在营销方面遇到了顾客不稳定、产品不丰富、价格偏高等系列问题,如果不能有效解决,会影响到生态农业的可持续发展,同时也影响了年轻学生的创业与就业。本文在调研的基础上,设计了一整套方案来解决小型生态农场的营销问题。

在农场营销方面,国内有众多的学者做过相关研究。部分学者认为农产品品牌的缺乏是农场营销乏力的重要原因。张司飞(2008)、董晓东(2017)研究指出农产品品牌成为制约中国农业可持续发展的重要因素,缺乏品牌是众多农场营销困难的核心原因。袁玉琴(2010)以崇明市为例,探讨了生态农产品营销应该如何以“品牌”为抓手,进一步推动生态农产品产业化进程。

学术对于生态优质农产品销售难原因的共性观点是信息不对称,所以提出了“社会规制”的解决对策。但是,由于社会规制主要由第三方认证与政府认证构成,对于一般的小型农场来说成本过高。国际有机联盟为此提出参与式保障认证(PGS)。目前我国在生态农产品消费者尚未成熟的情况下,这种模式推进有较大的难度。这是小型生态农场营销问题解决困难的关键所在。

在农场营销解决对策方面,许多学者提出O2O网络营销模式。王燕茹,梅佳,迟藤,卓银凤,马光耀(2014)经过实证方式分析了O2O方式的团购模式能够更好的把握住年轻消费群体,而一部分年轻消费者正是生态农场的目标顾客。吴芝新(2012)指出O2O的特点决定了其推广的效果可查证、交易明细可追踪、营销环节可监控等特点,分别利用线上线下的信息流、资金流、和客流、商务流等优势,能够更好的吸引消费者,从而提高盈利。

从现有研究来看,学术界对小型生态农场营销实际问题界定并不准确,而学术界提供的营销对策更多适合于大型公司制农场,并不适合小型生态农场。本研究将在实地调查的基础上,分析小型生态农场的营销问题,并为之设计可行、高效的营销策略。

2.中国小型生态农场营销现状与问题

2.1 中国小型生态农场营销现状

根据中国 CSA 大会的初步，目前有 400 家生态农场，其产品主要通过 CSA 方式销售。投资者多数为房地产商，以及部分金融、制造企业与高科技企业，如中国网易、美国高通等。生态农场投资额度从几百万到几千万不等。其中，以蔬菜类农场为主，水果农场、养殖农场为辅。多数农场都是综合性的，其中种养游结合的农场非常多，他们以后将是赢利的重点。在规模方面，蔬菜、水果农场凡是质量优异的，其规模都普通较小，一般都是 200 亩以下。而规模做到 500 亩以上的，不但成本高昂，其产品质量往往难以保证。

2.2 中国小型生态农场营销问题

顾客不稳定，总体利润不高。总体来看，各个农场都存在目标顾客群不稳定。此外，生态农场因规模偏小，其总体利润偏少。一般三年内赢利较少，三年到五年内基本持平。五年后的农场才能真正稳定赢利。合肥市读蔬农场刚刚第三年，仍在亏损，而谷米田庄 2017 年为第四年，客户共 500 多家，已经实现平衡；而亲沐家庭农场已经五年以上，实现了稳定赢利。当然，少数农场可以做到第二年赢利，如黄山七约农场，2016 年创建，2017 年就已经实现赢利。

产品生产不稳定，品类不丰富。作为配送农场，消费者家庭蔬菜基本于农场配送。但是，由于农场生产的有限性与消费者需求的多样性矛盾，农场供给及时性与丰富性一直都是顾客抱怨的重要方面。以巾帼生态园为例，其配送蔬菜为每周两次，每次 6 斤。因为一棚白菜生虫，所以其配送的产品仅为 3 个，其中一个是芹菜。由于芹菜抗虫、抗病，长势良好，每次配送不但量多而且稳定。但消费者在食用一个星期后就开始厌烦芹菜。与此相似的还有北京小毛驴农场，由于冬季叶类菜生产困难，他们一直给顾客配送胡萝卜，导致部分顾客强烈不满，甚至退订蔬菜。

销售价格大于顾客预期。现在中国北京的配送上门生态蔬菜价格约为 20 元，合肥配送上门的蔬菜价格约为 10 元，长期顾客的价格为 8 元。但是农贸市场的

蔬菜价格仅为 2-4 元，生态蔬菜的价格远远高于普通蔬菜。而根据调查，消费者对生态农产品的价格仅为普通农产品的 130%-300%，多数蔬菜价格在 5 元之内才是符合消费者预期。

缺乏主流营销渠道。现在生态农产品主要通过直接配送完成，但是没有类似超市与专卖店可供使用。生态农产品在各大超市中都有试销，但最终一一放弃，这包括合肥最负盛名的家乐福超市。而由农场独自建立的社区专卖店数量极少，甚至可以忽略不计。据笔者了解，整个合肥市真正的坚持下来的蔬菜专卖店仅双马农场一家，其他农场多是在开张与倒闭中循环。

3.中国小型生态农场营销问题的成因分析

3.1 生态农产品信息不对称

顾客不信任最主要原因仍然是对产品、农场以及农场主信息不了解导致的。所以在出现了一些不利的信息后，他们会产生摇摆，导致农场顾客群不稳定。而现在的第三方认证与参与式保障体系又不能覆盖所有的小型农场，所以生态农产品信息不对称制约了小农场生态农产品营销。在中国生态农业主要为小型农场的情况下，该现象实际上制约了整个生态农业的发展。

3.2 农场分散化发展

由于我国生态农业发展是典型的市场经济自发行为，其布局为随机分散式，独自分布于各大城市周边与生态环境良好地区。这些独立发展的农场在利用 CSA 方式向城市家庭进行配送产品时，会产生农场产品供给有限性与居民需求多元化矛盾。这是顾客抱怨农场配送产品不丰富的最核心原因。此外，农场独立发展还使其获得生产要素成本大幅提高，从而使生态农场的产品成本远高于现在的石化农场与小规模普通农户。当城市消费者将农贸市场的农产品与配送到户的农产品进行比较时，自然会觉得配送的生态农产品价格高于他们的心理预期。

3.3 仍处于发展初期

由于生态农业发展时期较短，国内尚未形成成熟的生态农产品营销渠道。小型农场既无法去创建自己独立的渠道，也无法在短期组建类似美国全食超市大型公共渠道。

3.4 消费者缺乏生态环保意识

消费者觉得生态农产品价格过高的原因除了生态农产品本身价格确实较高之外，还与消费者生态意识有关。真正的生态农产品不仅可以通过其优异的质量提升消费者健康水平，更可以减少农业面源污染，保护环境。当消费者在缺乏生态意识且不能把个人的健康成本与环境成本计算在内时，他们会觉得价格偏高。但是，当消费者把健康成本、生态环境成本以及社会成本计算在内时，生态农产品价格实际上并不高昂。以笔者家庭不测算，如果直接从生态农场订购按有机标准生产的蔬菜，每周 2 次、每次 6 斤，每斤 8 元计算，每月费用不过 384 元。再加上有时外出就餐与放假，每月蔬菜实际支出仅为 300 元左右。而生态大米、生态畜禽因消费量更少，所以综合来看，生态农产品综合成本是大多数家庭可以承受的。

4. 中国小型生态农场营销策略

4.1 加强生态理念宣传

继续对石化农业造成的各类疾病进行研究，并将相关成果在社会中进行大力宣传，以提升消费者生态保护意识与健康意识。当城市消费者具备生态意识后，价格、顾客不稳定因素等都可以解决。

4.2 促进小型生态农场集群式发展

正是由于小型生态农场的分散化发展导致其成本偏高，产品品类偏少，由此导致了多个营销问题。如果能通过规划，鼓励生态农场集中发展，既可以发挥集群优势降低成本，又可以使配送的产品更加丰富，还可以吸纳更多年轻人加入。

而中国土地集体所有优势使生态农场集群发展极为有利。根据中国宪法，农村地区耕地属于集体所有，所以可以利用该优势集中发展生态农业，将一个村庄耕地分成种植、养殖、休闲、体验、民宿、餐饮等不同功能区，以集群化的方式发展生态农业，将不同类型的小型生态农场集合成一个更具竞争力的合作社或者大公司，这样产品单调、价格过高等问题都会顺利解决。

4.3 利用新媒体，大力发展小型农场的品牌营销

小型农场营销发展之所以艰难，与其自身的经济实力过弱有关。而现代互联网的发展使宣传成本降低成为可能。目前中国的“三微”（微信、微博、微店）不但可以让小型农场与消费者之间实现互动，也可以使农场的产品直接进行销售，只要运营得当，其综合成本接近于零。另外，小农场之所以与消费者之间信任度不高也与其品牌建设不力有关。而通过调查可知，现在的农场品牌多数缺乏有效的核心价值，品牌名称、品牌标志等设计存在较多缺陷。要想全面解决信息不对称所带来的信任问题，必须全面提升小型生态农场品牌建设水平。主要步骤如下：

1. 提炼品牌核心价值。根据农场所在的环境，提炼好农场品牌的核心价值。
2. 设计好名称与品牌 LOGO。将品牌名、品牌标志物与核心价值联系起来，减少宣传阻力。
3. 利用新媒体与体验及时与消费者沟通。利用微博粉丝与微信朋友圈及时将农场信息传递给消费者。同时，利用集群优势，发挥体验营销威力，在三产融合基础上解决生态农产品营销难题。

4.4 创建新型生态农产品营销渠道，降低小型生态农场渠道建设成本

继续发展农场主与城市消费者直接见面的农夫市集，在建立信任关系的同时，形成生态农产品特有的营销渠道。在此基础上，创建依托于农夫市集的线上选择与线下配送体系。线上选择网页将各个农场全部集中，形成信息汇集地；线下配送体系包括配送中心与社区专卖店，把产品直接配送到城市社区，形成有利于小型农场的生态农产品主流营销渠道。

5.结论

中国小型生态农场正处于刚刚发展阶段,虽然在营销方面存在较多问题,但具有极大的发展潜力。在社会生态理念得以普及,生态农场集群化发展以及品牌建设完善之后,其面临的主要问题都可以得到有效解决。中国生态农业发展的主力军就是这批小型生态农场,他们不但可以解决中国的食品安全问题,还可以提升中国农业竞争力,助推美丽乡村建设,最终在中国全面实现小康。

参考文献:

- [1] 王媛媛.基于电子商务的区域性农产品营销模式分析.商业经济研究, 2017(3): 81-83 .
- [2] 张莉.互联网+农产品营销模式的创新研究.中国商论,2017(5):98-99.
- [3] 李卫鹏,邓小刚,唐友生.众协模式:中国特色的 CSA 安全农业之路—以“神农田园”模式为例.广东科技, 2017, 26(4):68-70.
- [4] 舒萍.生态信任:思考农业可持续发展的新视角.山东青年政治学院学报,2015,31(5):65-69.
- [5] 张乐.有机农业:生态信任的建立是根本.中国名牌,2015(13):60-62.
- [6] 孙剑,李崇光.论农产品营销渠道组织创新与发展[J].农业科技管理, 2003 (4) : 12.
- [7] 谢开木,胡翠荣.体验营销在农产品中的应用[J].中国农业大学学报(社会科学版), 2004 (2) : 26.
- [8] 许帮飞, 吴颖仪, 易曼等.广州地区有机农业发展探讨[J].现代农业科技, 2014 (24) : 18.
- [9] 袁媛, 袁永明, 陆建飞.江苏省宝应县、句容市有机农业发展模式对比[J].江苏农业科学, 2015 (4) : 26-29.
- [10] 胡华平.农产品营销渠道演变与发展研究:[硕士学位论文]. 华中农业大学, 2011.
- [11] 涂传清, 王爱虎. 农产品区域公用品牌的经济学解析:一个基于声誉的信号崩差模型[J]. 商业经济与管理, 2012(11) : 15-23.
- [12] 温铁军, 董筱丹, 石嫣. 中国农业发展方向的转变和政策导向:基于国际比较研究的视角[J]. 中国农业信息, 2011,(02).
- [13] 高璨, 王玉华, 李保明, 陈刚. 河北石家庄市典型地区有机农业模式研究[J]. 农机化研究, 2011, (09) : 15-17. .商业经济研究, 2017 (6): 46-47.

The Study of Agricultural Extension Program Based on Universities in County Area

-H.P. Zhang

X.Y. Ouyang

Anhui Agricultural University

Abstract :

Agricultural Extension Programs which based on universities was being launched widely in China along with the development of agricultural science and technology and the supply side agriculture reform. This research was aimed to analysis and compare related examples of agricultural extension programs based on universities in China and U.S.A. In order to improve current mode of agricultural extension programs and develop alternatives to China, different types of extension program will be evaluated critically. In county areas of China, agricultural extension programs based on universities were mainly depending on co-operated institutions or organizations between local government and university. Both of them were under the common purposes that the extension program could help to improve local agricultural techniques ; increase the efficiency of technology transformation and develop local agronomics. This research will take a close look at related examples of different Universities such as China Agricultural University, Northwest A&F University (China) and Colorado State University (U.S.A). The main research strategy in this study is comparative analysis. In order to compare different types of agricultural extension programs, four main issues will be critically analyzed : build dates, scales, administration systems and the achievements. Moreover, the local economic profits and social effects will be also considered as important indicators to evaluate these agricultural extension programs. The researchers were working on the Northern Anhui Institute in Yongqiao County which was a newly built agricultural extension institute of Anhui Agricultural University. Therefore, this study will also explain the experiences and problems engaged with the researchers while building the agricultural extension program. Recommendations and feasible strategies will be provided through the combination of the studies of different examples and working experiences to improve current agricultural extension programs based on universities in China.

-Key Words:

Agricultural Extension Program School-local Cooperation Agricultural Research Institute

1. Background

New-tech agriculture extension programs were being applied in different places nowadays in China. Alongside with the step of the revolution of agriculture, the number of agricultural extension programs based on local Universities were increasing dramatically in a few years time. New technology like mechanism, fertilizers and better seed can improve the productivity of agriculture. (Aker, 2012) Universities with new technology and skilled people of agriculture were able to help the local county to develop their agriculture and competitiveness of products. In that case, farmers and companies of agriculture were willing to cooperate with universities. With the relationship between universities, new technology of agriculture will be easier to applied by the farmers in local place. Meanwhile, the advantages and shortages in local agriculture will be better diagnosed by the experts from the universities

which is also important to help improve the local agriculture. On the other hand, the farmland provided by the local farmers may offer the universities better places to do experiments and test their new breeds. The effects of the cooperation between universities and local places were positive to both sides, therefore, the central government are now encouraging the local government to apply the agricultural extension programs base on universities in China. (Gao,2010)

In the latest No.1 Document from central government, three types of constructions were being highlighted in 5 February, 2017. One of the constructions is the industry which include new-tech agricultural industry, research centre of the industry and the pioneer of the industry. These industries have to be strongly linked to the local agriculture in order to develop the agricultural economy and form a cluster of agricultural companies in the future. The key issue to develop the industry is the technology and skilled workers which universities can provide. With specific place to investigate the local farmland and apply the new technology, local farmers will get more detailed data of their land and the universities will get more practical data of their research. In that case, local government must cooperate with universities to grantee the construction of the industries. (Lu, 2017)

Meanwhile, the No.1 Document clearly encouraged the universities and colleges to open related subjects of agriculture development for the incoming construction of agricultural industries. Local governments were also encouraged to cooperate with universities and provide suitable places for students to practice. The agricultural extension programs were emerged to meet the demand of the No.1 Document. The program could not only serve the local agriculture but also increase the results in education of universities. Because of that, more and more universities are taking part in the agriculture extension programs.

2. Examples in China and U.S.A

China have a number of universities launched the agriculture extension program so far, some of them have obtained significant achievements. Two types of the agriculture extension program will be briefly explained in the following part.

The first case is the “Zhouqu” extension type of China Agricultural University. This is a typical extension type which combined the targets of both agriculture extension of university and local government. Based on the requirement of local farmers, China Agricultural University improved local agriculture through the implementation of the new technology. The new technology will be spread by the institution in local places which were build by the university. Meanwhile, local department of agriculture also cooperate with the university to centralize the techniques as well as the education power. Thus, local farmers could benefit from the cooperation and study useful skill and knowledge and develop the local agriculture finally.(Li, Gao, 2012)

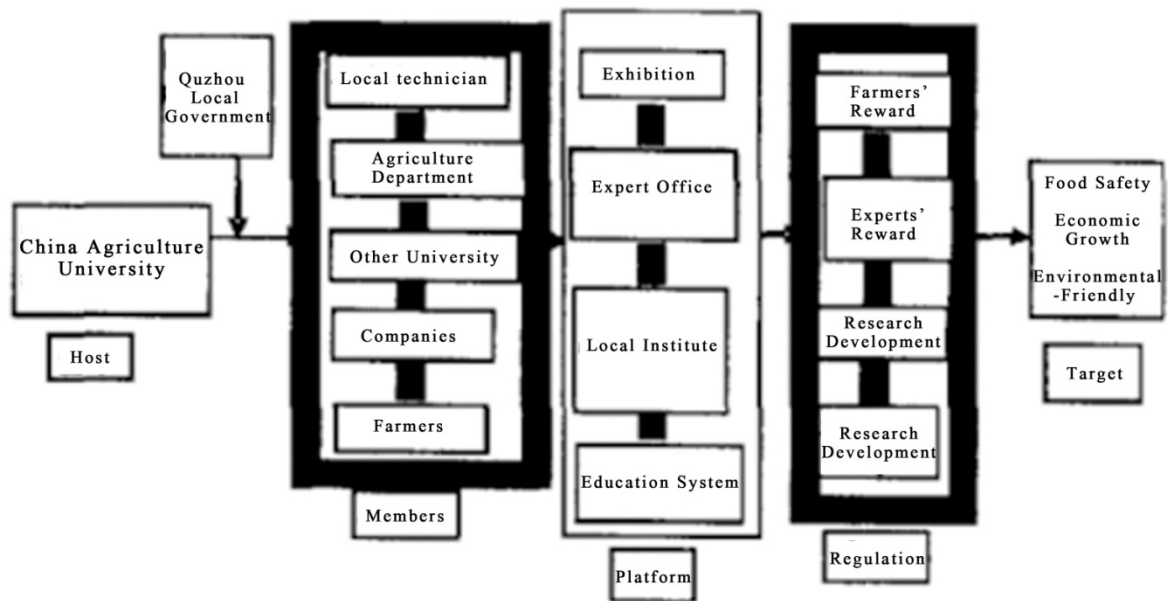


Fig1. Quzhou Extension Type Diagram

Source: Z.M Li, Q.J Gao The Study of Agriculture Extension of University, Science and Technology Management Research, 18th 2012.

The Second case is Northwest Agriculture and Forestry University. Over 50 agriculture extension programs have been launched to develop local agriculture in 5 different provinces in western China. The main strategy of these extension programs is exhibit their new techniques on the institution, meanwhile, education and services for local farmers were being provided through local office. The function of these institutions built by the university were mainly depended on local environment and most of them have become the landscape of local agriculture specialties. The university have also built a classified education system and a multi-source information service system in order to develop the agriculture in local region. Such type of agriculture extension was named as “One core with double wings”. The experts’ office have also been built to strengthen the cooperation with local agriculture department in Baoji City. With new techniques and experts in agriculture, local government became able to improve their agriculture and educate the farmers and finally improve the local economy. Model villages and model farmers have been created by using the new technology of university and thus attracted more and more farmers to follow the step of models. (An, Liu, 2014)

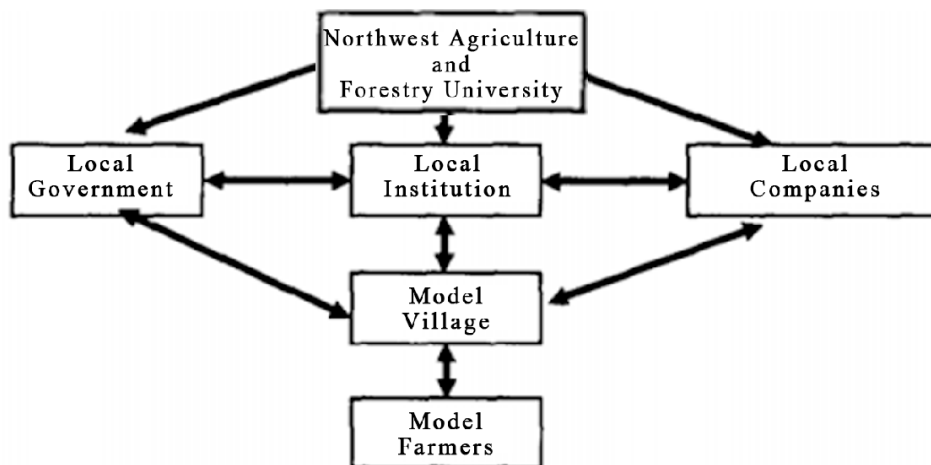


Fig 2. Extension Type of Northwest Agriculture and Forestry University

Source: L.C. An Z.D. Liu, *The Study and Practice of Agriculture Technology Extension Based on University*, Anhui Agriculture Journal, 20th 2014.

The experiences and studies in other countries were valuable to make comparison with the examples in China. The third case is Colorado State University. CSU Extension is a division of the Office of Engagement. Providing trusted, practical education to help you solve problems, develop skills and build a better future. It was established in 1912, with such long history and experiences, the extension system was well-developed and cover a wide range of industries as well as agriculture. The university has set up extension offices all over the state in Colorado. The state was divided into five regions with one regional extension office in each, meanwhile, every county also has extension office under the region. The extension model of Colorado State University is simple:

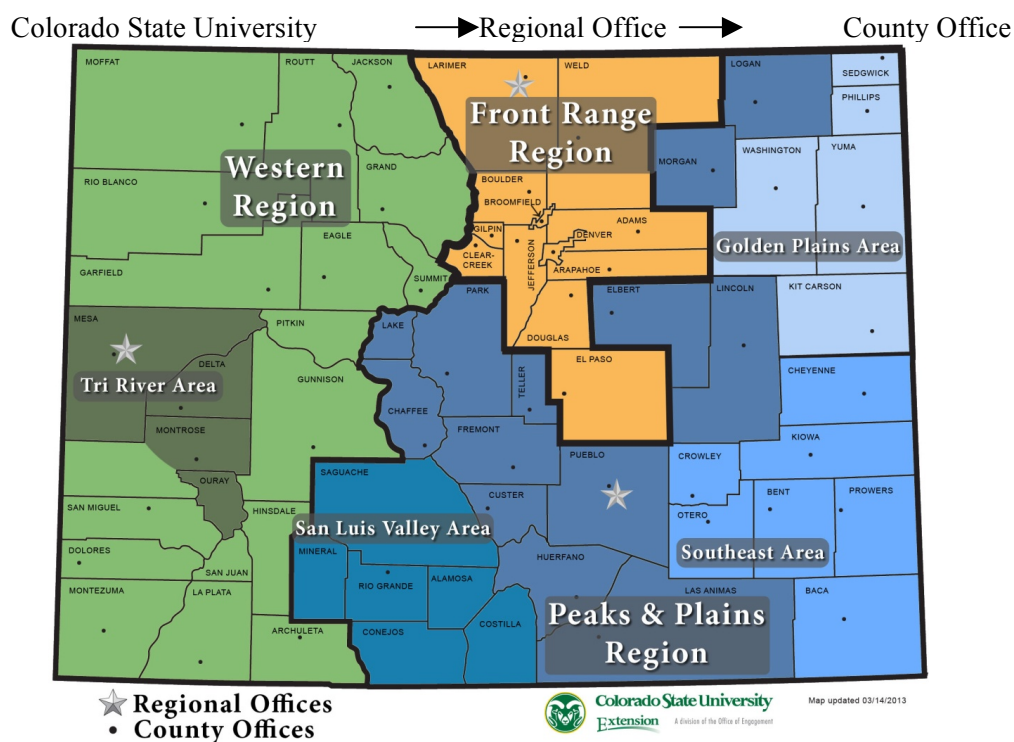


Fig 3. The map of Colorado State University Extension Office

Source: Website of Colorado State University

Even though difference exists among the three types of extensions, there are significant commonness inside. First, the university is the host of agriculture extension programs in different places which provided new technology and skilled people. Second, there are institutions build in local places with similar functions such as new technology education, new product exhibition, and etc. Third, the target of extension programs were close, which is to solve problems for local farmers and develop local agriculture. As agriculture can serve as an important engine for economic growth in the country, the extension programs have to be more practical such as solve problems of pest or disease, increase the harvest, reduce the pesticide abuse and etc.(Wang, 2017)

3. Case Study: Extension Program of Yongqiao County, Anhui Province, China

Anhui Agriculture University have launched the agricultural extension program with Yongqiao County since 2016. The agriculture has to be improved in Yongqiao County currently. The county is located in Northern Anhui Plain Area, the farmland is even and wide, therefore, grain corps and corns are widely planted in this place. With these kinds of plants, mechanization is strongly recommended to be applied in the county. However, the proportion of agricultural mechanization were not enough within the place. Some of the local farmers still use traditional method to farm which spend a lot of time and labor but it had little efficiency toward mechanical farming. New technology and skill can not be spread or applied in time due to the lack of education of local farmers. Although some local farmers have started to pay attention or even subscribe for new technology due to the agriculture extension program, it still needs to take more effort to develop the agriculture in the entire county. A institution has been built in the county as the first cooperation with university in agriculture extension. Local government has put high expect on the extension program and support enough fund for the construction of the institution. The institution have the technical support from the university and finical support from the local government, there is no doubt that it is our duty to develop local agriculture.

Currently, Yongqiao county is one of the grain production base in the province. However, the lack of mechanization has already limited the productivity so that how to help local farmers to use agricultural machines is the most urgent request. Not only because traditional ways of farming have little efficiency but also due to the price of labor was keep increasing in recent years. Meanwhile, the local produce has to be up graded due to the drastic market competition. Single farmer can hardly afford such large farming machines so that it is necessary to cooperate with other farmer or rent from companies or university. On the other hand, the education of new technology and skill is needed to use these farming machine safely. From the first short-term course of driving harvest machine, we found a large demand in the county. Many farmers are willing to study the driving course taught by the teacher from the university. It can be inferred that many other courses of new technology of farming can be set up in the county.

4. Achievements and Findings on the Extension Program

The first year of the extension program has gained significant achievements. New breed of wheat have received great attention from local farmers. It was planted in the experimental field of the university and became outstanding contrast to the local wheat breed around. The new breed has a strong ability to fight against disease, and the harvest weigh 5%-10% higher than the local wheat. Thus received a large amount of seed subscribe of the new breed in the spring of 2017. Farmers nearby the county have also came to confirm the new wheat breed and new technology, which is a good start for the extension program.

The first “Young Farmer Class” had been successfully operated in the county. It is also an important part of the extension program. The students under 24 years old had been live

and study an entire summer with local farmers, but they were being trained by the experts from the university. Their knowledge and theories had been practiced on the field which made them more industrious and skilled. The class is an attempt to discover how to educate young farmers effectively and also create their interests for farming.

The agriculture extension program is now widely launched among the universities in China. Other universities have exchange their staff of the program with Anhui Agriculture University, and some of them had came to Yongqiao county to practice. We learnt a lot from other universities, not only we learnt new techniques but also learnt the strategy to communicate with farmers with different education level. Different universities launched their extension programs in different places, thus the situations can be separated obviously. However, we have engaged similar problems such as some local farmers may refuse to study our courses, some local governments neglect the work of extension, many extension programs can hardly hire people with skill and patience and etc. Although we have made some achievements, but some problem have been emerged that we should not ignore:

a. The strategy for extension needs to be improved

Before the university set up the extension program in the county, local farmers used to follow the instructions of the local agriculture department. Even though university has served new breed and technology to the farmers, some of them cannot apply them in time. Meanwhile, because of lack of education, local farmers need to be carefully trained to use machines and new technology, otherwise it may cause dangerous result.

b. The extension program needs to be better organized

The extension program in Yongqiao county is still developing, the service and education were still rely on the personal responsibility of the teachers. There is no regulations or system to verify their work that some experts have little interests to help local agriculture. This has caused imbalance development of the local agriculture, some kinds crop were in good condition, but others are still need help.

c. Short of hands and short of function

The institution office in the county is still constructing, with no permanent place for working, the interview for new workers cannot start. Because short of hands, the plan for education has been delayed. Some of the work have to wait after the finish of the office. Therefore, current staff can only meet the basic demand of daily work, the investigation of local farmland, farming machine and farmers were incomplete which also impede the work of agriculture extension.

5. Recommendations

The increasing number of agriculture extension programs in the country have witness successful models. The impact of these program and the effect within these university which host these program is undoubted positive. However, due to the difference of location, weather and water, successful models of extension cannot be simply copied to other places. The university should carry liability to get involved in the local agriculture, investigate the basic information and solve problems for local farmers. New technology cannot be just a score for the subjects and experts should communicate with local farmer frequently to help them meet their demand. The new technology should be applied in local farming and help to increase the agriculture economy, only in that way, the agriculture extension programs can be proved irreplaceable.

6. References

- Aker, J. C. (2011). Dial “A” for agriculture: a review of information and communication technologies for agricultural extension in developing countries. *Agricultural Economics*, 42(6), 631-647.
- Q.J. Gao.(2010). Research of different agriculture extension, *Science and Technology Management Research*, 2010(5),127-130
- Y.Lu.(2017). The study of revolution and innovation of agriculture extension in China, *Science & Technology Information*, 2017(2),98-100
- Z.M Li, Q.J Gao(2012) The Study of Agriculture Extension of University, *Science and Technology Management Research*, 2012 (18), 45-50
- Q.Wang.(2017) Improve agriculture extension system to overcome new challenge, *China Rural Science & Technology*, 2017(2) ,14-15

以高校为依托的县区级新型农业合作推广模式的研究

——以宿州市埇桥区皖北综合试验站为例

张海鹏 欧阳晓宇 安徽农业大学

摘要：随着现代农业技术发展以及我国农业供给侧结构性改革的推进，以高校为依托的新型农业合作推广模式的探索与实践在全国各地积极展开。本文通过比较分析近年来国内外相关的高校依托型农业推广模式的体制、运转情况、取得成效及存在问题等方面对高校依托型农业合作推广模式进行探究，提出针对性的见解与策略。县区级的高校依托型农业推广模式多数以校地共建的机构或组织为依托，由农业高校提供新型技术、科研团队，服务人才，与地方农业主体进行对接，有效地提高新技术、新成果的推广速度，为当地农业产业发展提供精准服务。如何更快速地提高农业科技的推广速度，提高科研成果转化效率，带动地方农业经济发展，是建立高校依托型农业推广模式的最根本目的，也是地方农业的最基本需求。但作为新型推广模式，国内起步较晚，尚处在探索阶段，在模式的整体运转上与发达国家仍存在差距。本文将采用对比分析的方式，以中国农业大学、西北农林科技大学、美国科罗拉多州立大学等相关案例作为参考，并结合安徽农业大学皖北综合试验站的实例，进一步论证高校与地方在新型农业推广模式上的利弊，总结其中存在规律与经验教训。

关键词： 农业推广 校地合作 综合试验站

一、背景分析

随着现代农业技术发展以及我国农业改革的推进，新型农业合作推广模式的探索与实践在全国各地积极地展开。为了进一步提升地方农业科技水平与农产品竞争力主要的途径，以高校为依托的县区级新型农业合作推广模式也在近年来不断出现。高校作为新型农业科技的提供者与有着直接需求的当地农业产业相对接，可以有效地加快农业技术的推广速度与普及范围。同时更有针对性的对目标地区的农业产业进行微观调控与改良，从而更有效地发挥地方农业特色，增强当地农产品的市场竞争力。同时地方作为新型农业科技的载体，可以向高校提供更广阔的试验平台与更真实的试验数据反馈。

在 2017 年 2 月 5 日中共中央、国务院颁布的一号文件中，明确了在推进农业供给侧改革的抓手、平台、载体方面提出建设“三区”“三园”加“一体的政策。其中“三园”包含现代农业产业园、科技园、创业园。目的是形成现代农业产业集群，打造现代农业创新高地，同时为各类人才在农村创新创业提供扶持和服务。而建设“三园”中，首要需求就是科技与人才支持。所以，地方政府与当地农业高校开展深度合作，是确保“三园”正常建设，加速推进现代农业改革的重要手段。同时一号文件明确提出鼓励高等学校、职业院校开设相关专业和课程，培育一批专业人才，扶持一批乡村工匠。而在人才培养的方式上，能够与地方政府合作，让学生有实践操作的平台，也能进一步提升教学效果。因此，以高校为依托的新型农业推广模式，也逐步开始在全国范围内进行推广。

二、国内外相关案例

目前我国已有多所高校开展了该类型的农业推广工作，并且有许多已经取得了初步成效。例如中国农业大学的舟曲县推广模式，非常典型地将农业推广目标与曲周县当地政府目标相结合。以农户的技术需求为基础，凭借高校在当地的农业基地为平台进行扩散式农业推广。同时与当地政府及农业科研部门相互合作，形成技术集成优势，以基地及多元化的培训体系作为农业技术的推广平台，给地方农业生产带来了显著的效益提升。

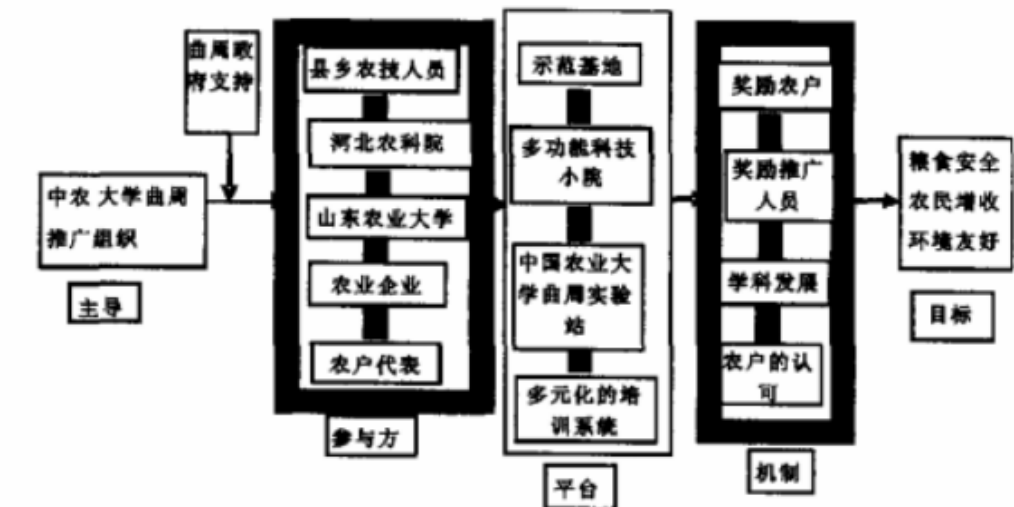


图 1 曲周县农业推广模式示意图

来源：李争鸣，高启杰《大学农业推广组织模式创新的实证研究》，科技管理研究，2012 年第 18 期。

西北农林科技大学也在农业推广领域取得了诸多进展，其以试验示范站为载体，培训和服务为两翼的科技推广模式及专家大院模式在陕西陕北以及其他省建立了 50 多个以特色项目带动地方农业发展的示范基地。经过多年的推广工作，形成了以地区特色产业主导产业的农业示范试验站为载体，多层次科技培训和多渠道信息服务网络为支撑的“一轴两翼”的推广模式。其中农业专家大院作为西北农林科技大学与宝鸡市政府探索的新型农技推广模式，与当地主要农产品集中地紧密关联，深度合作，产学研紧密结合，是高校在地方进行农业技术推广的核心之一。

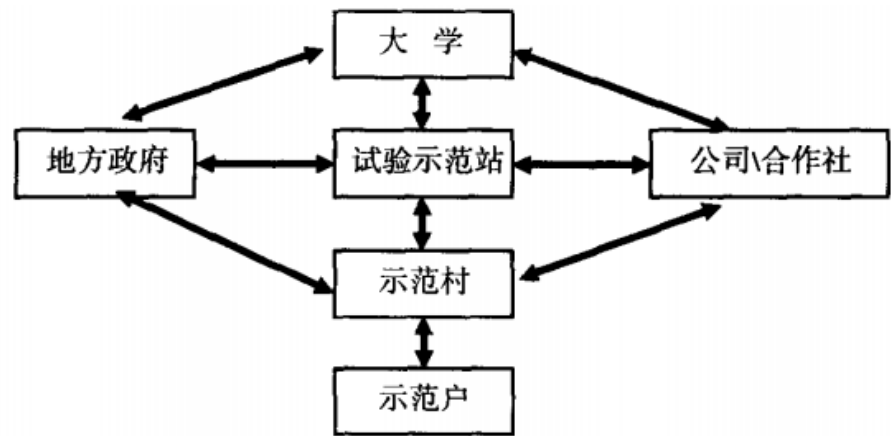


图 2 西北农林科技大学农业推广模式

来源：安成立，刘占德 《以大学为依托的农技推广模式的探索与实践》，安徽农学通报，2014 年 20 期

国外相关研究也有着重要的参考意义，以美国科罗娜多州立大学为例，其推广部门成立于 1912 年，是一个提供可靠并具操作性的教育课程的办公室合约部门来帮助目标对象解决问题，学习专业技能并开拓未来。在其涵盖内容非常广泛，其中农业推广是作为推广整体的一部分，并未单独列出，而是在地方推广办公室中安排专业对口的推广人员来帮助解决具体问题。其覆盖面非常完善，州级以下所有县区都设有推广办公室，且推广模式相对更加简洁：

科罗娜多州立大学→区域级推广办公室→县级推广办公室

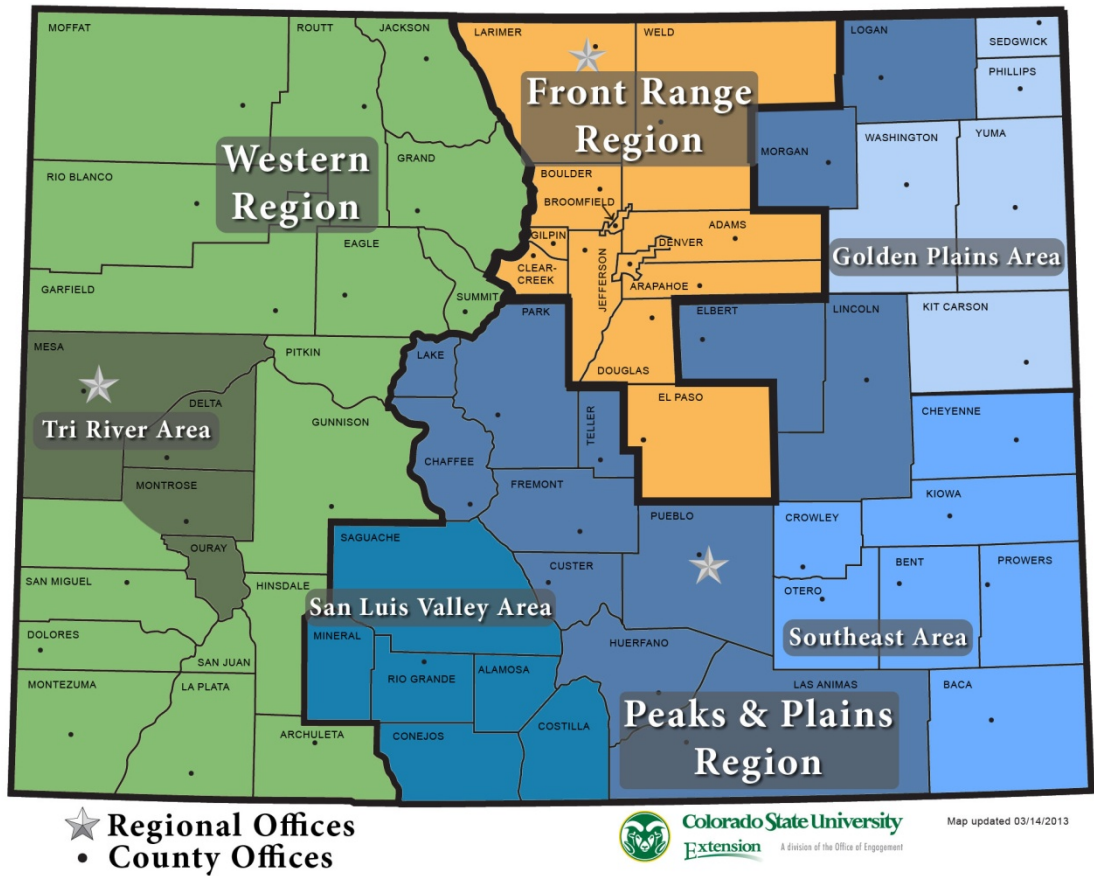


图 3 科罗娜多州立大学推广办公室分区示意图

来源：科罗娜多州立大学网站

综合以上案例，可以发现，三所高校的推广模式虽有所区别，但是也有着明显的共同点。第一，三所大学均以大学为推广主导，进行技术与人才支持；第二，从高校到地方，均有着功能相近的试点或工作机构。第三，其推广的最终目标基本一致，都是致力于解决地方实际问题，推动地方发展。

三、埇桥区地方农业推广现状

作为皖北综合试验站扎根的地区，埇桥区的农业推广存在着较多可以改良的空间。从地理位置上看，埇桥区地处皖北平原地区，地势平坦，田块面积大，以种植大田粮食作物为主，具有很大的发展现代机械化农业的潜力。然而现阶段，埇桥区农业机械化整体程度并不高，在每年农忙时节，依旧有部分农田采用传统人工方式进行收割、

播种。对于新技术、新品种的应用，虽然有部分农户与合作社与高校相互合作，及时更新，但是在区域整体的即时推广应用方面，依然需要加大广力度。皖北实验站作为当地第一所高校依托型农业推广试验站，获得了多方的关注与支持，同时也肩负着地方农业技术推广的重任。

目前，埇桥区的农业推广尚存在着部分问题，区作为安徽省重要的食生产基地，需要进一步提升新型农业技术在地方农业生产上的应用率。传统以人工为主的农业生产方式不仅效率低下，而且随着近年来人工成本的不断上升，已经越来越不符合农业市场化需求。农业合作社与农民的合作力度有待加强，传统以家庭为单位的小型农户缺乏购买大型农业生产工具的能力，也没有相应的操作技术。

四、工作取得的进展与思考

皖北实验站在第一年的玉米产业推广工作中取得了优秀的的成绩，新品种的成功落地让高标准试验田直接在当地农业的生产中形成了“活广告”，优秀的抗病抗虫害能力及出色的产量，让一部分当地的农业合作社主动寻求与安徽农业大学进行合作。随后的小麦生产，也成功地辐射了周边小片区域，当地农户主动采用了新品种与新的种植技术。取得了一定成绩的同时，也加强了与全国各所农业院校的交流与合作，相互探讨地方农业推广的心得与教训。另外，高校本部的各项农业试验也在当地取得了一系列进展，申报了多个技术专利与地方规范。在皖北站开展的“青年农场主班”，更是迈出了探索如何培养下一代农业接班人的重要一步。通过参与实际的农业生产，与农业企业对接，进行农业机械化操作培训，全方位地对学生培养。让农业教学更加贴近实际，不在游离于书本与理论知识。

但是，作为起步阶段，目前皖北站在埇桥区的农业推广虽然取得了部分成绩，但依然存在很多亟待解决的问题。

1、推广模式较为单一

埇桥区现在的主要推广模式还是依靠当地政府宣传，高校在地方影响力不够，无法快速有效地将新品种、新技术应用到当季的农业生产中。并且当地农民的受教育水平普遍一般，信息渠道有限，对新技术的学习也较为缓慢。

2、大学推广的推广机制有待改进

目前，皖北站的推广运营机制尚在完善中。在当地的农业服务与推广更多依赖于高校校内专家的责任意识与科研需求，缺乏合理的评价体系与奖惩机制，造成了在地方农业的推广上出现了向部分主导产业倾斜的现象，从而忽视了地方农业的整体发展需求。

3、人才缺乏，功能不够完善

皖北站预计建设的培训部门尚未建设完成，相关的专业性人才也尚未配备到位，因此导致很多培训及推广工作无法正常开展。同时由于缺乏工作人员，对地方的农业调研也不够深入，不够全面。

五、总结

以高校为依托的农业推广模式在各地有着成功地案例，其作用和发展空间是毋庸置疑的。但是，由于农业本身受地理位置，气候条件，水文条件等自然因素影响较大，即使成功地案例也难以在不同的地区进行复制。作为高校，其农业推广必须深入地方基层，了解当地农户的最基本需求，让农业技术与科研成果脚踏实地服务于地方农业，才能够从根本上促进地方农业发展，增加经济效益。

Aker, J. C. (2011). Dial “A” for agriculture: a review of information and communication technologies for agricultural extension in developing countries. *Agricultural Economics*, 42(6), 631-647.

高启杰. (2010). 多元化农业推广组织发展研究. *技術經濟與管理研究*, 2010(5), 127-130.

安成立, 刘占德, 刘漫道, 赵俊兴, 张超, 王逸珺, ... & 马启峰. (2014). 以大学为依托的农技推广模式的探索与实践--以西北农林科技大学为例. *安徽农学通报*, 20(20), 1-6.

梁均平. (2012). 新形势下以大学为依托的农业推广模式的思考. *现代经济信息*, (24), 376-378.

刘恩才, 李淑清, & 于和之. (2005). 我国农业推广体系改革与创新研究探讨. *农业经济*, (2), 29-31.

王强,(2017). 健全现代农业推广体系 迎接新机遇新挑战. *中国农村科技*.(2),14-15

Study on the Innovation and Reform of Grass-roots Agricultural Technology Extension System--a case of Linqun county in China

Miao Li^{1,2}, Mingdong Zang^{1,2}, Qiushi Tian², Baowei Duan², Yongqin Liang,
Zhenxiao Deng²

1.Nothwest Integrated Agricultural Experimental Station, Research Institute for New Rural Development, Anhui Agricultural University, Hefei 230036, China

2. The government of Linqun county, Anhui Province, Linqun 236400, China

Abstract: Grass-roots agricultural extension system is the leading force to the development of modern agriculture in China, is an important support for the promotion of rural social and economic development, is the building of a new socialist countryside force. In the present study, we analyze the basic situation of building of grass-roots agricultural technology extension system in Linqun county. Then we discuss some problems in the building of grass-roots agricultural technology extension system in Linqun county: the function of grass-roots agricultural technology extension center is weak; the content of agricultural technology extension is difficult to adapt to farmers' needs for

technology; the extension mode of agricultural technology departments does not adapt to the needs of modern agriculture. In order to perfect the building of grass-roots agricultural technology extension system in Linqun county, the countermeasures and recommendations are put forth as follows: we should focus on promoting the adjustment of agricultural structure, promoting agricultural industrialization, realizing agricultural efficiency and increasing farmers' income in Linqun county. We must strengthen the construction of modern agricultural extension and technology transfer system and accelerate the reform and innovation of agricultural extension system in Linqun county. Furthermore, we must strengthen the input of funds, and ensure that the basic work of public welfare agricultural technology extension is smoothly carried out; innovate upon the system, and improve the function of grass-roots agricultural technology extension center; implement management on agricultural technology extension personnel's performance, and promote the extension efficiency; strengthen the building of extension team in rural areas, and cultivating high-quality agricultural technology extension personnel; explore University-based Extension service mode to meet new farmers' needs and modern agricultural extension in Linqun county.

Key words: Agricultural Technology Extension System, Linqun county,

Introduction

To further strengthen and improve the agricultural extension system, to promote the reform and development of agricultural extension system, and to speed up the construction of agricultural extension system to meet the requirements of the development of modern agriculture, is the historical mission entrusted by the times to every agricultural man. This paper analyzes the grassroots agricultural extension system reform and construction on some attempts and innovations in Linqun County, Fuyang city, Anhui province. In order to provide a reference for the further promotion of new agricultural technology extension service system reform and development.

Results and Discussion

1. New situation faced by agricultural extension in Linqun County

Thirty years of reform and opening up, China's agricultural development has achieved fruitful results, agricultural development background has

undergone profound changes, agricultural technology promotion is facing a new situation.

Firstly, the basic position of agriculture is further strengthened. The central government has issued six "one document" continuously, locking "three rural issues", unprecedented efforts, and ushered in a major historical opportunity for agricultural development. The state has formulated "industry nurturing agriculture" and "supporting farmers" and a series of preferential agricultural policies, abolishing the agricultural tax, the implementation of a number of seeds, agricultural subsidies for agricultural production, has injected strong vitality and vigor to the "three rural" work.

Secondly, the object and field of agricultural extension service are constantly broadened. With the development of agricultural industrialization, agricultural production is gradually changed, agricultural extension is so single individual farmers are no longer as the beginning of reform and opening up, simply send a pest information, or to engage in new technology new varieties introduction, demonstration and promotion, but extended to the field of specialized cooperative economic organizations of farmers, agricultural industrialization the enterprise and the elements of agricultural production and agricultural product quality supervision.

Thirdly, the contradiction between agricultural development and

agricultural resources is becoming increasingly serious. The cultivated land area continues to decrease, the farmland irrigation facilities are aged and out of repair, the global climate warming leads to droughts and floods frequently, and the widespread application and abuse of chemical inputs seriously restrict the development of agriculture. However, the population of our country is increasing year by year, and the demand for agricultural products keeps increasing rapidly. The demand for the quality and safety of agricultural products is getting higher and higher. These contradictions are intertwined, which seriously hinders the development of agriculture.

In addition, agricultural extension service means innovation. With the development of the rural economy and modern media technology, television, network, newspapers and other modern information technology is widely used in the field of agricultural technology promotion, not only a large amount of information, and spread fast, wide coverage and profound influence.

At last, it is difficult to popularize agricultural technology. Central to the "three rural" and attaches great importance to the work of grassroots agricultural extension funds shortage contradiction, current agricultural technology extension system and the continuous development and change of the mode of agricultural production, the contradiction of farmers growing demand for science and culture and

the agricultural extension team's service ability defects of the contradiction, the rapid development of social economy and the backward agricultural extension service means conflict and seriously restricted the grassroots agricultural extension work, to improve agricultural extension services is more and more difficult.

2. Current situation of Agricultural Technology Extension in Linquan County

In recent years, continue to strengthen the county agricultural extension system construction, improve the means of promotion, increase efforts to promote science and technology and the depth of development of science and technology correspondent, agricultural science and technology to help train, "three science and technology to the countryside", crop pests professional control, standardized production technology, fertilization and other agricultural extension service activities. By vigorously implement the "science and technology training of new farmers", "sunshine project" and "technology village" project of farmer science and technology training of farmers, increase awareness of scientific farming and a substantial increase in the level of management, promote the development of agriculture and rural economy, prominent reflected in the following aspects.

The agricultural structure adjustment has achieved initial success,

and the regionalization of agricultural production has basically come into being. In accordance with the development idea of "one village, one product, one Township, one industry", the county has vigorously developed the characteristic and advantageous agricultural industry, and formed a unique production base of agricultural products with various characteristics, and constructed a new pattern of the layout of the county's agricultural industry.

The rural economic cooperation organization has developed rapidly, and new agricultural technology extension platforms have been launched. In order to adapt to the specialized production, to further improve the efficiency of agricultural production and the ability to resist risks, Linquan vigorously develop specialized cooperative economic organizations, the rural specialized cooperative economic organizations as the extension of agricultural technology promotion platform and promotion system, abundant agricultural technology promotion means, effectively promote the development of agricultural industrialization.

Agricultural extension system has been gradually improved, and the service ability has been enhanced continuously. The vast number of agricultural technicians have taken root at the grassroots level and played an important role in popularizing advanced and applicable agricultural new technologies, new varieties and carrying out scientific and technological training for farmers.

The informatization construction of villages and towns is developing rapidly, and the means of agricultural extension are becoming more and more modernized. With cable TV, fixed telephone and mobile phone, broadband and other villages to accelerate the construction of home projects, agricultural extension has not only limited guidance in the past field or technical meetings; now, the technical guidance in agricultural production, pest control, agricultural products and dynamic views of new varieties, new pesticides, new fertilizer recommendation can be issued through television, telephone, SMS, Internet and other ways, greatly enriched the agricultural technology promotion means, accelerate the speed of technology promotion.

3. Problems and difficulties in popularizing agricultural technology in Linquan

Although some achievements have been made in agricultural extension in Linquan County, there are still some outstanding problems due to various objective reasons.

Agricultural extension system is not smooth, the mechanism is not live, the ranks of instability, leading to grass-roots promotion system vitality enough. Primary agricultural technology promotion funds are few, lack of effective guarantee mechanism, extension system is difficult to play a role. The extension of agricultural technology is weak, and the age

of agricultural staff is older and knowledge is aging. The farmers' ideas are backward, and the overall quality is still low. The difficulty of agricultural extension is increased. Land circulation is slow, restricting the development of agricultural industrialization, limiting the popularization and application of advanced agricultural technology. Linquan county has a large rural population and a large arable land, but less than one mu per capita cultivated land, and the difficulty of land circulation is due to the large number of farmers involved in the scale planting. Small scale production and operation cost of a large, low efficiency, restrict the development of agricultural mechanization and industrialization, but also limits the popularization and application of advanced agricultural technology.

4. Countermeasures and suggestions for strengthening the construction of basic agricultural technology extension system in Linquan

Firstly, improving the system, innovation mechanism, and effectively strengthen the construction of agricultural extension system at the grass-roots level. Secondly, giving full play to government functions and increase support. Thirdly, innovation promotion concept, improve promotion methods. At last, encouraging U.S. and Chinese university partnership to advance agricultural research and technology transfer through university-based Extension help create all kinds of agricultural

technology demonstration integrated agricultural experimental station, demonstration park and farm, do to the farmers, farmers with a dry, guiding farmers to rely on science and Technology entrepreneurial wealth. New technology and new agricultural varieties, the introduction of the first in science and Technology Demonstration integrated agricultural experimental station (field) planting experiment, after the successful promotion to farmers, explore an introduction, testing, demonstration, promotion of new agricultural technology promotion road management and agricultural industry as a whole combination. In addition, we should further strengthen the support for rural specialized cooperative economic organizations, and promote the rapid development of agricultural industrialization through the extension of the rural economic cooperation organization as a new platform and extension system for agricultural technology popularization in Linquan county.

References

Lin HS. Reform of world agricultural extension system and its enlightenment to China. Journal of Fujian Agriculture University (Social Science Edition). 2004.

Fan SS. The Ideas of Reforming the Grass-roots Agricultural Technical Station in Fujian. Science Technology and Industry. 2007.

Gai YJ. The Enlightenment of the Agricultural Extension System of USA to Our Country. China Forestry Economy. 2006.

我国农村基层农技推广体系改革的实践与思考——以安徽省阜阳市临泉县为例

臧明东^{1,2}，李森^{1,2}，田秋实²，段保卫²，梁永勤²，邓真晓²

(1.安徽农业大学新农村发展研究院皖西北综合试验站，中国合肥，230036；2.临泉县人民政府，中国临泉，236400)

摘要：农村基层农技推广体系是我国现代农业发展的主导技术力量，是促进我国农村社会经济发展的重要支撑，是我国建设社会主义新农村的生力军。当前，应大力推动农业结构调整，推进现代生态农业产业化，实现农业增效、农民增收、农村增绿，必须加强现代农技推广体系建设，加快推进基层农技推广体系的改革和创新。近几年来，安徽省阜阳市临泉县在该项工作上做出了许多有益的探索，如与安徽农业大学共建校县合作的大学农业推广平台“一站一盟一中心”模式被列为全国重点推广模式之一。为更好地推进临泉县农技推广体系改革与建设工作，本文分析了临泉县农技推广面临的新形势、问题和困难，用科学发展观的思想提出了基于校县合作平台深入推进大学农业推广体系以加快促进农村基层农技推广体系改革的对策建议。

关键词：基层农技推广体系，临泉县，大学农业推广体系

加强和改进传统农技推广体系，推进传统农技推广体系向现代农技推广体系改革发展，加快构建适应现代农业发展要求的一主多元的现代农技推广体系，是时代赋予每个农技工作者的历史使命。本文分析了安徽省阜阳市临泉县在基层农技推广体系改革和建设上的一些尝试和创新举措，以期为进一步推进基层农技推广服务体系改革和发展提供参考。

1. 基层农技推广面临的新情况

近些年来，我国农业发展取得了巨大成就，三农问题也发生了深刻的变化，基层农技推广面临新的情况。一是农业的基础地位得到进一步加强。中央连续多年出台了“一号文件”都是关于“三农”，农业发展迎来了重大的历史机遇。国家对农业生产实行农机等多项补贴，给“三农”工作注入了强大的生机和活力。二是农技推广服务的对象和领域不断拓宽。随着农业产业化发展，农业生产方式正逐步发生改变，农技推广已不像改革开放初期那样搞个新品种新技术引进、示范、推广，而是扩展到了农民专业合作社、农业产业化企业以及农业生产各要素和农产品质量的监管等领域。三是农业发展与农业资源约束的矛盾日益严峻。耕地面积持续减少，农田水利设施老化失修，全球气候变暖导致干旱、洪涝灾害频发，化学投入品的广泛应用甚至滥用等都严重制约着农业的发展。而我国农产品需求持续较快增长，人们对农产品质量安全要求越来越高。这些矛盾交织在一起，严重阻碍着农业的发展。四是农技推广服务手段不断创新。随着农村经济和现代传媒技术的发展，网络、微信等现代信息技

术广泛应用于农技推广领域，不但信息量大，而且传播速度快、覆盖范围广。五是农技推广的难度不断加大。现行农技推广体制与不断发展变革的农业生产方式的矛盾，农民日益增长的科学文化需求与农技推广队伍自身服务能力缺陷的矛盾，社会经济迅速发展与落后的农技推广服务手段的矛盾等，都严重制约着基层农技推广工作，导致提高农技推广服务的难度越来越大。

2. 临泉县农技推广的现状

近年来，临泉县不断加强农技推广体系建设，改进推广手段，加大科技推广力度和深度，开展科技特派员、“科技三下乡”、测土配方施肥等农技推广服务活动，通过大力实施“新型职业农民培训”、“阳光工程”等农民培训工程，农民科技意识明显增强，科学种田和管理水平大幅提高，有力的促进了农业和农村经济的发展，突出体现在以下几个方面：（1）农业结构调整初见成效，农业生产区域化布局基本形成。（2）农村经济合作组织发展快速，新的家庭农场、专业合作社不断出现。（3）基层农技推广体系逐步完善，推广服务能力不断增强。（4）乡镇信息化建设快速发展，农技推广手段日益现代化。

3. 临泉县农技推广存在的问题和难点

临泉县农技推广工作虽然取得了一定的成效，但由于受多种客观原因的制约，还存在一些突出问题，主要表现在：（1）基层农技推广体制不顺、机制不活、队伍不稳，导致基层推广体系活力不够。（2）基层农技推广经费少，缺乏有效的保障机制，推广体系难以发挥作用。（3）农技

推广力量较薄弱，农技人员年龄偏大、知识老化。（4）农民思想观念落后，整体素质仍然偏低，加大了农技推广的难度。（5）土地流转较慢，制约农业产业化发展，限制了先进农业技术的推广应用。

4. 加强临泉基层农技推广体系建设的对策和建议

针对临泉县基层农技推广中存在的问题，特提出如下对策和建议：

（1）创新机制体制，切实加强基层农技推广体系建设。（2）发挥政府职能，加大扶持力度。（3）创新推广理念，改进推广方式。（4）引入大学农业推广体系，建设各类试验站、省级和国家级农业示范园、引导农民依靠科技创业致富。引进的农业新品种、新技术首先在试验站和示范园试种试验，成功后再向农户推广，探索一条引进、试验、示范、推广为一体的农业产业化经营与农技推广相结合的新路。（5）进一步加强对农村专业合作经济组织的扶持力度，将家庭农场和专业合作社作为农技推广的新平台和推广体系的延伸，推动农业产业化快速发展。

参考文献：

1. 林豪森. 世界农业推广体制变革对我国的启示. 福建农林大学学报(哲学社会科学版). 2004
2. 范水生. 对改革福建省基层农业推广站的几点思考. 科技和产业. 2007
3. 高志雄. 以试验站为依托的大学农业科技推广模式研究. 西北农林科技大学. 2013

Characteristics and influencing factors of soil respiration

Xiao Tao Email: hyytaoxiao@163.com

Abstract: Knowledge of seasonal trend and controls of soil respiration is important for understanding and predicting the global carbon cycle. In order to better understand the limiting factors affecting soil respiration, We evaluated the controls of soil respiration based on nearly two years of field measurements of soil respiration, temperature, moisture content and soil properties in twelve sites of Hefei, China. The results showed that in study periods, soil respiration rates were ranged from 1.56 to 4.27 $\mu\text{mol m}^{-2} \text{s}^{-1}$. Months and soil temperature had significant influence on soil respiration ($P < 0.05$). Soil properties that concentrated on 0-10 cm soil depth have important influence on soil respiration. That is, soil organic carbon, NO_3^- -N, P and fine root density ($R < 2\text{mm}$) had positively influence on soil respiration, however, soil dissolved organic carbon has negatively influence on it. The results of the study allow us assess possible impacts of global warming and changes of soil nutrients on soil respiration.

Key words: Soil , Soil respiration, Soil nutrients, Carbon sequestration.

1. Introduction

Soil is the major carbon pool in terrestrial ecosystems (Schlesinger and Andrews 2000), for it contains twice and three times as much C as in atmosphere and vegetation (Han et al. 2007). Soil respiration is estimated to be the largest component of carbon fluxes from soil surface to atmosphere and is important for global carbon balance (Buchmann 2000). Soil respiration includes three biological processes (root respiration, microbial respiration and fauna respiration) and controlled by complex environmental and biotic factors. Therefore, detailed information about soil respiration and its controlling factors is essential to constrain ecosystem C storage and to understand the response of soil respiration to land use change (Tufekcioglu et al. 2001; Lee et al. 2004).

In the global scale, soil temperature is considered to be a major environment factor controlling soil respiration, and has been modeled with soil respiration using linear, power and sigmoid functions. Moreover, other biotic and abiotic factors have been reported to directly and indirectly influence soil respiration, such as vegetation types (Feizienė et al. 2008), root biomass (Nadelhoffer and Raich 1992), soil moisture content (Reichstein et al. 2002), precipitation (Lee et al. 2002), soil texture (Raich and Potter 1995), soil organic carbon (SOC) content (Maestre and Cortina 2003), N, C/N ratio and P (Keith et al. 1997). While the conclusions of factors that influencing soil respiration are still inconsistent.

In order to better understand the characteristics and influencing factors of soil respiration , soil respiration and soil nutrients were investigated for nearly two years . Our specific goals were to determine the seasonal and effect of environmental factors on soil respiration. The long-term objective of the study is to assess possible impacts of predicted global warming and soil nutrients made by external disturbance on soil respiration.

2. Materials and methods

2.1 Study site and description

The study site is located in Hefei, eastern China (117°11'-117°22' E, 31°48'-31°58' N).

Zonal soil is yellow brown soil which corresponds to alfisols according to the USDA classification (Soil Survey Staff 1999). The climate is dominated by north subtropical monsoon climate with hot and humid summer and dry and cold winter. The mean annual air temperature and precipitation are 15.7°C and 1000 mm, respectively.

2.2 Soil respiration measurement

twelve sites located in Hefei were chosen for the study. To eliminate the influence of vegetation type on soil respiration, the vegetation at all sites is *Cinnamomum camphor* – *Liriope spicata* community. Soil respiration was measured using a LI-6400 portable photosynthesis system (LI-COR Inc., USA) attached with a LI-6400-09 soil CO₂ flux chamber (Jin et al, 2010). At least 24 h prior to the measurement, PVC collars (80 cm² in area and 5 cm in height) were put 2–3 cm into the soil and all live plants and litter inside the soil collars were removed to prevent aboveground plant respiration. Soil temperature at the depth of 5 cm was measured adjacent to each PVC collar at the time of the soil respiration measurement using a thermocouple connected to LI-6400. Each measurement was done 8 replications in each site.

2.3 Soil sampling and chemical analysis

At each site, three soil samples were taken randomly from 0-10 cm, 10-20 cm and 20-30 cm soil depth. All samples in the present study were analysed for soil moisture content, sand content, dissolve organic carbon (DOC), microbial biomass carbon (MBC), P, N, SOC, NH₄⁺-N and NO₃-N. The concentrations of DOC was measured in solution using MultiC/N3100 TOC analyser by shaking 30 g of field-moist soil with 50 ml 2M KCl for 15 min in 100 ml polypropylene bottles on a reciprocating shaker at a speed of 200 rev min⁻¹ (Jone and Willett 2006), the solution was also used for analyzing of NH₄⁺-N and NO₃-N using FIAStar5000 flow injection analyser (Zhang et al. 2010 A). The subsamples of 1.0 g of air-dried soil sample were wet digested with HNO₃-HClO₄ reagent, and the digestes analysed for P (Xu et al. 2000). N was analyzed using an auto Kjeldahl analyzer. SOC was determined by Walkley—Black wet oxidation (Zhang et al. 2010 B). MBC were determined by the chloroform fumigation-extraction method (Wu et al. 1990).

In each site, the biomass of fine root (R<2 mm) and small root (2 mm <R<5 mm) were assessed in 1 m² ground according that three soil depth, three replications was done when sampling. After been washed by water, the root from each size category were oven-dried at 65°C for 24h and then weighed.

2.4 Statistical analyses

Data analysis was done by SPSS 19.0 software. Soil respiration, soil temperature, and soil moisture content were compared in sites and months using analysis of variance. Possible effects of soil DOC, MBC, SOC, N, P, C/N ratio, root density and sand content on soil respiration rates were evaluated with correlation analysis. All statistics were considered significant at the P < 0.05.

3. Results

3.1 Seasonal changes of soil respiration

In all sites, soil respiration rates were ranged from 1.56 to 4.27 μmol m⁻² s⁻¹. Soil respiration differed significantly with sampling time (p<0.05), soil respiration rate increased toward June, while decreased to December (Fig. 1). The largest values of soil respiration rates

were recorded from June to August.

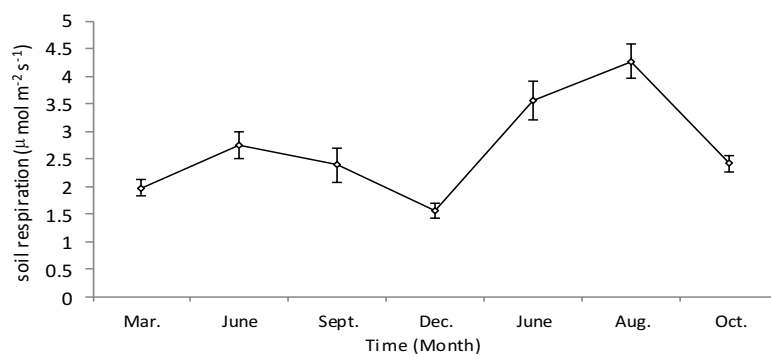


Fig. 1 Changes of soil respiration during study periods. Vertical bars represent

3.2 Effects of temperature and moisture

During study period, there was a marked seasonal pattern in temperature at 0-5cm soil depth (Fig. 2; $P < 0.05$), and a highly significant relationship between soil respiration and soil temperature (Fig. 3; $P < 0.05$).

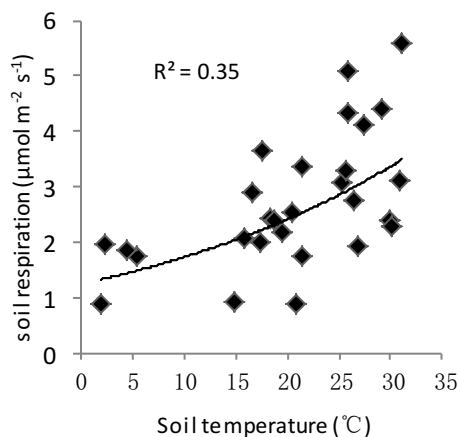
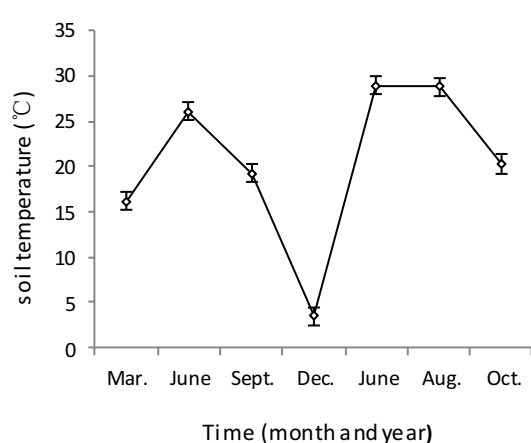


Fig. 2 Changes of soil temperature (0-5cm) **Fig. 3** Relationship between soil respiration and soil temperature

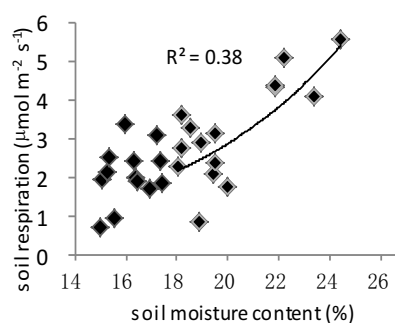
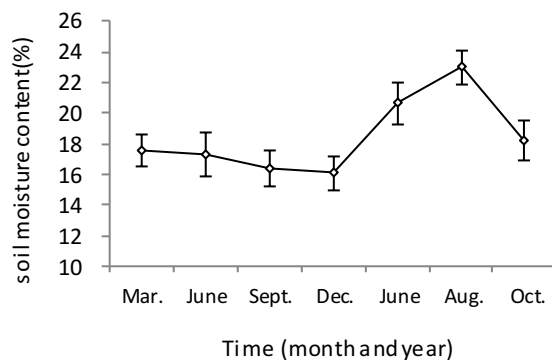


Fig. 4 Changes of soil moisture contents **Fig. 5** Relationship between soil respiration and soil moisture content

Soil moisture content differed significantly with the sampling time (Fig. 4; $P < 0.05$). The relationship between soil respiration and soil moisture appeared to fit two regressions with two levels of soil moisture contents (Fig. 5). When soil moisture was below 18%, no statistically significant relationship ($P = 0.273$) was found between soil respiration and moisture, while above 18%, soil respiration was significantly and positively correlated with soil moisture ($P < 0.01$).

3.3 Effect of soil characteristics

With regards to soil properties, because of the poor correlation among soil depth, the contents at different soil depths were used in subsequent analysis. The results from correlation analysis showed that At 0-10 cm soil depth, soil respiration was significantly and positively correlated with SOC, $\text{NO}_3^- - \text{N}$, P and fine root density ($R < 2\text{mm}$), negatively correlated with DOC. At 10-20 cm soil depth, soil respiration was significantly and positively correlated with N and P, while negatively correlated with DOC. At 20-30 cm soil depth, soil respiration was only positively correlated with fine root density (Table 1).

Table 1 Correlation matrix of soil respiration and properties

Indices	Index value range	Correlation matrix										
		1	2	3	4	5	6	7	8	9	10	11
at 0-10cm soil depth												
1-soil respiration (μmol m ⁻² s ⁻¹)	0.72-3.97	1	0.76*	-0.30	0.55	-0.70*	0.45	0.68*	-0.42	0.77*	0.38	0.89**
2-SOC content (g kg ⁻¹)	5.20-15.81		1	-0.38*	0.88**	-0.72*	0.54	0.64	-0.39	0.68*	0.36	0.67
3-N content (g kg ⁻¹)	0.80-1.93			1	-0.72*	0.12	0.24	0.02	0.42	-0.16	-0.03	-0.22
4-C/N ratio	3.40-17.24				1	-0.56	0.27	0.36	-0.50	0.50	0.23	0.43
5-DOC content (mg kg ⁻¹)	64.05-116.42					1	-0.51	-0.51	0.69*	-0.72*	-0.49	-0.40
6-MBC (mg kg ⁻¹)	104.23-348.57						1	0.76*	-0.09	0.84**	0.69*	0.38
7-NO ₃ -N (mg kg ⁻¹)	0.31-1.78							1	0.02	0.80**	0.72*	0.50
8-NH ₄ ⁺ -N (mg kg ⁻¹)	0.51-0.87								1	-0.44	-0.27	-0.23
9-P (g kg ⁻¹)	0.13-0.46									1	0.72*	0.60
10-sand (g 100 cm ⁻³)	0.19-19.06										1	0.12
11-fine root density (g m ⁻²)	37.30-314.12											1
at 10-20cm soil depth												
1-soil respiration (μmol m ⁻² s ⁻¹)	0.72-3.93	1	0.37	0.74*	-0.13	-0.70*	0.24	0.09	-0.43	0.82**	0.59	0.36
2- SOC content (g kg ⁻¹)	2.75-11.71		1	0.54	0.78*	-0.55	0.55	0.69*	0.58	0.58	0.39	0.03
3- N content (g kg ⁻¹)	0.38-1.10			1	-0.10	-0.34	0.24	-0.08	-0.13	0.52	0.19	0.29
4- C/N ratio	6.07-21.29				1	-0.39	0.52	0.88**	0.77*	0.31	0.34	-0.25
5- DOC content (mg kg ⁻¹)	64.80-105.77					1	-0.49	-0.49	-0.05	-0.87**	-0.78*	0.05
6-MBC (mg kg ⁻¹)	42.33-350.68						1	0.71*	0.07	0.57	0.73*	-0.48
7-NO ₃ -N (mg kg ⁻¹)	0.12-6.92							1	0.40	0.52	0.66	-0.25
8-NH ₄ ⁺ -N (mg.kg ⁻¹)	0.27-2.00								1	-0.18	-0.27	-0.12
9-P (g kg ⁻¹)	0.09-0.47									1	0.88**	-0.04
10-sand (g.100cm ⁻³)	0.21-10.33										1	-0.32
11-fine root density (g m ⁻²)	1.97-84.92											1
at 20-30cm soil depth												

1-soil respiration ($\mu\text{mol m}^{-2}\text{s}^{-1}$)	0.72-3.93	1	0.18	0.59	-0.48	0.36	-0.19	-0.54	-0.23	-0.15	-0.19	0.72*
2- SOC content (g kg^{-1})	2.70-12.997	1	0.70*	0.53	-0.06	-0.06	0.63	0.57	0.40	0.85*	0.56	0.46
3- N content (g.kg^{-1})	0.38-1.21	1	1	-0.22	0.05	0.05	0.31	-0.01	-0.04	0.45	0.61	0.86**
4- C/N ratio	4.29-17.13			1	-0.15	-0.15	0.57	0.83**	0.70*	0.57	0.08	-0.35
5- DOC content (mg kg^{-1})	62.02-90.31				1	1	0.36	-0.03	-0.05	-0.98**	0.10	0.07
6-MBC (mg kg^{-1})	70.47-275.53						1	0.79*	0.60	0.62	0.66	0.20
7- NO_3^- -N (mg kg^{-1})	0.09-4.23							1	0.46	0.74	0.52	-0.14
8- NH_4^+ -N (mg kg^{-1})	0.12-1.24								1	0.15	0.01	-0.09
9-P (g kg^{-1})	0.10-0.44									1	0.72	0.16
10-sand ($\text{g } 100\text{cm}^{-3}$)	0.27-6.74										1	0.32
11-fine root density (g m^{-2})	0-34.53											1

Note. *and **-data significant at probability level $P>0.05$ and $P>0.01$, respectively.

3. Discussion

4.1 Seasonal pattern of soil respiration

In the study period, mean annual soil respiration is $2.17 \mu\text{mol m}^{-2} \text{s}^{-1}$ among all sites. Soil respiration differed significantly with sampling time ($P < 0.05$), and the trend corresponds to the changes of soil temperature in temperate latitudes. This might be because the variation of soil temperature is attributable to seasonal changes of fine root biomass and photosynthetic supply, thus change the contribution of fine root respiration to total soil respiration (Widén and Majdi 2001). In addition, the changes of soil temperature could influence the activities of soil microorganisms. In normal ecosystem under certain temperature range, the more temperature is, the higher microbial respiration is. Li et al. (2002) and Epron et al. (2001) reported that seasonal changes in availability of photosynthate may affect root respiration as well as respiration of associated microorganisms because of the changes in root exudate, moreover, the fluctuations in atmospheric pressure influence the exchange of CO_2 between the soil and atmosphere (Baldocchi and Meyers 1991).

4.2 Effect of temperature and moisture

In the present study, the changing trend of soil respiration and soil temperature corresponds well to each other. During study periods, when soil moisture content within the range of 18%-25%, soil moisture content have a positive influence on soil respiration. This indicated that rates of soil respiration increased from December to June are not be only due to the soil warming, but also to the soil moisture improving from a dry state to a near optimal.

4.3 Effects of soil properties on soil respiration

Soil properties influence soil respiration through affecting the total productivity, allocation of assimilate belowground, and the quantity and quality of organic matter entering into soil (Keith et al. 1997). So, it is necessary to examine the effects of soil properties on soil respiration. In the study site, soil properties that influence soil respiration mainly concentrated on 0-10 cm soil depth indicating that properties of surface soil have important influence on soil respiration. Own result showed that soil respiration was positively correlated with SOC, NO_3^- -N, P and fine root density ($R < 2\text{mm}$), and negative correlated with DOC on 0-10cm soil depth, which was well in agreement with the previous studies.

Soil respiration positive correlated with SOC content, this may be because lower soil C content limited the microbial activities and microbial biomass, reduced the contribution of microbial respiration to soil respiration.

In the present study, P made a significant and positive correlation with soil respiration. It may be because fine roots and the root exudates were enhanced by increased P availability. However, it is not mean the more phosphors in soil the higher respiration is. When soil fertilized by P, in the longer term, it could reduce soil respiration which appeared to be due to decreasing root activity, indicating that the pattern of distribution of assimilate in the fertilized tree was changed, and the parts that enter into the soil from root turnover and exudation was reduced (Keith et al. 1997).

DOC made negatively influence on soil respiration, The may be because dissolved organic carbon bounded by heavy metal, thus showed a strong toxic effect on the soil

microbial community leading to the inhibition of microbial respiration. (Guggenberger et al. 1994).

Fine root positively influence on soil respiration through the decomposition of fine roots and the contribution of rhizosphere respiration. Similar studies reported that during growing seasons, the contribution of autotrophic respiration to total soil respiration is about 30-50% (Epron et al. 2001).

With regards to the influence of soil properties to soil respiration, the results may inconsistent in different treatments. This might be synergistic or antagonistic effects of several controls relating to environmental conditions, or to the dominance of a new control when changing the compositions of soil. The effects of soil properties on soil respiration is still poorly understood in different ecosystems, so, more attention need to be paid to quantify the nutrient-induced alterations in soil respiration.

Reference

- Baldocchi DD, Meyers TP (1991) Trace Gas Exchange Above the Floor of a Deciduous Forest 1. Evaporation and CO₂ Efflux. *J Geophys Res* 96:7271-7285
- Buchmann N (2000) Biotic and abiotic factors controlling soil respiration rates in *Picea abies* stands. *Soil Biol Biochem* 32: 1625–1635
- Epron D, Dantec VL, Dufrene E, Granier A (2001) Seasonal dynamics of soil carbon dioxide efflux and simulated rhizosphere respiration in a beech forest. *Tree Physiol* 21: 145-152
- Feizienė D, Povilaitis V, Kadžienė G (2008) Springtime soil surface respiration and soil vapour flux in different long-term agro-ecosystems. *Ekologija* 54: 216–225.
- Guggenberger G, Glaser B, Zech W (1994) Heavy metal binding by hydrophobic and hydrophilic dissolved organic carbon fractions in a Spodosol A and B horizon. *Water Air Soil Poll* 72: 111-127
- Han G, Zhou G, Xu Z, Yang Y, Liu J, Shi K (2007) Biotic and abiotic factors controlling the spatial and temporal variation of soil respiration in an agricultural ecosystem. *Soil Biol Biochem* 39: 418–425
- Jin XB, Bai JH, Zhou YK (2010) Temperature sensitivity of soil respiration is affected by nitrogen fertilization and land use. *Acta Agr Scand Section B - S P* 60: 480-484
- Jones DL, Willett VB (2006) Experimental evaluation of methods to quantify dissolved organic nitrogen (TON) and dissolved organic carbon (DOC) in soil. *Soil Biol Biochem* 38: 991-999
- Keith H, Jacobsen KL, Raison RJ (1997) Effects of soil phosphorus availability, temperature and moisture on soil respiration in *Eucalyptus pauciflora* forest. *Plant Soil* 190: 127–141
- Lee MS, Nakane K, Nakatsubo T, Mo WH, Koizumi H (2002) Effects of rainfall events on soil CO₂ flux in a cool temperate deciduous broad-leaved forest. *Ecol Res* 17: 401–409
- Lee XH, Wu HJ, Sigler J, Oishi C, Siccama T (2004) Rapid and transient response of soil respiration to rain. *Global Change Biol* 10: 1017–1026.
- Li M, Hoch G, Körner C (2002) Source/sink removal affects mobile carbohydrates in *Pinus cembra* at the Swiss treeline. *Trees* 16:331–337.
- Maestre FT, Cortina J (2003) Small-scale spatial variation in soil efflux in a Mediterranean semiarid steppe. *Appl Soil Ecol* 23: 199–209
- Nadelhoffer KJ, Raich JW (1992) Fine root production estimates and belowground carbon allocation in forest ecosystems. *Ecology* 73: 1139–1147
- Raich JW, Potter CS (1995) Global patterns of carbon dioxide emissions from soils. *Global Biogeochem Cy* 9:23–36

- Reichstein M, Tenhunen JD, Rouspard O, Ourcival JM (2002) Severe drought effects on ecosystem CO₂ and H₂O fluxes at three Mediterranean evergreen sites: revision of current hypotheses? *Global Change Biol* 8: 999–1017
- Schlesinger WH, Andrews JA (2000) Soil respiration and the global carbon cycle. *Biogeochemistry* 48: 7–20
- Soil Survey Staff (1999) Soil taxonomy: a basic system of soil classification for making and interpreting soil surveys (2nd ed.), Agriculture Handbook Number 436, US Department of Agriculture and Natural Resources Conservation Service, US Government Printing Office, Washington, DC, pp 854- 869
- Tufekcioglu A, Raich JW, Isenhardt TM, Schultz RC (2001) Soil respiration within riparian buffers and adjacent crop fields. *Plant Soil* 229: 117–124
- Widén B, Majdi H (2001) Soil CO₂ efflux and root respiration at three sites in a mixed pine and spruce forest: seasonal and diurnal variation. *Can J Forest Res* 31: 786–796.
- Wu J, Joergensen RG, Pommerening B, Chaussod R, Brookes PC (1990) Measurement of soil microbial biomass C by fumigation-extraction automated procedure. *Soil Biol Biochem* 22: 1167-1169
- Xu XN, Tokashiki Y, Hirata E, Enoki T, Nogami K (2000) Ecological studies on subtropical evergreen broad-leaved forest in Okinawa, Japan: Litter production and nutrient input. *J For Res*, 5:151-156
- Zhang K, Xu XN, Wang Q (2010 A) Characteristics of N mineralization in urban soils of Hefei, East China. *Pedosphere* 20: 236-244
- Zhang K, Xu XN, Wang Q, Liu B (2010 B) Biomass, and carbon and nitrogen pools in a subtropical evergreen broad-leaved forest in eastern China. *J For Res* 15:274–282

土壤呼吸特征及影响因素

陶晓 邮箱: hyytaoxiao@163.com

摘要: 土壤呼吸季节变化及影响因素的研究对全面预测全球碳循环起到重要作用。为系统研究土壤呼吸影响因素, 本研究在安徽省合肥市选取 12 块研究地, 并对其土壤呼吸、土壤温度、土壤水分、土壤养分进行了近两年的观测。研究结果表明, 研究期内土壤呼吸范围为 $1.56\text{--}4.27\ \mu\text{mol m}^{-2}\text{ s}^{-1}$, 月份及土壤温度对土壤呼吸影响显著 ($P < 0.05$)。0-10 cm 土壤养分含量对土壤呼吸产生重要影响, 即: 土壤呼吸与土壤有机碳含量, 硝态氮、全磷及细根($R < 2\text{mm}$) 含量呈显著正相关, 与土壤溶解性有机碳含量呈显著负相关 ($P < 0.05$), 本研究对预测全球变暖及土壤养分变化对土壤呼吸的影响起到重要意义。

关键词: 土壤, 土壤呼吸, 土壤养分, 碳固滞

引言

土壤是陆地生态系统重要碳库 (Schlesinger and Andrews, 2000), 其碳储量分别是大气、植被碳储量的 2 倍和 3 倍 (Han 等. 2007)。土壤呼吸是土壤与大气碳交换的重要过程, 对全球大气碳平衡起到重要作用 (Buchmann, 2000)。土壤呼吸包括三个重要的生物学过程 (根系呼吸、微生物呼吸及动物呼吸), 且受环境及生物因素的综合影响。因此, 对土壤呼吸特征及影响因素的研究, 对深入理解土壤碳循环及环境变化对土壤呼吸的影响具有重要意义。

在全球范围内, 土壤温度被认为是影响土壤呼吸的重要环境因子, 且在不同的生态系统中, 可用线性、曲线较好的拟合两者的关系。此外, 前人研究表明, 其它生物和非生物因素亦直接或间接地影响土壤呼吸, 如植被类型 (feizienė 等. 2008)、细根生物量 (Nadelhoffer and Raich, 1992)、土壤水分含量 (Reichstein 等. 2002)、降水 (Lee 等. 2002)、土壤质地 (Raich and Potter, 1995)、土壤有机碳 (SOC) 含量 (Maestre and Cortina, 2003)、N、C/N 和 P (Keith 等. 1997)。但在不同生态系统中, 影响土壤呼吸因素的结论仍不一致。

为了更好的了解土壤呼吸的特征和影响因素, 本研究通过对土壤呼吸和土壤养分进行了近两年的观测, 以确定土壤呼吸的季节性变化及环境因素的影响。本研究对评估全球变暖和土壤养分变化对土壤呼吸的可能影响起到重要作用。

1 材料及方法

1.1 研究地概况

本研究选取中国东部城市合肥 (117°11'- 117°22'E, 31°48'- 31°58'N) 为研究区域。地带性土壤为黄棕壤 (Soil Survey Staff 1999)。气候以北亚热带季风气候为主, 夏季炎热湿润, 冬季寒冷干燥。年平均气温和降水分别为 15.7°C 和 1000 毫米。

1.2 土壤呼吸测定

在合肥郊区选取 12 块样地为研究地, 为消除植被类型对土壤呼吸的影响, 研究地植被类型均选取香樟-麦冬配置模式。采用 Li-6400 便携式光合作用测定系统测定土壤呼吸 (LI-COR 公司, 美国)。测量前至少 24 小时, 将 PVC 土壤呼吸环 (面积为 80 cm²) 埋入土壤, 并清除土壤圈内所有活的植被及凋落物。用仪器自带的土壤温度电耦测试 PVC 环旁 0-5 cm 土壤温度, 测量时每个样地 8 次重复。

1.3 土壤样品采集及化学分析

在每个样地, 按照 0-10cm, 10-20cm 和 20-30cm 土层深度随机采集三个土壤样品。用便携式保温箱带回实验室进行土壤含水量、含砂量、溶解有机碳 (DOC)、微生物生物量碳 (MBC), P, N, SOC, NH₄⁺-N 和 NO₃⁻-N 分析。根系及沙砾采回后, 用水快速冲洗样品表面的滞尘, 除去余水后分别置于 65°C、105°C 干燥箱中烘干至恒重后称重。

DOC 测定方法: 称取 30 g 鲜土放入 50 mL 的 2 mol/L 的 KCL 溶液中, 震荡 30 min, 静置后用 0.45 μm 玻璃纤维滤膜过滤 (Jones and Willett, 2006), 用 Multi N/C 3100 分析仪测定 DOC, 用 FIAstar 5000 流动注射分析仪测定 NH₄⁺-N, NO₃⁻-N (Zhang 等. 2010 A)。全 P 采用高氯酸-浓硝酸消煮法制备, 滤液使用 FIA Star 5000 流动注射仪测定 (Xu 等. 2000)。MBC 采用氯仿熏蒸-K₂SO₄ 浸提法 (Wu 等. 1990)。其它指标采用常规方法进行测定 (Zhang 等. 2010 B)。

1.4 数据分析

数据经 Excel-2007 整理后, 采用 SPSS18.0 进行统计分析。用方差分析检验不同月份中土壤呼吸、土壤温度、土壤含水率是否差异显著; 运用相关分析土壤呼吸与 DOC、MBC、NH₄⁺-N、NO₃⁻-N、SOC、N、P、C/N 比、根系生物量及沙砾含量间的关系进行分析。

2 结果

2.1 土壤呼吸的季节变化

研究期内，样地土壤呼吸速率为 $1.56\text{--}4.27\ \mu\text{mol m}^{-2}\text{ s}^{-1}$ 。采样时间对土壤呼吸影响显著 ($p<0.05$)，土壤呼吸速率 6 月上升，12 下降 (图 1)。从 6 月到 8 月，土壤呼吸速率最大。

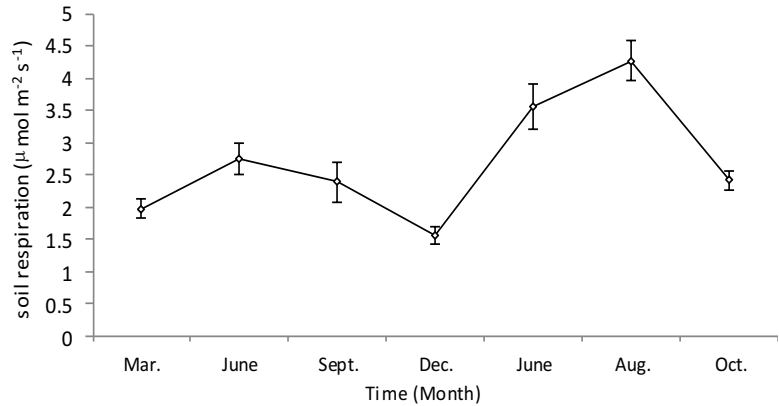


图. 1 土壤呼吸的季节变化

2.2 土壤温度及含水率对土壤呼吸的影响

研究期间，在 0-5cm 土层温度季节变化明显 (图 2, $P<0.05$)，且土壤温度对土壤呼吸影响显著 (图 3, $P<0.05$)。

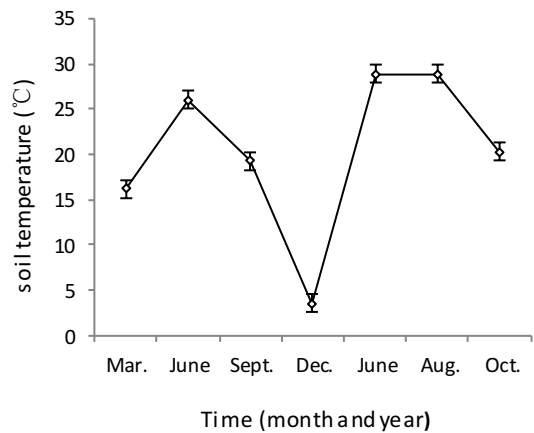


图. 2 土壤温度变化 (0-5cm)

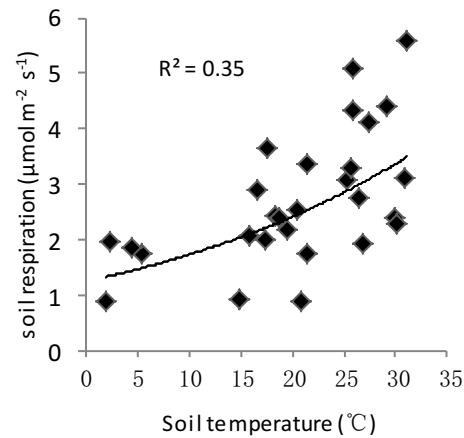


图. 3 土壤呼吸与土壤温度间的关系

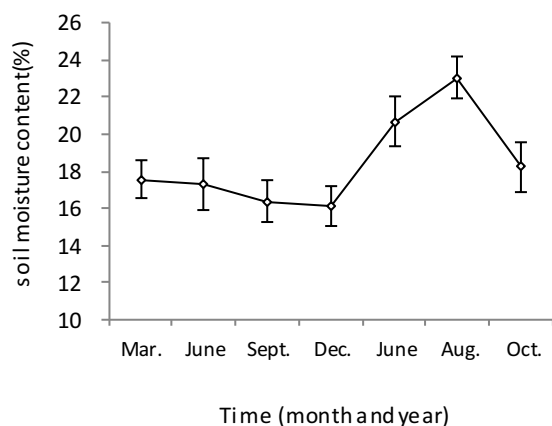


图. 4 土壤含水率变化

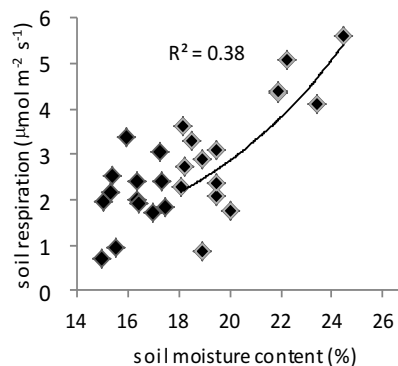


图. 5 土壤含水率与土壤呼吸间的关系

土壤含水率随时间变化显著 (图 4, $P < 0.05$)。土壤含水率在 18% 以下时, 土壤呼吸与水分之间无显著相关 ($P = 0.273$), 土壤含水率在 18% 以上, 土壤呼吸与土壤含水率呈显著正相关 (图 5, $P < 0.01$)。

2.3 土壤养分含量对土壤呼吸的影响

相关分析的结果表明, 土壤呼吸与 0-10 cm 土层 SOC、 NO_3^- -N、P 和细根密度呈显著正相关, 与 DOC 呈显著负相关。与 10-20 cm 土层氮、磷呈显著正相关, 与 DOC 呈负相关。与 20-30 cm 土层中细根密度呈正相关 (表 1)。

Table 1 土壤呼吸与土壤养分间的相关性

指标	指标范围值	相关性										
		1	2	3	4	5	6	7	8	9	10	11
0-10cm 土层												
1-土壤呼吸 (μmol m ⁻² s ⁻¹)	0.72-3.97	1	0.76*	-0.30	0.55	-0.70*	0.45	0.68*	-0.42	0.77*	0.38	0.89**
2-SOC 含量(g kg ⁻¹)	5.20-15.81		1	-0.38*	0.88**	-0.72*	0.54	0.64	-0.39	0.68*	0.36	0.67
3-N 含量(g kg ⁻¹)	0.80-1.93			1	-0.72*	0.12	0.24	0.02	0.42	-0.16	-0.03	-0.22
4-C/N	3.40-17.24				1	-0.56	0.27	0.36	-0.50	0.50	0.23	0.43
5-DOC 含量(mg kg ⁻¹)	64.05-116.42					1	-0.51	-0.51	0.69*	-0.72*	-0.49	-0.40
6-MBC (mg kg ⁻¹)	104.23-348.57						1	0.76*	-0.09	0.84**	0.69*	0.38
7-NO ₃ -N (mg kg ⁻¹)	0.31-1.78							1	0.02	0.80**	0.72*	0.50
8-NH ₄ ⁺ -N (mg kg ⁻¹)	0.51-0.87								1	-0.44	-0.27	-0.23
9-P (g kg ⁻¹)	0.13-0.46									1	0.72*	0.60
10-砂砾含量 (g 100 cm ⁻³)	0.19-19.06										1	0.12
11-细根密度 (g m ⁻²)	37.30-314.12											1
10-20cm 土层												
1-土壤呼吸 (μmol m ⁻² s ⁻¹)	0.72-3.93	1	0.37	0.74*	-0.13	-0.70*	0.24	0.09	-0.43	0.82**	0.59	0.36
2-SOC 含量(g kg ⁻¹)	2.75-11.71		1	0.54	0.78*	-0.55	0.55	0.69*	0.58	0.58	0.39	0.03
3-N 含量(g kg ⁻¹)	0.38-1.10			1	-0.10	-0.34	0.24	-0.08	-0.13	0.52	0.19	0.29
4-C/N	6.07-21.29				1	-0.39	0.52	0.88**	0.77*	0.31	0.34	-0.25
5-DOC 含量(mg kg ⁻¹)	64.80-105.77					1	-0.49	-0.49	-0.05	-0.87**	-0.78*	0.05
6-MBC (mg kg ⁻¹)	42.33-350.68						1	0.71*	0.07	0.57	0.73*	-0.48
7-NO ₃ -N (mg kg ⁻¹)	0.12-6.92							1	0.40	0.52	0.66	-0.25
8-NH ₄ ⁺ -N (mg kg ⁻¹)	0.27-2.00								1	-0.18	-0.27	-0.12
9-P (g kg ⁻¹)	0.09-0.47									1	0.88**	-0.04
10-砂砾含量 (g 100 cm ⁻³)	0.21-10.33										1	-0.32
11-细根密度 (g m ⁻²)	1.97-84.92											1
20-30cm 土层												

1-土壤呼吸 ($\mu\text{mol m}^{-2} \text{s}^{-1}$)	0.72-3.93	1	0.18	0.59	-0.48	0.36	-0.19	-0.54	-0.23	-0.15	-0.19	0.72*
2-SOC 含量(g kg^{-1})	2.70-12.997		1	0.70*	0.53	-0.06	0.63	0.57	0.40	0.85*	0.56	0.46
3-N 含量(g kg^{-1})	0.38-1.21			1	-0.22	0.05	0.31	-0.01	-0.04	0.45	0.61	0.86**
4-C/N	4.29-17.13				1	-0.15	0.57	0.83**	0.70*	0.57	0.08	-0.35
5-DOC 含量(mg kg^{-1})	62.02-90.31					1	0.36	-0.03	-0.05	-0.98**	0.10	0.07
6-MBC (mg kg^{-1})	70.47-275.53						1	0.79*	0.60	0.62	0.66	0.20
7-NO ₃ -N (mg kg^{-1})	0.09-4.23							1	0.46	0.74	0.52	-0.14
8-NH ₄ ⁺ -N (mg kg^{-1})	0.12-1.24								1	0.15	0.01	-0.09
9-P (g kg^{-1})	0.10-0.44									1	0.72	0.16
10-砂砾含量 ($\text{g } 100 \text{ cm}^{-3}$)	0.27-6.74										1	0.32
11-细根密度 (g m^{-2})	0-34.53											1

注. *, **-分别表示在 $P>0.05$ and $P>0.01$ 水平上相关。

3 讨论

3.1 土壤呼吸的季节变化

研究地土壤呼吸均值为 $2.17 \mu\text{mol m}^{-2} \text{s}^{-1}$ 。土壤呼吸与月份有显著性相关 ($P < 0.05$)。这可能是由于土壤温度的变化导致细根生物量和光合产物的季节性变化,从而改变根系呼吸对土壤呼吸的贡献率 (Widén and Majdi, 2001)。此外,土壤温度的变化也会影响土壤微生物活性。在一定温度范围内,土壤温度越高,微生物呼吸作用越强。Li 等 (2002) 和 Epron 等 (2001) 报道,光合产物的季节性变化可能通过影响根系分泌物进而影响根系呼吸及与呼吸相关的微生物的活性。同时,大气压力的变化也影响土壤与大气之间的 CO_2 交换 (Baldocchi and Meyers, 1991)。

3.2 土壤温度及土壤含水量对土壤呼吸的影响

在本研究中,土壤呼吸和土壤温度的变化趋势较吻合。研究期间,当土壤含水量在 18% - 25% 范围内时,土壤含水量对土壤呼吸有积极影响。这表明,12 月至 6 月土壤呼吸速率的增加不仅是由于土壤温度的增加,而且得益于土壤水分状态的改善。

3.3 土壤养分状况对土壤呼吸的影响

土壤养分通过影响生物量生产、分配,及进入土壤的有机质数量和质量进而影响土壤呼吸 (Keith 等, 1997)。因此,研究土壤养分对土壤呼吸的影响非常有必要。本研究表明,0~10 cm 表层土壤性质对土壤呼吸有重要影响,土壤呼吸与 SOC、 NO_3^- -N、P 和细根密度 ($r < 2\text{mm}$) 呈正相关,与土壤 DOC 含量呈负相关,这也与前人研究结果较一致。

土壤呼吸与 SOC 含量呈正相关,这可能是因为土壤碳含量低限制了微生物活动和微生物生物量,进而降低了微生物呼吸对土壤呼吸的贡献。P 与土壤呼吸呈显著正相关。这可能是 P 的有效性增加提高了细根和根系分泌物,进而增加了根系呼吸对土壤呼吸的贡献。然而,这并不意味着土壤中的 P 越多,呼吸就越高。当土壤磷摄入过多时,从长远看,它可以降低降低根系活性进而降低土壤呼吸 (Keith 等, 1997)。

DOC 对土壤呼吸有消极影响,可能是由于重金属附着于 DOC 中,进而对土壤微生物群落有较强的毒性作用,从而抑制微生物呼吸 (Guggenberger 等, 1994)。细根密度通过细根分解及根际呼吸对土壤呼吸产生影响及贡献。类似的研究表明,在生长季节,自养呼吸对土壤总呼吸的贡献约为 30-50 % (Epron 等,

2001)。

土壤性质对土壤呼吸的影响在不同生态系统中，其研究结果可能不一致。这主要由于在不同的环境条件各影响因素形成协同或拮抗作用，或者形成新的控制因子。土壤性质对土壤呼吸的影响在不同生态系统中的研究仍显不足，因此需要更多地关注土壤养分变化对土壤呼吸影响方面的研究。

参考文献

- Baldocchi DD, Meyers TP. Trace Gas Exchange Above the Floor of a Deciduous Forest: 1. Evaporation and CO₂ Efflux. *J Geophys Res.* 1991, 96:7271-7285.
- Buchmann N. Biotic and abiotic factors controlling soil respiration rates in *Picea abies* stands. *Soil Biol Biochem.* 2000, 32: 1625–1635.
- Epron D, Dantec VL, Dufrene E, Granier A. Seasonal dynamics of soil carbon dioxide efflux and simulated rhizosphere respiration in a beech forest. *Tree Physiol.* 2001, 21: 145-152.
- Feizienė D, Povilaitis V, Kadžienė G. Springtime soil surface respiration and soil vapour flux in different long-term agro-ecosystems. *Ekologija.* 2008, 54: 216–225.
- Guggenberger G, Glaser B, Zech W. Heavy metal binding by hydrophobic and hydrophilic dissolved organic carbon fractions in a Spodosol A and B horizon. *Water Air. Water Air Soil Poll.* 1994, 72: 111-127.
- Han G, Zhou G, Xu Z, Yang Y, Liu J, Shi K. Biotic and abiotic factors controlling the spatial and temporal variation of soil respiration in an agricultural ecosystem. *Soil Biol Biochem.* 2007, 39: 418–425.
- Jin XB, Bai JH, Zhou YK. Temperature sensitivity of soil respiration is affected by nitrogen fertilization and land use. *Acta Agr Scand Section B - S P.* 2010, 60: 480-484.
- Jones DL, Willett VB. Experimental evaluation of methods to quantify dissolved organic nitrogen (TON) and dissolved organic carbon (DOC) in soil. *Soil Biol Biochem.* 2006, 38: 991-999.
- Keith H, Jacobsen KL, Raison RJ. Effects of soil phosphorus availability, temperature and moisture on soil respiration in *Eucalyptus pauciflora* forest. *Plant Soil.* 1997, 190: 127–141.

- Lee MS, Nakane K, Nakatsubo T, Mo WH, Koizumi H. Effects of rainfall events on soil CO₂ flux in a cool temperate deciduous broad-leaved forest. *Ecol Res.* 2002, 17: 401–409.
- Lee XH, Wu HJ, Sigler J, Oishi C, Siccama T. Rapid and transient response of soil respiration to rain. *Global Change Biol.* 2004, 10: 1017–1026.
- Li M, Hoch G, Körner C. Source/sink removal affects mobile carbohydrates in *Pinus cembra* at the Swiss treeline. *Trees.* 2002, 16:331–337.
- Maestre FT, Cortina J. Small-scale spatial variation in soil efflux in a Mediterranean semiarid steppe. *Appl Soil Ecol.* 2003, 23: 199–209.
- Nadelhoffer KJ, Raich JW. Fine root production estimates and belowground carbon allocation in forest ecosystems. *Ecology.* 1992, 73: 1139–1147.
- Raich JW, Potter CS. Global patterns of carbon dioxide emissions from soils. *Global Biogeochem Cy.* 1995, 9:23–36.
- Reichstein M, Tenhunen JD, Rouspard O, Ourcival JM. Severe drought effects on ecosystem CO₂ and H₂O fluxes at three Mediterranean evergreen sites: revision of current hypotheses? *Global Change Biol.* 2002, 8: 999–1017.
- Schlesinger WH, Andrews JA. Soil respiration and the global carbon cycle. *Biogeochemistry.* 2000, 48: 7–20.
- Soil Survey Staff. Soil taxonomy: a basic system of soil classification for making and interpreting soil surveys (2nd ed.), Agriculture Handbook Number 436, US Department of Agriculture and Natural Resources Conservation Service, US Government Printing Office, Washington, DC, pp. 1999, 854- 869.
- Tufekcioglu A, Raich JW, Isenhardt TM, Schultz RC. Soil respiration within riparian buffers and adjacent crop fields. *Plant Soil.* 2001, 229: 117–124.
- Widén B, Majdi H. Soil CO₂ efflux and root respiration at three sites in a mixed pine and spruce forest: seasonal and diurnal variation. *Can J Forest Res.* 2001, 31: 786–796.
- Wu J, Joergensen RG, Pommerening B, Chaussod R, Brookes PC. Measurement of soil microbial biomass C by fumigation-extraction automated procedure. *Soil Biol Biochem.* 1990, 22: 1167-1169.
- Xu XN, Tokashiki Y, Hirata E, Enoki T, Nogami K. Ecological studies on subtropical

- evergreen broad-leaved forest in Okinawa, Japan: Litter production and nutrient input. *J For Res.* 2000, 5:151-156.
- Zhang K, Xu XN, Wang Q. Characteristics of N mineralization in urban soils of Hefei, East China. *Pedosphere.* 2010 A, 20: 236-244.
- Zhang K, Xu XN, Wang Q, Liu B. Biomass, and carbon and nitrogen pools in a subtropical evergreen broad-leaved forest in eastern China. *J For Res.* 2010 B, 15:274–282.