

# Oregon Agricultural College Extension Service

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Director

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Cooperative Extension Work in Agriculture and Home Economics  
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## REPORT OF THE Klamath County Agricultural Economic Conference

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AGRICULTURAL COLLEGE  
23 JUL 1927  
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Klamath Falls, February 9 and 10, 1927

OUTLINING A  
COUNTY AGRICULTURAL PROGRAM

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#### ACKNOWLEDGMENT

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## INTRODUCTION

THIS bulletin is published in order to have on record the findings and recommendations of the various groups that made up the Klamath County Agricultural Economic Conference held at Klamath Falls February 9 and 10, 1927.

For several weeks previous to the conference, a careful and detailed study of the county's agriculture was made by various committees of local business men and farmers, assisted by specialists of the Extension Service of Oregon State Agricultural College. Crops and livestock production, actual and potential, transportation facilities, distribution costs, and many other problems confronting the farmers were reviewed in committee. The recommendations made by these committees were submitted to the conference, considered, and with certain modifications finally adopted.

Taken together, these reports form a foundation upon which to build a county agricultural program. Individually the reports constitute a guide to the most approved practices in the production and marketing of the county's chief agricultural products.

It is not to be expected that this conference will bring success to every producer in the county. It is, however, a beginning in the right direction. Its ultimate value will depend upon the extent to which the recommendations made will be effected.

The conference opened with an attendance of seventy-five of the county's most representative farmers and closed the second day with more than one hundred in attendance.

# Minutes of the Conference

## Opening Session, February 9, 1927.

The Klamath County Agricultural Economic conference was called to order at 10:40 a.m. February 9, 1927, by Chairman Roy Nelson, in the assembly room of the City Library. The purpose of the conference was explained briefly by the chairman.

Mr. F. L. Ballard, county agent leader of Oregon State Agricultural College, was introduced and gave a talk on the development of economic conferences, setting forth the causes and reasons for such conferences and the results to be expected from them.

Mr. C. A. Henderson, county agent, briefly outlined the development of agriculture in the county and explained the program of the present conference. The various committees and their chairmen were announced and meeting places assigned to each.

Meeting adjourned at 11:25 a.m., and committees met at assigned places.

## Concluding Session, February 10, 1927.

The second session of the Klamath County Agricultural Economic conference was called to order at 1:30 p.m. February 10, 1927, by Chairman Roy Nelson, in the assembly room of the City Library. Mr. A. C. Cooley was introduced and gave a talk on agricultural reclamation work on United States Reclamation projects.

On call of the chairman, the report on club work was read by Mrs. Nellie C. Whitlatch, chairman of the committee. Mrs. Whitlatch moved that the report be adopted. The motion was seconded and carried.

The farm management report, on call of Mr. Nelson, was presented by Chairman U. E. Reeder. Motion was made by Mr. Reeder that the report be adopted. The motion was seconded and carried.

Report of the dairy committee was called for and was read by Mr. Ray Loosley, chairman of the committee. Mr. Loosley moved that the report be adopted. The motion was seconded and carried.

Report of the poultry committee was called for and presented by Dr. F. M. Trout, chairman pro tem. of the committee. Dr. Trout moved for the adoption of the report. The motion was seconded and carried.

Report of the rabbit committee was called for and was presented by Mr. H. R. Milner. Mr. Milner moved that the report be adopted. The motion was seconded and carried.

The potato committee report was next presented by Mr. Henry Semon, chairman of the committee. Mr. Semon moved that the report be adopted. Motion was seconded and carried.

Report of livestock committee was called for and presented by Mr. H. A. Lindgren, secretary. Mr. E. M. Hammond, chairman of the committee, moved that the report be adopted. Motion was seconded and carried.

Report of truck crops committee was called for and presented by W. H. Hawkins. Mr. Hawkins moved that the report be adopted. Motion was seconded and carried.

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Mr. M. K. Wiley, president of the Idaho Grimm Alfalfa Growers Association, was introduced by the chairman. He gave a short talk on Ladino clover as it is being used in Idaho at the present time.

The chairman called for the report of the farm crops committee, which was presented partly by Mr. Charles Mack, chairman of the committee, and partly by Professor George R. Hyslop, secretary. Mr. Mack moved that the report be adopted. The motion was seconded and carried.

Mr. U. E. Reeder moved that these reports be published for future reference. Motion was seconded and carried.

The meeting was declared adjourned by the chairman at 4:10 p.m.

—W. WRAY LAWRENCE, Secretary.

# Boys' and Girls' Clubs Report

## Achievements

Boys' and girls' club work in Oregon is conducted by the United States Department of Agriculture, the Oregon State Agricultural College, and the State Department of Education, cooperating.

The County Court of Klamath county has made appropriations during the past six years for club work in this county.

Practically all projects of club work have been carried on since the work was organized. Boys and girls have been enrolled each year and a high percentage have completed their work. From 25 to 40 standard clubs have been organized each year.

From 30 to 75 Klamath county club members have attended the boys' and girls' Summer School at Corvallis each year.

Livestock judging teams have been trained and have competed with other teams at the County and State fairs and at the Pacific International Livestock Exposition. A potato grading team from Klamath county participated in a contest at the Pacific International in 1926.

Canning and breadmaking teams have also given demonstrations at the County and State fairs.

Club picnics and tours have been held each year.

## Club Recommendations

1. That the club projects in the county coincide as far as possible with the recommendations of this conference.

2. That a definite, concerted effort be made to secure a larger enrollment of boys than at present, though still keeping the interest of the girls.

3. That the following boys' projects be stressed:

Potato  
Farm Accounts  
Dairy Calf  
Herd Record  
Poultry  
Rabbit

4. That the social side of club work be used in bringing out desirable qualities in club members.

5. That the number of club members sent from Klamath county to the Summer School at Corvallis be limited to approximately 50 members, and that only those doing outstanding work be taken on this trip.

6. That the public be encouraged to look upon club work as one phase of education.

Signed:

FRED PETERSON, Chairman, Klamath Falls  
MRS. NELLIE WHITLATCH, Merrill  
ROY NELSON, Keno  
FRANK SEXTON, Secretary, Klamath Falls  
Club Committee.

# Dairy Committee Report

## I. PRESENT CONDITIONS IN THE DAIRY INDUSTRY

The size of the dairy industry of Klamath county can be measured fairly accurately, because practically all the milk sold is handled by factories located within the county. Reports from these factories indicate that in 1926 production of butter-fat totaled 966,339 pounds.

It is not known exactly how much was produced in 1919, but from the values indicated by the census of that year it appears that there was an increase of more than 350 percent in the production from 1919 to 1926. Most of the milk produced in 1919 was sold in the form of cream for butter or ice-cream manufacture or for use as market milk. No cheese was made in the county in 1919.

In 1926 the total value of manufactured products including bottled milk is estimated at \$636,716. This includes 579,672 pounds of creamery butter and 393,000 pounds of cheese, the latter product being developed since 1919. In 1919 there were 2585 dairy cows of milking age in the county, while it appears that in 1926 there were about 5500.

Information carefully obtained shows that the production of butter lacked about 100,000 pounds of meeting the requirements of the county in 1926. About that much butter was imported, while practically none was exported. Most of the cheese made in the county was exported, while at the same time, more than 20,000 pounds was imported.

Manufacturing facilities in the county are good. The existing plants offer a market for all milk produced. There is no present need for enlarging or extending these facilities. It appears that prices being returned to the farmer are satisfactory. Prices offered for raw product are sufficient to keep practically all of that produced from being shipped out of the county.

Marketing facilities for butter are good since practically all is sold on local markets at prices as high as competition with butter made outside the county will permit.

There has been a steady increase in the number of dairy cows. There is sufficient butter imported at this time to make a market for the product of from 600 to 800 cows of producing ability equal to that of the average cow in the county. To put it another way, if the average production of the cows in the county was increased about 10 percent this increased production would produce sufficient butter to replace the annual imports.

It is estimated that the average production per cow is about 180 pounds of fat a year. While this compares favorably with the statewide average it is much lower than it should be when the favorable feed conditions are taken into consideration.

## II. OUTLOOK FOR FURTHER DEVELOPMENT

There can be no question that the dairy industry can be safely expanded until all local demands are satisfied. It is not out of place at this time to consider conditions that have a bearing on the advisability of

development in excess of meeting local requirements. It is not necessary in this report to recite all the facts with reference to the present or possible crop resources of the county. A few essentials will make clear the basis for the committee's recommendations.

There is a large acreage of excellent alfalfa raised in the county. The acreage can be expanded. This means that there is and can always be available an abundant supply of cheaply produced legume hay, essential to cheap milk production. Under irrigation at least 20 tons of roots can be grown on an acre of land at an estimated cost of production of about \$3.00 a ton. This gives a very satisfactory succulent feed to go with an unlimited hay ration. Irrigated pasture on a conservative estimate should return via the dairy cow about \$38 to \$40 an acre, net. Enough barley can be grown on the project to supply all the grain that it would be desirable to feed to the cows. The bulk of production should be made on good hay, roots, and pasture, with grain being fed to only the highest producing cows and then only in limited amounts.

While the Fort Klamath section of the county presents a somewhat different problem than does the irrigated section, it also possesses opportunities which with the right system of management are possibly more favorable to the production of high quality products at a low cost than the rest of the county. The important thing to remember with reference to the production resources is that there is an abundant supply of good forage potentially available, and that cheap production is made with good forage.

The best market at the present time for all of Oregon's surplus dairy products is in California. It will probably be many years before that market becomes oversupplied with western products, if ever, but if it should become difficult to sell on that market the lower production costs that can be realized in this county will more than overcome the effect of overstocking the market, with consequent lowering of prices. No part of Oregon except that part that has water transportation can ship to California cheaper than can Klamath county. None of Idaho, Utah, or the other important competing areas can compete with Klamath county on transportation costs to the southern markets, which is another advantage enjoyed by the county.

Tables I and II showing freight and express rates on a comparative basis illustrate this point.

TABLE I. FREIGHT RATES PER CWT. ON BUTTER

To San Francisco From:	Carlot rate	Minimum weight	Less than car- lot rate
Klamath Falls .....	\$1.10½	20,000	\$1.34
Medford .....	1.11½	20,000	1.36
Redmond .....	1.52½	20,000	1.71½
Portland .....	.58	20,000	.58
Yakima .....	1.32½	20,000	1.50
Boise .....	1.64	24,000	2.31
Wallowa .....	1.41½	20,000	1.74
Enterprise .....	1.45	20,000	1.76½

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TABLE II. EXPRESS RATES PER CWT. ON BUTTER

To San Francisco	
From :	
Klamath Falls .....	\$1.78
Medford .....	1.78
Portland .....	2.52
Redmond .....	3.64
Enterprise .....	3.94
Yakima .....	3.79
Boise .....	3.83

It is entirely reasonable to expect that Klamath county whole milk and sweet cream will before many years be shipped direct to San Francisco for market milk consumption. Already preparations are made to ship fluid milk from Siskiyou county, California, to the bay region. Klamath county is but a few miles farther north, with excellent transportation facilities.

It is seen, therefore, that production costs are more favorable than the competing producing regions and that the market outlet appears to be as favorable as one could expect. On the basis of this reasoning the committee feels that there is room for material expansion in the dairy industry in Klamath county, consistent with good management of the dairy herds and intelligent marketing of the product.

### III. RECOMMENDATIONS TO GUIDE EXPANSION

There is no exception to the necessity of following the well known principles of good dairy cattle management in this county. They should all be followed. There are certain points that the committee feels should be emphasized if the industry is to make the most rapid progress in its development.

#### 1. Herds Should be of Size to be Independent Units

It has been repeatedly demonstrated that with larger herds there are found better methods of management and lower production costs. It is not conceivable that any community will become highly developed in dairying unless it can compete with other localities by maintaining low production costs. A community does not become important as a dairy center where dairying is conducted as a side issue to some other enterprise, or only as a means of paying the family living costs. A real dairy industry can be developed only by following methods that will make it a permanent part of the agriculture of the country. This means that herds should be maintained of sufficient size to enable them to stand alone as a unit on any one farm. This does not mean that one should specialize on dairy cattle only. The idea is that herds should be of sufficient size so that if other important farm enterprises should be suddenly eliminated the dairy unit will still be an economically operated and profit-producing unit.

There is room for unlimited specialization in dairying, if one desires to specialize. Specialization is to be encouraged. With the use of milking machines, large units can be handled with low labor costs. Milking machines can be used effectively on herds with as few as 10 or 12 cows.

For the sound development of the industry, the committee feels that where dairying is a part of a diversified system herds should be standardized on a basis of from 12 to 15 cows; and that where specialization is practiced, a herd with a minimum of 25 cows and a maximum of unlimited size should be operated.

## **2. Feeding Methods can be Improved**

Hay should be the basis of all winter production, while pasture should be the basis for summer production. With hay as the main part of the ration, every effort must be made to produce and cure it so as to retain most of the leaves and with fine stems. Poorly cured hay has no place in the dairy cow's ration. Roots can be cheaply raised and stored for winter use as a succulent.

Pasture will return an annual income of nearly \$40 net per acre through the average dairy cow, and much more through good cows.

The standard ration for the county should be good hay, roots, and pasture. This can be supplemented with a small amount of barley or oats, which can be grown on the farm. Where there is any indication of a mineral deficiency, sterilized bone-meal should be fed as a mineral supplement. It is recognized, of course, that there are small localities and probably individual farms where these rations should be modified, but as a basis from which to work the above recommendations can be considered standard for the county.

## **3. Better Cattle**

Two problems are presented in attaining a goal of better dairy cattle. First is improvement in cattle already in the county, and second is introducing new cattle.

The first goal can be reached fairly easily by culling out the poor cows and improving the herds through pure-bred sires. A cow-testing association should be organized this spring and a campaign put on to eliminate the 50 percent of scrub sires in the county.

It is easier and safer to breed cattle than to buy them. This county is reasonably free from that great scourge of dairy cattle, infectious abortion. It should be kept so. No cattle of breeding age should be brought into the county unless tested and found to be free from this disease, or found to be from herds that are not infected. To be sure of this no one should purchase cattle except with the advice of the county agent or some one qualified to help protect the buyer from this danger. The possibility of purchasing calves of known ancestry offers an opportunity of increasing the cow population of the county at a low cost and with reasonable safety from disease and is to be encouraged. It is better to develop slowly in the dairy business and avoid abortion disease infection with its consequent great economic losses than to rush in and acquire the infection.

## **4. Dairy-minded Farmers Needed**

Dairy cows cannot be milked from horseback. The proper management of a dairy herd requires attention to many details that may seem trivial to those with little or no dairy cattle experience. Nevertheless,

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the successful dairyman is he who pays proper attention to these details. Unless one is willing to handle dairy cows as they must be handled to make the business a success, he should not go into the business. There are so many leaks through which the profits will disappear that those who do not care to inform themselves regarding these leaks are warned that under improper management methods failure may come as quickly as success can be expected. For real success in the dairy business the county needs many more dairymen of the type of those whose success is now outstanding. Those contemplating starting in the dairy business will do well to follow the lead of the most successful dairymen.

### 5. Definite Work to be Done

The committee recommends that this dairy committee should be made permanent and that it should hold at least one annual meeting for the purpose of reviewing the situation and as many other meetings as are necessary to the welfare of the industry.

The committee further announces its intention to do the following things this year, under the leadership of the county agent:

- (a) Organize a cow-testing association this spring.
- (b) Put on a pure-bred bull campaign to replace the scrub dairy sires in the county with pure bred before January 1, 1928.

Respectfully submitted,

R. S. LOOSLEY, Chairman  
H. A. TALBOT, Plevna  
CLYDE BRADLEY, Merrill  
FRED MCKENDREE, Merrill  
J. L. JACOB, Malin  
O. F. GLICK, Malin  
JOE MICKA, Malin  
G. P. SHAMHART, Merrill  
S. NICHOLSON, Ft. Klamath  
PERCY MURRAY, Klamath Falls  
EARL SIMMONS, Klamath Falls  
JOHN REBER, Malin  
G. A. THOMA, Merrill  
P. F. KIELSMEIER, Klamath Falls  
JOE WRIGHT, Miller Hill  
MONROE LYTLE, Bonanza  
U. E. REEDER, Pine Grove  
G. P. KELLER, Langell Valley  
MRS. ROBERT ADAMS, Merrill  
E. D. SMITH, Malin  
P. M. BRANDT, Secretary, O. A. C.  
Dairy Committee.

# Farm Crops Committee Report

The latest estimate on the value of crops in Klamath county is \$1,223,183 for the 1924 crop year. This production consisted principally of hay, followed by grain and potatoes. The principal acreage of hay is alfalfa, followed by wild grass and small grain. The returns from the hay and grain have been such in recent years that farmers are looking for more profitable crops.

The biggest change to date is an increase in the potato acreage. The potato crop is being considered in a special report.

Another change that has taken place, partly as a result of high labor cost, is a tendency to increase returns in pasture.

## I. PASTURES

### Pasture Returns

Practically any of the soils under irrigation may be successfully used for pasture, provided a good stand is established with the right pasture mixtures. Many of the thin lands, wet places, and somewhat alkaline soils may be more profitably used for pasture than for any other crop. Excellent pastures are also being developed on some of the peat lands, although experience on these soils is not as conclusive as on the other soils in the project.

### Pasture Plants

Probably the best all-around pasture plant for any except alkali soils is Kentucky blue-grass. Other permanent grasses and legumes include orchard grass, common white clover, and giant or Ladino clover. The less permanent grasses to provide pasture while the others are getting established are English rye grass and timothy. For the alkali soils the Zawadke Alkali Grass is best where the alkali is strong. Where not so strong, yellow or white biennial sweet clover is one of the most productive pastures. These sweet clovers may often be included in some of the non-alkali pastures, especially if water shortage is likely to develop in the summer.

### Seed for Pastures

Only high class seed should be used. Where good seed is used, relatively small quantities per acre are sufficient to get good stands. All grass seed should be tested for purity and germination previous to planting.

### Planting Methods

The seed-bed for pasture should be moist, and in order to retain moisture near the surface it should be firm rather than loose. This is especially true on the peaty lands. Pasture may be planted any time during the growing season. Permanent pasture on the irrigated uplands may be planted any time during the growing season, provided there is time to get it well established before cold weather sets in.

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Good stands are secured either by broadcasting and harrowing in or by drilling. There must be plenty of moisture to assure germination. Stands may be secured by drilling pasture seed in old and thin stands of alfalfa.

On the peat lands best results have been obtained by planting in early spring or in late August or September. With spring planting, the land should be rolled.

### Water Requirements

Permanent upland pastures should be irrigated every 10 to 14 days throughout the growing season, under most conditions here. The grass must be kept growing.

On the peat lands flooding about every 2 weeks is necessary because of the shallow rooting system.

### Length of Pasture Season

The season on permanent pasture usually runs 5½ to 6 months. Sweet clover furnishes good pasture for about 5 months.

### Carrying Capacity

Good permanent grass will carry per acre during the pasture season from 6 to 8 ewes and their lambs, or 2 cows. Good sweet clover will carry 3 cows per acre. Good blue-grass pasture on the peat lands will carry 6 to 8 ewes and their lambs from early April to last of October. The permanent grass pastures in the Fort Klamath district will carry one 700- to 800-pound steer to every acre and a half.

### Pasture Mixtures

A recommended mixture for irrigated upland is:

- 4 lbs. rye grass
- 3 lbs. timothy
- 3 lbs. Kentucky blue-grass
- 3 lbs. orchard grass
- 1 lb. white clover, or preferably Ladino clover.

This mixture sowed at 10 pounds to the acre will cost about \$4.50.

For the peaty soils:

- 5 lbs. timothy
- 3 lbs. alsike
- 3 lbs. orchard grass
- 4 lbs. blue-grass
- 1 lb. Ladino clover.

For the alkali land, Zawadke's Alkali grass alone at 2 pounds per acre is best.

For medium alkali land sweet clover at 8 to 10 pounds is most desirable.

For some of the wet, non-alkali peaty lands, Reed's canary grass is probably the best grass.

### Dry Land Seeding

The sowing of grasses on dry land has been so generally unsuccessful that it is not recommended. The grass showing best results so far is crested wheat grass, but its production under Klamath rainfall conditions is somewhat doubtful.

### Pasture Management

Keeping stock off the pasture when it is soft or too young early in the spring, irrigating when necessary, scattering of manure, occasional spreading of manure on the pasture, occasional reseedling of worn-out stands, and rotation grazing are practices which usually make pasture most productive. Probably the greatest opportunity in pasture improvement lies in the inclusion of more Ladino clover in the pastures.

## II. SEED PRODUCTION

Seed production presents another opportunity in developing our agriculture so as to produce paying and salable crops. The United States annually imports large quantities of alfalfa, red, alsike and white clover seed, all of which may be successfully produced in Klamath county. Freight rates by rail to Portland thence by boat to Baltimore, which serves a large seed-consuming territory, are \$1.22½ per hundred, as compared to a rail rate of \$3.30 to \$3.67½ to midwestern points.

There is little danger of overproducing any of these seed crops, especially red and alsike clover.

Oregon annually imports large quantities of alfalfa seed, and there is a good market for it in the Mississippi Valley as well.

### Alfalfa Seed

Grimm alfalfa seed is in greatest demand. It rarely produces good seed yields where stands are thick and the growing conditions are good for a good hay crop.

The best seed yields are usually secured where stands are thin and growing conditions not too good. Thin soils, very light irrigation so plants sometimes suffer somewhat for water, slightly alkaline soils, serious competition with grass, injury to roots and similar unfavorable conditions often stimulate better seed production. It is recommended that certified Grimm seed production be tried on a small scale to find its suitability to Klamath conditions. Because of length of growing season it is recommended that the first crop be saved for seed.

### Red, Alsike, and White Clover for Seed

Red clover is the only clover grown on a commercial seed basis in the county to date. Alsike and white clover always seem to fill well and produce seed where small trials have been made.

All except the alkali soils on the project are suited to the production of clovers. The peaty, low and wet soils are more adapted to alsike, white and Ladino clover.

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No clover seed business will be successful without good seed. Hardy strains of red clover are particularly important. All seed with dodder, plantain, and similar weeds should be avoided.

Several methods of getting a stand may be used. Sulfur usually helps in getting stands established. Methods of planting are as follows:

- (a) Sow with grain in April, with press drill.
- (b) Plant grain in the spring. When it needs irrigation, drill in the clover seed and then irrigate. This usually takes place in June.
- (c) After grain is harvested, drill clover seed into the stubble about August 15. Irrigate immediately if there is not enough moisture in the soil to bring up the crop.
- (d) On weedy land sow alone after a short fallow.

White and Ladino clovers are suited to level moist lands. Great care in their harvest is involved to save the seed. These clovers are better suited to specialists, red and alsike clover being better as general farm crops.

Alsike clover is the most consistent producer of seed and is suited to the wetter soils. The first crop is taken for seed, and it is not pastured back or clipped.

There is room in Klamath county for an annual production of from 8,000 to 12,000 acres of clover seed, or about 50 cars.

The farm returns from clover seed are high, and as equipment and methods are worked out the crop is likely to prove the most profitable on the project.

### **Management for Red Clover Seed**

Clip or pasture back as early in the spring as possible and still get all the weeds. It is preferable to do this not later than May 20 to June 1 to avoid frost loss in the late summer and fall.

Irrigations required will vary with soils and seasons. Two irrigations are usually required to produce the seed crop. The first irrigation is given when the plants first show signs of drying. This is usually between the 1st and 10th of June, under average conditions. Another irrigation usually comes in about three weeks. Irrigations should be made with light applications of water.

### **Harvesting Red and Alsike Clover**

The seed is valuable and should be saved. It is ready to cut when the heads are brown, well filled and the seed is hard. High geared mowing machinery is desirable, especially with thick stands. When mowers are used it is best to use a bunching attachment to leave the seed in bunches. Probably the best harvest machine is the self-rake reaper. Mowers and rakes are used when other equipment is not available. Raking must be done only when the clover is tough and at best will cause some shattering. Clover bunches or shocks should be small to dry out readily.

Hulling or threshing should take place as soon as the clover is dry. Threshing from the fields is good practice where possible. Where there is delay, stacking to get it off moist land is often desirable. Stacks should be topped with straw to keep them dry in case of rain. A huller is the best machine, but a grain thresher with hulling attachment may be used. The straw should be examined carefully for seed as it sometimes pays to rethresh it to get all the crop. This is especially true after a grain thresher.

Good cleaning equipment is necessary to put clover seed in marketable condition, as the trade requirements are very strict.

Red and alsike clover may be expected to yield about 5 bushels an acre.

It is recommended that red and alsike clover seed crop be harvested two years in succession and then plowed up and other crops put in, as in a four-year rotation, including potatoes and grain.

### III. GRAINS

Grain on diversified irrigated farms is largely a rotation crop to use in getting stands of clover and alfalfa and to provide feed for farm use. Grain is a major crop on Tule Lake, where production is on rented or leased land. Grain on dry lands is not profitable except in years of good rainfall.

#### **Seed-bed for Grains**

Grain after cultivated crop like potatoes requires only disking, harrowing, and sowing. On stubble land or after sod, plowing is necessary. The seed-bed should be moist and firm to bring up the grain quickly.

#### **Wheat Varieties**

The most commonly grown wheat varieties are Marquis, Burbank, and Bluestem. Federation is used to a limited extent. Federation has so generally outyielded the other varieties elsewhere that it should be thoroughly tested to determine its place here.

#### **Barley Varieties**

For the project lands Hannchen and Trebi are the best varieties. Hannchen makes a particularly heavy grain of high quality.

Trebi is a stiff-strawed barley suited to rich soils where lodging is bad. Club Mariout is a particularly early variety, that does well on late Tule Lake lands, but the straw is weak and harvest losses are sometimes high.

#### **Oat Varieties**

No standard oat varieties are grown. It is recommended that some new oats be established in the county. Good varieties are Markton for the cold sections, Swedish Select, Golden Rain, and Silvermine.

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### Grain Demonstrations

The County Agent's office is requested to conduct grain demonstrations to determine which varieties are best and to establish a local seed supply.

### Seed Treatment

Copper carbonate is the standard treatment for wheat. Formaldehyde is the best treatment for oats and barley. All seed should be treated to prevent smut.

### Seeding

The time and rate of sowing vary in different sections and on different soils. Recommended rates of sowing in pounds per acre are:

	Wheat	Oats	Barley	Rye
Dry land .....	30 to 35			25 to 30
Tule Lake .....	50	50 to 80	40 to 70	
Irrigated land .....	60	80	60 to 70	

These rates for irrigated lands are lower than those used in many other irrigated sections.

Grain sowing should take place as early as reasonably prompt germination will permit. This will vary from April 1 to June 10.

### Irrigation of Grain

Usually only one irrigation is given to grain. This is usually after it is up and shades the ground.

### Harvesting Grain Crops

Because of uneven ripening, binding, even though an expensive harvest method, is most generally practiced on the irrigated lands. Headers and combines are used on dry land and Tule Lake lands where farms are larger.

### Market for Grain

The local mill consumes most of the grain although a good deal goes to Portland and San Francisco. In 1926, 80 cars were reported shipped out of the county.

## IV. ALFALFA

Alfalfa is the most important forage crop in the county, occupying about 17,500 acres. Yields on the project average about 3 tons an acre and on Tule Lake about 4.2 tons an acre. The important thing in alfalfa production is to get good stands of the right variety.

### Variety

On account of its long life, hardiness, resistance to disease, and unfavorable conditions and its ability to produce a heavier tonnage, Grimm alfalfa is recommended as the standard variety. Only certified seed can be depended upon.

### Sulfur Application

Sulfur on alfalfa produces substantial increases in yield. The crude or powdered sulfur is the cheapest form to use. Applications of 100 pounds in fall or early spring, about every four years, are recommended.

### Disposition of the Crop

Most of the crop is and should be fed to livestock. The new rail-road lines and rates have opened outside markets for the hay. A total of 38 cars was shipped out to Northern California and Willamette Valley points in 1926. On the other hand alfalfa and other hay was shipped in for logging camp use.

Alfalfa for sale should be well cured, clean, fine, leafy, and free from weeds and dead stuff. It must be of good color. Good alfalfa hay is usually cut when about one-tenth in bloom. It is cured and stacked as quickly as possible. While it is probably best to feed most of it at home, new transportation rates will make a wider market for the crop.

## V. SUCCULENT FEEDS

Succulent feeds such as silage and roots are especially desirable for dairy cattle and ewes, and are good for other stock. With cheap hay there is less demand for such crops. These feeds are especially good before, during, and after lambing time.

### Silos and Silage Crops

Silos are rather expensive and because of first cost and expensive filling machinery are less popular than a few years ago. The development of trench silos provides a cheap, easily filled, and convenient storage place for succulent feed. Trench silos are cheaper than above-ground silos and more satisfactory than pit silos.

The best silage crops for the county are peas and oats, sunflowers, and sweet clover.

### Roots

Mangels and Half Sugar beets are generally successful. Half Sugar, Long Red, Giant, Intermediate, and Red Eckendorf are good varieties. Carrots are also good yielders and produce well in some cases where beets do not do well. Yellow Giant and Chantenay are good varieties.

In some cases difficulty is experienced in getting stands of mangels and carrots. This is often because of loose seed-beds and too-deep planting. Occasionally it is caused by old dead seed. Root land should be well manured to produce good yields. With low yields the cost per ton is too high.

## VI. DRAINAGE AND IRRIGATION

Considering the fact that adequate drainage is so vital to good production and that all loaning agencies lay so much stress on it when making loans, the committee recommends that the proper drainage be provided as soon as possible for all lands needing it. The committee further recommends that farmers use greater care in preparing their

lands for irrigation and adopt those practices in handling water which will reduce to the minimum the dangers of poor irrigation practices.

### VII. WEEDS

Conditions under irrigation are ideal for weed spread. Weeds are estimated to cause a reduction in production of from 3 to 10 percent. The common annuals probably do the worst damage. They include lambs-quarters, Russian thistle, tumbleweed, and mustard. Bull thistles are a serious pasture weed. Among the perennials wild morning-glory, death-weed and quack-grass are worst. Perennial weed patches should be kept isolated and worked separately to avoid spread by roots. All tools should be cleaned off after plowing or working the patches. The clean culture method is considered the best control method. Plowing followed by heavy stands of alfalfa is considered the best method of death-weed control although eradication is not assured.

It is recommended that each community take up the matter of weed control on farms, and with the Reclamation Service, highway and railway officers seek to prevent spread from rights of way.

CHAS. MACK, Chairman, Spring Lake  
 E. A. GEARY, Klamath Falls  
 HENRY SEMON, Henley  
 C. A. HILL, Mt. Laki  
 MONROE LYTLE, Bonanza  
 O. A. SCHULTZ, Henley  
 LUTHER HASKINS, Merrill  
 D. E. ALEXANDER, Rock Creek  
 F. J. BOWNE, Bonanza  
 U. E. REEDER, Pine Grove  
 ROY NELSON, Keno  
 R. E. BRADBURY, Pine Grove  
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 E. M. HAMMOND, Merrill  
 JESS JOHNSON, Spring Lake  
 L. A. WEST, Spring Lake  
 IRA OREM, Spring Lake  
 G. R. HYSLOP, Secretary, O. A. C.  
 Farm Crops Committee.

# Potato Committee Report

## I. PRESENT SITUATION AND OUTLOOK

Klamath county occupies an enviable position in Oregon and Northwest potato production. Production conditions here are very favorable for the development of an important and permanent industry. Transportation facilities and freight rates are such that Klamath potatoes may enter California markets under less railroad freight handicap than can potatoes from any other important potato section of Oregon or Washington, except Portland. Boat shipments to California port cities are somewhat cheaper than rail rates from Klamath. A few rates are set forth in Table III.

TABLE III. FREIGHT RATES PER 100 POUNDS ON POTATOES

To Northern California points	From					Grandview	
	Klamath Falls	Redmond	Portland	Tacoma	Yakima	Wapato	Pocatello, Idaho
San Francisco .....	36	†43½	†25½	*28½	*36½	---	---
Sacramento .....	36	58½	35½	47	55	---	---
Stockton .....	36	58½	35½	47	55	---	---
Red Bluff .....	31½	58½	42½	62½	55	---	---
Willows .....	35½	58½	42½	62½	55	---	---
Chico .....	34½	58½	42½	62½	55	---	---
To Southern California points							
Los Angeles .....	---	†65½	†40½	*47	*60½	---	---
Pasadena .....	53	81½	56½	76½	76	53	---
San Pedro .....	60	81½	60	80	76	---	---
Riverside .....	59	†59½	†40½	*41	*54½	---	---
Bakersfield .....	63½	81½	63½	80	76	---	---
Santa Barbara .....	49½	72½	49½	69½	69	---	---
San Diego .....	56½	79½	56½	76½	76	---	---
	†70½	†97	†74	†85½	†93½	---	---
	§63½	86	63	74½	82½	---	---
	---	---	---	†50	---	---	---

\*Applies via boat from Seattle, Tacoma or Portland.

†Applies via boat from Portland.

‡Applies to shipments billed through.

§Applies only on cars reshipped from Stockton or San Francisco via A. T. & S. F.

Charges must be paid to Stockton or San Francisco and new bill of lading issued handling same as a local shipment from Stockton or San Francisco to San Diego.

¶By boat direct.

Klamath potato quality is such as to command a strong position in the market. This market must be safeguarded by sending out only good stock under the Klamath name.

### Climate Suited to Potato Production

Weather data and experience of committee members indicate that the Klamath project generally enjoys climatic conditions and a growing season suited to production of large yields of late, or main crop, potatoes. Frost frequently cuts down potatoes, especially on the lower lands, but as a rule yields are good. The growing season is cool, making for good table quality and good seed quality.

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### Water Supply is Adequate

The district has an unusually dependable water supply, and water is generally available when needed.

### Potato Growing Soils Extensive in Area

Klamath county soils are generally suited to potato production. Most are mellow. Many are well drained. Many have been in alfalfa. Potato soils typical of the Klamath project are listed below: Yakima sand, Yakima sandy loam, Yakima fine sandy loam, Yakima loam, Klamath fine sandy loam, Klamath loam and peat.

TABLE IV. SOIL TYPES FOR POTATO GROWING

District	Total potential potato area (Acres)	Area too wet, alkaline, or not under ditch (Acres)	Approximate land ready for potatoes now (Acres)	Area within long haul market distance (Acres)	Area within market distance at present (Acres)
Langell Valley.....	15,450	10,450	5,000	5,000	-----
Bonanza District	17,180	9,180	8,000	-----	8,000
Poe Valley.....	8,730	5,730	3,000	-----	3,000
Klamath Falls to Merrill .....	46,100	26,100	20,000	-----	20,000
Merrill to Adams Point .....	8,220	6,220	2,000	-----	2,000
Adams Point to Malin .....	15,320	5,320	10,000	10,000	-----
Malin .....	4,000	-----	1,000	1,000	-----
Tule Lake .....	10,000	5,000	1,000	1,000	-----
Totals .....	125,000	68,000	50,000	17,000	33,000

Of the area within marketing distance at present there can be approximately 8,250 acres in potatoes each year, based on a four-year rotation of potatoes, grain, and clover seed 2 years.

This indicates that there is land for expansion of the industry as rapidly as the market can absorb the increase.

### Yields Compare Favorably With Other Districts

The acre yield of potatoes in Klamath county compares favorably with other important counties in the leading potato states. Production per acre of the ten leading counties in Michigan ranges from 61 to 175 bushels an acre with average production for those counties of from 82 to 109 bushels. The six leading west slope counties of Colorado produce from 135 to 210 bushels an acre under irrigation. This compares favorably with Washington and Idaho. Aroostock county, Maine, is the banner county, producing 201 to 333 bushels an acre a year, the total production being from 21 to 36 million bushels annually.

Klamath county production is estimated at about 150 to 240 bushels an acre, with a total production cost per acre in 1926 of nearly \$100.

### Increase in Potato Acreage Should be Conservative

Production and shipments of potatoes from Klamath Falls have increased rapidly during the past three years. Shipments in 1924 were 27

cars; in 1925 they totaled 135 and in 1926 they were 368. These are exclusive of probably 20 to 25 cars trucked out to adjoining counties. The rapid increase in production has been due in part to favorable rates and a recognition of the advantages of the industry and in part to two good price years.

While there is plenty of land and water for expansion, the tendency for 1927 is to plant a large acreage. The estimated increase for the year in the United States is 13 percent and for Oregon as a whole from 15 to 25 percent. The 1926 crop in the United States was big enough.

Klamath production should increase conservatively. Large increases in acreage by "wild-catters" seeking to make a killing in one year are almost certain to bring over-production and will demoralize the industry and prices. Potato farmers should not break up their rotation to put in more potatoes on the eve of a low priced year. The natural advantages of Klamath county justify a larger production, but a price of 80c per hundred is too low for any profit, except for experienced men getting large yields.

Success in the industry depends on large yields and low costs per bushel. The varieties, practices, and methods recommended for Klamath county follow.

## II. PRODUCTION IN RELATION TO GRADE

### Effect of Preceding Crop on Grade

Where land is rich and properly prepared a good grade of potatoes may be expected. Grain land produces smooth potatoes, although the size is often small. Clover, grass sod land, and alfalfa sod are good. Such land appears to hold moisture better and to maintain more even growth. Potatoes after diseased potatoes are often rough.

### Potatoes After Grain

Grain stubble can usually be put in very good shape and a very good quality of potatoes produced. The yield will depend on how long the ground had been in grain and what the preceding crops were. Grain land more than one year from a legume crop will generally produce low yields.

Potatoes following grain are usually smooth, often small, but generally of very good quality. Wireworms have given most trouble where potatoes have followed several years of grain. These conditions are usually most serious in high spots throughout the grain fields.

Grain land is often too poor in nitrogen for large yields. Rotted manure should be applied to old grain land ahead of potato crop if the cropping system cannot be arranged to have clover produced there.

### Potatoes After Clover—Red and Alsike

Red clover is the ideal crop to precede potatoes, although alsike is also good. There is a big crop residue in tops and easily rotting roots that enriches the soil and becomes quickly available for potatoes. Better yields are secured with no more work. Ground following clover will,

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as a rule, be mellow and rich and will produce a better grade of potatoes. Sweet clover is recommended where ground is somewhat alkaline, although there is a danger of scab trouble on such land.

### **Potatoes After Grass Sod**

Sod is a good crop to precede potatoes. The biggest difficulty is getting the sod rotted and the ground pulverized and in shape. Sod ground sometimes dries out badly and is uneven. There may be a poorer grade of potatoes unless ground is well prepared.

Grass sod should be fall plowed shallow or thoroughly disked, and followed with a deep spring plowing previous to planting. Ground that has been in grass sod, if well prepared, usually produces smooth potatoes.

### **Potatoes After Alfalfa**

Alfalfa is a good crop to precede potatoes, except for the undecayed roots. Shallow fall crowning, followed by a deep spring plowing, is a good practice. If fall plowed, potatoes may be planted the first year. Where alfalfa is spring plowed, the heavy, undecayed roots interfere with planting and cultivation and the potatoes do not get full advantage of the crop residue.

### **Potatoes After Potatoes**

Potatoes should not be planted on the same ground more than one year in succession, except under special conditions. If clean seed is used and planted on old alfalfa ground, and no serious diseases show up the first year, the second year of potatoes may be planted. On old alfalfa ground the biggest yield is usually obtained the second year. Great care must be used, however, to keep down disease.

The quality of second-year potatoes on old alfalfa ground should be better than the first crop, provided disease does not interfere and other conditions are favorable. Potato growing is recognized as a permanent business in Klamath county. Disease may be spread by irrigation water, farm tools, etc. No field should be cropped to potatoes more than one year in succession where conditions will be such as to favor the spread of disease.

### **Potatoes on New Ground**

Where new ground is used, properly prepared, and in good condition, a light yield of good quality potatoes may be expected. New ground too often is not well leveled and is hard to irrigate evenly. Usually sagebrush roots will remain in the soil and interfere with cultivation. These work to make a poorer quality. New land is usually low in nitrogen, which reduces growth and yield.

## III. SEED QUALITY AS AFFECTING YIELD

### **Use Good Seed**

Use Oregon certified or standard seed if possible. Single drop certified seed is preferred to any other kind. Larger seed for cutting is preferable if quality is questionable. Oregon certified or standard seed

can usually be depended upon to give better quality than any other seed under similar conditions.

### Single Drop or Whole Seed

Single drop seed from practically disease-free stock is more desirable than cut seed. There is less danger of drying up, rotting, and maggot injury to seed pieces. Where single drop seed is used it is recommended that it be taken only from fields free from disease. Single drop seed will tend to produce more sprouts, which will result in a higher percentage of medium-sized No. 1 potatoes.

### Cut Seed

Where cut seed is used a two-ounce piece will generally give better results than a smaller piece when seed pieces are cut from fairly good sized potatoes for the following reasons:

- (a) Large seed pieces will go through more adverse conditions after planting and stand more frost than smaller pieces.
- (b) Large seed pieces will produce more healthy plants and a larger number of medium-sized tubers of better grade. There is less second growth and less digger injury to medium-sized potatoes.

### Culls

Use no cull seed of any kind. Klamath is building a reputation for potatoes. Cull seed produces culls not worthy of the Klamath brand. Use no uneven, knobby, pointed, spindling, off-type or diseased seed. Use no small, smooth, or single drop seed sorted out of common potatoes; these are often too diseased to plant.

### Soil Preparation as Affecting Grade

Previous to plowing, any stubble, manure, or trash should be worked into the soil by disking, or in case of alfalfa stubble, by crowning. If plowed twice, the first plowing may be shallow and the last should be deep, at least 10 to 12 inches. Clean cultivation should be practiced through the early spring to kill all the weeds possible and to keep the soil pulverized. Planting is done as soon as possible, provided the seed-bed is in good shape. A good, mellow seed-bed means better yields. Proper preparation and cultivation of soil before planting does away with much cultivation after planting. Less cultivation after planting reduces cutting of feeder roots, thereby producing a better yield and smoother potatoes.

## IV. FERTILIZERS FOR POTATOES

### Nitrogen Needed

Except for the peaty soils, the soils of Klamath county in their natural state are low in nitrogen. The growing of clover or alfalfa takes care of most nitrogen needs. Some of the soils are also weak in sulfur, and this should be applied to the legume crop preceding the potatoes.

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Sulfate of ammonia, at 150 to 250 pounds an acre, is the most likely to be helpful on soils that have not recently been in a legume crop.

### Potash for Peat

The peaty soils are usually low in available potash and often respond to that fertilizer. Sulfate of potash is the better form for potatoes.

### No Increase From Fertilizers

Commercial fertilizers of the following compositions were tried out in 1926, mainly on good rich ground. They gave no results that would return a profit:

- 2.5 nitrogen, 10.6 phosphate, 10.0 potash;
- 3.3 nitrogen, 7.7 phosphate, 6.0 potash;
- 3.0 nitrogen, 10.0 phosphate, 7.0 potash; plus 7 pounds sulfur.

More work is needed to determine the place of fertilizers in the potato program. There is little reason to believe that fertilizer applications are practical on land that has been well-manured or that is in a good legume rotation.

### Care with Manure

Barnyard manure is a good potato fertilizer, but should be well rotted before going on potato land. It may well be put on the fall before. Fresh horse manure or sheep manure should never be put on just before potatoes as those manures make conditions favorable to potato scab. More fertilizer information is needed, and we recommend that the county agent establish and carry out fertilizer trials on the various soil types to work out this information.

## V. SEED TREATMENT AND DISEASE CONTROL

All seed potatoes should be given one of the standard treatments before planting. Better yields of better potatoes result from seed treatment. The three treatments that are effective in disease control are: hot formaldehyde, corrosive sublimate, and organic mercury.

### Hot Formaldehyde

When properly applied, this method is effective in control of rhizoctonia and scab. Where dipping equipment is available, it is the most convenient method. The cost, not including labor, is approximately 6c per sack. It is a rapid method of treatment, but directions on strength of solution, treating temperature, and time in the solution should be carefully followed. Potatoes dipped by this method are not injured for commercial purposes.

### Corrosive Sublimate

This method is slower, but is effective in controlling disease. It is a more expensive treatment, costing, without labor, 10c to 15c per sack, but requires less equipment and is therefore better suited to smaller growers than the hot formaldehyde.

To be most effective, clean potatoes should be dipped in bulk. Dirty potatoes or sack dipping weakens the solution too rapidly. Since seed must be treated from one-half hour to two hours, the method is slow. The short treatment is given where there is little disease or where the potatoes have begun sprouting. The labor cost may be higher than the hot formaldehyde process, although this depends largely on arrangement. Corrosive sublimate is poisonous, and potatoes after being dipped by this method cannot be used for human consumption or fed to stock.

### **Cold Formaldehyde**

Cold formaldehyde has been superceded by the above two methods, which are much more effective.

### **Organic Mercury**

This includes Semesan Bel, certain Bayer compounds, and possibly others. Some of these are very successful treatments, but too expensive at present. The cost ranges from 17c to 25c per sack, depending upon the method used in treating the seed.

## **VI. DISEASES**

Diseases are a source of serious loss in the county. Conditions are favorable for several of them. The most serious is probably rhizoctonia, followed by virus diseases, wilt, and scab.

### **Rhizoctonia**

Rhizoctonia is at present the most serious disease in the county. It is carried into fields on untreated seed and lives over in the soil from previous infestations. The conditions favorable for its development are low, moist places in field, especially where overirrigation is followed and where no provisions are made to carry away waste water. It is worst in cool, moist growing conditions. The disease results in reduced yields, irregular potatoes, and bad surface appearance.

### **Virus Diseases**

This group is one of the most serious groups of potato diseases. These diseases dwarf plants, reduce yields, and produce many culls because of small sizes and irregular shapes. Rugose mosaic, mild mosaic, "witches" broom, and giant hill are found in the county at the present time. These diseases are spread through seed, from plant to plant by insects such as aphids, by root contact, and possibly by other means. Because they are spread by insects they are difficult to control.

### **The Wilt Diseases**

The wilt diseases shorten the productive period, reduce size, and produce potatoes with discolored stem ends. They are becoming more serious in this section. The conditions favorable to wilts are: infected seed, planting potatoes two or more years in succession, leaving tops and

old tubers in field, and feeding culls where potatoes are to be planted. Wilt diseases are spread mostly through seed potatoes or by soil infection.

### **Scab**

Scab seriously affects the salability of potatoes. It is not very general over potato sections of the county, being found principally in a few spots favorable to it. The conditions favorable to it are infected seed, infected soil, alkaline soils, and too much fresh manure. In most cases it is readily controlled by treatment and rotation.

### **Stem End Rot (Jelly End Rot)**

Stem end rot or jelly end rot was noticed more than ever in 1926. It appears to be the result of unfavorable moisture conditions in soil during growing season. It is worst on long potatoes. Steady growth with uniform moisture is the best preventive known at present.

### **Storage Rots**

Storage rots are caused by several diseases. Favorable conditions for these rots are caused by warm and moist storage, poorly ventilated storage, storing wet potatoes, soggy potatoes grown on too wet land, diseased potatoes, and mechanical injury resulting from careless digging and handling.

## **VII. FIELD METHODS FOR DISEASE CONTROL**

Plant certified or other high-grade seed. Plant only treated seed and on clean ground. Do not grow potatoes more often than once in four years on the same soil. Level land to prevent low, wet, and poorly drained spots where the plants get too wet. Irrigate moderately so as to prevent an excess of water in the soil and to keep plants in good growing condition. Rogue out disease where practicable. Keep weeds out. Avoid alkaline soils.

### **Certification Needed**

Klamath county should produce enough certified seed for commercial purposes and use in all Klamath fields and to meet California requirements for certified seed. Enough should be produced to care for other neighboring markets, such as Jackson and Josephine counties.

Seed-plots should be planted by the tuber unit method to simplify roguing. Each farmer should have his own seed-plot and keep it rogued free from disease and have it inspected for certification.

## **VIII. VARIETIES, PLANTING, AND CULTIVATION**

### **Standard Varieties**

Assuming good seed, the following varieties are recommended: for early commercial potatoes for local consumption, Bliss Triumphs; for late commercial potatoes, Netted Gem and Burbank.

### Size of Seed Pieces to Use

Where whole seed is to be planted, small, whole seed, 1 to 2½ ounces is preferable, if small size is not due to disease. Where large seed is cut, the pieces should not be less than 1½ ounces and are probably better if not less than 2 ounces.

All seed to be cut should be treated before cutting. The right cutting method is important. Pieces should be blocky. Do not split the blossom end, as it is the strongest sprout piece. Have at least two eyes on each seed piece. Coat seed immediately after cutting with sulfur or land-plaster to prevent rotting and poor stands. Seed should be planted as soon after cutting as possible. If not planted right away the cut seed should be spread out in a thin layer. Seed should not be exposed to hot sun after cutting. It should not be exposed in furrows for any length of time.

### Spacing of Rows and Plants in the Rows

Rows should be about three feet six inches apart, depending upon method of cultivating and fertility of soil. For commercial planting on rich soil, plants can be 12 to 14 inches apart in the row. If soil is poor, plant farther apart in the row, as 16 to 19 inches apart.

### Method of Planting

Planting for commercial purposes may best be done by potato planting machines. Two-man planters usually get the best stands. Hand planting in furrows, if promptly covered, is usually better than plowing in. Prompt covering is necessary.

### Depth of Planting

Potatoes should be planted from 4 to 5 inches deep.

### Time to Plant

Planting time depends on weather and soil conditions, location, and kind of seed to be used. There is little gained by planting in soil too cold for reasonably prompt sprouting or where early planted potatoes are frosted down several times. On the other hand, where early planting permits earlier harvest, there is an opportunity to get into the late summer market with higher prices.

Early planting for late or main crop potatoes is from May 10 to May 18. Medium planting is from May 19 to June 1. Late planting is from June 1 to 10. Medium planting for late potatoes gives most satisfactory results. Earlier planting is safe where whole seed is used and summer frost is not too frequent. Early plantings with cut seed are also feasible on warm slopes where there is good air drainage and little frost.

## IX. CULTIVATION PRACTICES

Cultivation should result in control of weeds and a favorable soil condition, such as a loose, mellow surface. It should maintain a good

stand. Cultivation should do no injury to the plant roots and should not involve unnecessary work and cost. Where the ground is packed by planter wheels and horses on moist soils a deep cultivation immediately after planting is recommended. Harrowing afterward is a cheap and effective method of controlling weeds and may be continued until the plants get three or four inches high. Cultivation with riding or walking cultivators should be rather shallow and the outside shovels should be set to throw earth around the plants and to cover weeds in the row. When the plants get far enough along for irrigation, furrowing out should begin. This is done with a single shovel cultivator with wings to make a narrow furrow and wide high ridges.

Weeds cause much moisture loss and reduction of yield. Cultivate often enough to keep weeds down before they get large. The first cultivation may be deep, but later ones should be shallow to avoid root cutting. Cultivate just deep enough to prevent any baking of soil on the surface. Eliminate all cultivation so deep that it will cut feeder roots after they have spread across the rows. Do not cultivate too close to the plants. A light cultivation after each irrigation is usually good practice until vines get large.

Proper cultivation affects grade by making conditions more favorable for continued even growth. It is recommended in cultivating potatoes that it should be done in such a way as to produce high and wide ridges, which will help to prevent sunburn and freezing. Under those conditions the tubers will have an opportunity to develop above the level of the irrigation water and consequently less disease and rot develops.

## X. IRRIGATION PRACTICES IN RELATION TO PRODUCTION

### Soil Preparation for Irrigation

Soil should be prepared with a gentle even slope, containing no low spots. Water should not be run over 300 to 400 feet down the rows and should be turned in for 15 to 20 minutes. Water should pass through the row in this time. Use lath or pipe boxes down furrows if land is steep. Irrigate in deep furrows; keep water below growing potatoes. Do not flood. Provide furrows to take away waste water.

### Number and Amounts of Irrigations

If ground is too dry to bring up potatoes, irrigate, then plow as soon as possible and plant. After plants are up see that good moisture is maintained at least 6 to 8 inches from the surface. Light, frequent irrigations are better than a few heavier irrigations.

### Effect of Overirrigation on Yield, Disease and Grade

Overirrigation reduces yield, causes sogginess, brings rough potatoes, and increases disease, especially rhizoctonia and scab. It must be avoided if Klamath quality is to be maintained.

## XI. POTATO HARVEST METHODS

### Reduce Digger Injury

Serious loss in potatoes takes place because of mechanical injury in digging. Fork jabs often cause a high percentage of loss. Mechanical diggers often cut, jab, and bruise potatoes because of too small capacity, too vigorous shaking on long elevator aprons, sharp ends on apron links, and dropping potatoes too far from the elevator. Vine separators often jab large tubers.

Where horse-power diggers are used the 24-inch size is recommended. For dry, mellow land where separation is easy, short aprons and low wheels are best. For wet land or where separation is difficult higher wheels and greater separating surface are necessary. A horse-drawn digger operated with an engine makes possible variation in apron speed and shaking and can be better adapted to dig clean and avoid injury.

Digger aprons should be manufactured so that the sharp ends of links do not stick up and injure potatoes. Farmers should watch this carefully and make adjustment to minimize such injury. On some makes the apron may be reversed. Where too much shaking is taking place the tumbling sprockets should be replaced with round sprockets or units. Vine kickers and extension elevators may often be advantageously removed where separation is easy.

### Reduce Harvest and Handling Cost

Owing to cold weather it is necessary to move potatoes directly into some protected place for storage or sorting. Where hard early frost has preceded digging or where there are frosts at digging time, some potatoes are occasionally slightly frosted and made unfit for shipping. It is recommended that such potatoes be put in storage and graded for market at the end of a week or after there is time for the frost injury to show up. Grading in the field is impracticable where there is any frost injury as some injury is sure to be overlooked and the United States grades are very strict on such injury.

### Field Sorting

Because of difficulty in getting the right kind of sorters at picking up time, the committee strongly recommends that hand sorting in the field be discontinued. If necessary, as for prompt loading or for long hauls, one-horse drawn sorters, in charge of experienced and responsible men, may be used to sort what the pickers pick up. In most cases, however, bin sorting is recommended as a smaller crew is needed, better work is done, and less hired help is necessary.

### Labor Costs

The harvest labor cost is a large item in production cost. The harvest season is short. The labor problem becomes more acute as the acreage increases. When farmers bid against each other for labor, the wage scale advances to their disadvantage. It is recommended that the local potato growers' association establish a wage scale for each season and that the county agent's office be used as a labor agency in securing plenty of help for the critical harvest period.

## XII. FARM AND TERMINAL STORAGE

### **Storage Necessary**

The nature of the crop and the long season of potato use necessitates a large amount of storage. Good storage must keep the potatoes cool, dry, and dark and protect them from freezing. The ideal storage temperature is 34 to 38 degrees Fahrenheit.

### **Good Drainage Necessary**

Potato storage places must be well drained and dry. They must be so located that the floors will not be wet by rise of the water level, melting snow water, or heavy rain. Usually the places should be underlaid with enough tile to prevent wet floors.

### **Wet Potatoes**

It is best to put potatoes into storage dry. This is often impossible. The best drying is secured where they are stored on slatted floors, allowing air movement up through the bins.

### **Ventilation**

Ample ventilating flues are needed to take off warm moist air and get the potatoes to a cool dry condition for safe storage. There is little freezing loss in well constructed storage places.

### **Shrinkage Serious**

Poor storage results in serious shrinkage. This may vary from 4 percent to more than 20 percent. Shrinkage takes place when the potatoes get too warm, too moist, or too cold. Loss also occurs from unsound tubers and decay loss and from too deep piling in pile or bins. A properly constructed storage place with good ventilation reduces loss from heat and moisture.

### **Storage Advantages**

In good storage, potatoes may be better protected. Grading may be carried out with regular farm labor and under better conditions. Potatoes are more readily marketable than if stored in pits because of greater accessibility.

### **Economic Storage**

To be efficient, the storage place must be economically built and durable enough to last many years. Expensive masonry houses have often proved to be white elephants because of investment, taxes, etc.

### **Convenience Desirable**

The storage place should be convenient for loading and unloading and for sorting and handling of the stock. Houses with ample driveway space and sorting space are generally most satisfactory.

### XIII. KINDS OF STORAGE

#### **Pits**

Pits are useful for short periods and in emergency. The labor cost is high but there is no overhead expense with them. Losses from water, freezing, shrinkage, and rot average rather heavy. It is difficult to provide effective ventilation or an even temperature. Pits are not satisfactory for commercial potato growers.

#### **Farm Cellars**

The well built farm cellar of moderate cost is a great advantage. It should be large enough to accommodate the average crop of the grower. All the requirements for good storage may be met in Klamath county with structures made of poles, earth or earth and stone, woven wire, straw and very little lumber. Storage costs under such conditions are reasonable. More expensive construction may be of lumber, concrete or hollow tile, but it is easy to make the expense too great.

Farm cellars should be big enough to permit driving in and out and should have plenty of sorting room. They are especially convenient at digging time.

#### **Terminal Storage**

Such storage is necessary in a cold section to keep potatoes rolling to market. It is costly for long periods as charges are often high and frequently stock must be resorted and resacked. Good terminal storage is a great advantage to any large potato growing section as quick shipments are thus made possible.

#### **Storage Costs**

Costs vary from 5c to 50c per hundred, depending on house, storage period, and labor involved. No potatoes are stored without both risk and cost. Many losses are incurred through faulty storage. Storage costs include investment in building with machinery and equipment, taxes, depreciation, insurance and interest on property and stock. Other costs include shrinkage, sacks and labor, light, fuel, record keeping, etc.

### XIV. MARKETING AND GRADES

#### **Competitive Buying**

Present marketing facilities are satisfactory. We feel that there is no necessity at this time of attempting to organize a growers' marketing association, but instead should encourage as many potato dealers as possible to establish a branch at Klamath Falls.

The Klamath Potato Growers' Association should be reorganized, but active marketing should not be included in its activities.

#### **Federal Warehouses**

We recommend the establishment of Federal warehouses, the storing of potatoes under Federal inspection, and issuing of storage receipts to be used as collateral in securing advances.

All potatoes should be carefully graded as uniformly as possible to meet the demands of our markets and to build up a trade in Klamath potatoes.

All potatoes grading above 85 percent Number 1 should be marketed in branded bags containing thereon the word "Klamath." This committee strongly opposes using the word "Klamath" on any grades running under 85 percent Number 1.

We urge the United States Department of Agriculture to modify grades of potatoes so that there may not be such a wide spread in quality within individual grades as at present. We believe that grades may be established more nearly on the basis of food value or possibly peeling or preparation loss. An example is calloused-over cuts or slight jabs in large potatoes, now Number 2, but really involving a smaller percent of peeling loss than in small sound Number 1 tubers. We request that, if such grades can not be worked out to apply to all potatoes in the United States, regional grades, as Northwest or Pacific Coast grades, be worked out and presented at hearings in important producing sections.

We further request the Department to clarify grades and grading procedure by publishing explanatory matter, such as rules, regulations, etc., which growers may read and thereby grade their product without waiting for Federal supervisors' interpretations.

HENRY SEMON, Chairman, Henley  
 E. M. BUBB, Klamath Falls  
 L. B. DAWSON, Spring Lake  
 S. P. DEHLINGER, Mt. Laki  
 J. A. JOHNSON, Spring Lake  
 WALTER SMITH, Langell Valley  
 JACK GRAFTON, Klamath Falls  
 M. R. ADAMS, Klamath Falls  
 S. L. BURNETT, Midland  
 C. A. HILL, Mt. Laki  
 M. P. EVANS, Klamath Falls  
 WILL BLACKBURN, Pine Grove  
 A. KALENA, Malin  
 A. R. CAMPBELL, Pine Grove  
 FRANK MAYFIELD, Henley  
 G. J. HILYARD, Klamath Falls  
 H. J. TICHNOR, Langell Valley  
 J. A. GORDON, Klamath Falls  
 G. R. HYSLOP, Secretary, O. A. C.  
 Potato Committee.

# Farm Management and Economics Committee Report

It is the purpose of this report to consider the present resources of the Klamath Reclamation Project from the standpoint of land utilization, available labor, available capital, and the selection of crop and livestock enterprises in the hope that these resources may be utilized to the best advantage in adopting and developing profitable systems of farming in the district.

This report covers only the main division of the Klamath Irrigation District, as the main division is older and more fully developed and the figures on production, sales, prices, etc., extend over a longer period of time. The remainder of the irrigated sections on the project are too new to contribute facts which may be used to outline reliable systems of farming for the irrigated lands. It is the belief of this committee, however, that the recommendation on the main division will apply to all irrigated lands in the county.

## I. THE AGRICULTURAL SITUATION

The agricultural history of the project shows a progressive development from stock raising, largely dependent on public lands, to diversified irrigated farming.

According to the Klamath office of the United States Bureau of Reclamation, in 1926 there were 402 farms with a farm population of 1607 persons. The average number of irrigated acres per farm is 86. The average gross investment per farm is \$9877.00, of which \$7526.00 represents land and buildings, and \$2351.00 is invested in livestock and equipment.

### Value of Crops and Livestock, 1926

The total value of crops produced on the main division of the Project, in 1926, was as follows:

Alfalfa .....	\$ 299,000.00
Potatoes .....	266,850.00
Wheat .....	58,386.00
Garden and Vegetables .....	17,328.00
Native and Grain Hay .....	9,600.00
By-products .....	8,100.00
Barley .....	5,120.00
Oats .....	3,926.00
Rye .....	2,187.00
Miscellaneous .....	1,942.00
Fruit .....	105.00
<b>Total .....</b>	<b>\$ 672,544.00</b>

The total value of livestock on the main division of Project, in 1926, was as follows:

	Value	Number
Sheep (farm flocks) .....	\$ 296,000.00	29,600
Dairy cattle .....	226,800.00	3,410
Stock cattle .....	127,800.00	3,088
Horses and mules .....	84,800.00	1,501
Fowls .....	48,300.00	42,000
Hogs .....	34,800.00	1,971
Bee hives .....	1,470.00	210
<b>Total .....</b>	<b>\$ 819,970.00</b>	

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### Utilization of Land, 1926

The cultivated lands of the project were utilized for crop production in 1926 about as given in Table V.

TABLE V. HOW IRRIGATED LAND WAS UTILIZED—KLAMATH RECLAMATION PROJECT

Name of crop	Average acres past 10 years 1917-1926	Acres in 1926	Percent of irri- gated land in crops listed 1926
	<i>Acres</i>	<i>Acres</i>	<i>%</i>
Alfalfa hay .....	13,550	11,026	31.0
Other hay .....	1,483	838	2.4
Pasture .....	10,159	15,982*	45.0
Wheat .....	2,836	3,206	9.2
Barley .....	1,756	730	2.0
Oats .....	1,730	476	1.4
Rye .....	578	363	1.0
Potatoes .....	431	1,391	4.0
Garden truck .....	104	85	0.25
Miscellaneous crops and idle land.....	.....	663	2.00
Vegetables .....	No data	70	0.20
Clover seed .....	No data	50	0.15
<b>Total</b> .....	.....	<b>34,880</b>	<b>98.6</b>

\*Includes all land designated as pasture, including high class irrigated pasture as well as seep land, waste land, and pasture of little value.

### Comparative Profitableness of Crops

Some crops on the project are grown as a direct source of revenue (cash crops), while others are produced for livestock feed only. The committee desires to determine which crops now grown are most desirable as cash crops, or which will, on the average, return the largest revenue on their own account. To make such a comparison and determine returns that may be reasonably expected per acre from various crops, the committee has considered the following facts in so far as they are available:

- (a) Average yield per acre, 1917 to 1926.
- (b) Average crop prices received by farmers, 1917 to 1926.
- (c) Average cost of production per acre, 1926.

The following table sets forth the average per-acre yield of crops grown on the project as determined by survey of the Reclamation Service. These figures are considered by the committee to be from 25 to 40 percent low. They will serve, however, as a basis for comparison, since the estimates appear to be uniformly low on all crops.

TABLE VI. AVERAGE YIELDS PER ACRE, UNITED STATES RECLAMATION SERVICE REPORTS 1917-1926

Crop	Highest yield per acre 1926	Average yield per acre 1926	Average yield per acre past 10 years
Alfalfa hay	6 tons	2.7	2.7
Other hay	.....	1.4	1.4
Wheat	48 bus.	16.0	16.5
Barley	58 bus.	11.0	21.4
Oats	75 bus.	17.0	25.0
Rye	30 bus.	7.0	9.9
Potatoes	570 bus.	210.0	129.0
Pasture (5 months)	1 dairy cow or 4 ewes and lambs*		
Clover seed	520 lbs.	500.0	

\*High class irrigated pasture will carry double this amount of stock 5 months.

The following average prices for crops, based on United States Reclamation Service reports, for ten years, are considered reasonable prices farmers may expect to receive.

TABLE VII. AVERAGE CROP PRICES RECEIVED BY FARMERS—UNITED STATES RECLAMATION SERVICE REPORTS

Crop	10-year average 1917-1926
Alfalfa hay	\$ 11.75 per ton
Other hay	11.14 per ton
Wheat	1.48 per bu.
Barley	.83 per bu.
Oats	.63 per bu.
Rye	1.06 per bu.
Potatoes	1.03 per bu.
Pasture (per head per month)	
Dairy cows	2.00
Ewe and lamb	.50
Clover seed	.20 per lb.

The period covered in this table includes the four war years when prices were high and may therefore average higher than for next ten-year period.

From the average yield per acre, as shown in Table VIII, and the average probable price per unit, as indicated in Table VII, the probable gross returns per acre may be computed. This is shown in Table VIII.

TABLE VIII. GROSS RETURNS PER ACRE FROM CROPS, 1917-1926

Crop	Return per acre 1926	Return per acre 10-year average
Alfalfa hay	\$ 27.00	\$ 31.72
Other hay	11.20	15.59
Pasture (see note)	25.25	25.25
Wheat	17.76	24.42
Barley	7.04	17.76
Oats	8.16	15.75
Rye	5.67	10.49
Potatoes	189.00	132.87
Truck crops—estimated	500.00	500.00
Clover seed	100.00	100.00

NOTE: Based on one cow per acre 5 months, producing annually 180 pounds butter-fat, or 15 pounds butter-fat per month at 45c per pound, equals \$33.75, total income while on pasture. Assuming that pasture

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replaces  $\frac{1}{2}$  of hay and that 1 pound of grain is fed cows daily while on pasture, the following deductions are made: 1250 pounds hay at \$10.00 a ton equals \$6.25; 150 pounds grain at 13¢ per pound equals \$2.25; \$6.25 hay fed plus \$2.25 grain fed equals \$8.50; \$33.75 minus \$8.50 equals \$25.25, gross returns for the average pasture per acre. Good irrigated pasture will produce four times this return per acre. With higher-producing cows the return per acre would also be larger.

The following cost-of-production items represent the best estimates of the committee, reinforced by the Experiment Station's forage cost study along with brief potato and pasture cost records. These cost figures are not set up as being conclusive or entirely accurate (except in the case of the alfalfa hay), but they represent the best combined judgment of the committee.

**TABLE IX. ESTIMATED COST OF PRODUCTION OF CROPS PER ACRE, 1926**  
(Includes all costs except Interest on Investment, Overhead Labor, and Hauling to Market.)

Crop	General expense —see Note (1)	Man labor at \$0.40	Horse labor at \$0.12 $\frac{1}{2}$	Machine expense	Material, seed, sacks, twine, etc.	Total per acre
Alfalfa hay (Experiment station survey) .....	\$ 3.85	\$11.41	\$ 2.99	\$ 1.85	\$ 1.23	\$21.33
Potatoes—see Note (2) .....	4.00	39.01	10.23	5.17	25.99	84.40
Pasture-Tame grass— Note (3) .....	4.00	2.55	1.11	.91	4.74*	13.31
Wheat (committee estimate) .....	4.00	3.81	1.98	4.90	2.40	17.09
Oats (committee estimate) .....	4.00	3.81	1.98	4.50	3.03	17.32
Barley (committee estimate) .....	4.00	3.81	1.98	4.26	2.26	16.31
Rye (committee estimate) .....	4.00	3.81	1.98	4.10	1.67	15.56
Clover seed (grower's record) .....	4.00	14.00	4.20	10.18	1.40	33.78

\*Includes average cost of establishing pasture the first year (\$1.97) plus manure used per acre (\$2.77).

NOTES: (1) General Expense covers irrigation costs, taxes, insurance and general repairs chargeable to crops.

(2) Estimates of 12 potato growers producing 240 acres potatoes.

(3) Estimate of 3 growers producing 79 acres irrigated pasture.

From the gross returns per acre, as shown in Table VIII, is deducted the estimated cost of production, as indicated in Table IX, to determine the net returns per acre which may be reasonably expected from the various crops. Table X indicates the computed relative profitability of major crops grown on the project.

**TABLE X. COMPUTED NET RETURNS PER ACRE FROM CROPS**

Crop	Average yield per acre	Average price per unit	Average gross value per acre	Average cost per acre—see Note (1)	Average net re- turns per acre
Alfalfa hay .....	2.7 tons	\$11.75	\$31.72	\$21.33	\$10.39
Other hay .....	1.4 tons	11.14	15.59	(No data)	—
Pasture—see Note (2) .....	—	—	25.25	13.31	11.94
Wheat .....	16.5 bus.	1.48	24.42	17.09	7.32
Barley .....	21.4 bus.	.83	17.76	16.31	1.45
Oats .....	25.0 bus.	.63	15.75	17.32	1.57—
Rye .....	9.9 bus.	1.06	10.49	15.56	5.15—
Potatoes .....	129.0 bus.	1.03	132.87	84.40	48.47
Clover seed .....	500.0 lbs.	.20	100.00	33.78	66.22

NOTES: (1) Average cost per acre is estimated. It includes all cost items except "Interest on Investment," "Overhead Labor" and "Hauling to Market."

(2) The figures are for average pasture. Good irrigated pasture will produce four times this amount.

In reality the returns, as indicated, are *not absolutely net* because "Interest on Investment," "Overhead Labor," and "Hauling to Market" costs have not been deducted. Since these cost items are so variable they are not included with any of the crops. The average net returns, therefore, as listed in the table, represent a relative or comparative return which, under average conditions, may reasonably be expected from these crops. These figures are based on the assumption that all of these crops (except pasture) are sold off the farm at average prices.

After analyzing these figures carefully, the committee believes that from the crop standpoint, on the average, the most profitable farming will come from growing potatoes, clover seed and alfalfa as cash crops, with wheat as a nurse crop, and the production of barley, oats and rye only as required for feed purposes. Sufficient irrigated pasture should be grown to meet livestock needs. The important place of alfalfa in maintaining soil fertility and developing rotations, should be given careful consideration, regardless of its value as a cash crop.

The committee, in its analysis, concluded that each crop, on the average, should produce a minimum of \$12.00 per acre above the cost of production, as computed in Table IX, before it would be considered desirable on its own account as a cash crop. The committee considered that this amount would be the minimum necessary to pay interest on investment, overhead labor, and management costs.

As indicated in Table X, the only crops which, on the average are reaching this goal are potatoes, clover seed, and irrigated pasture.

#### **Average Returns Per Average Acre, All Crops Combined—Crop Ratio Basis**

As computed by the committee, the three crops which are relatively the most profitable utilize only 49.15 percent of the crop land. The committee realizes that other factors than cash returns per acre must be considered in developing and maintaining a permanently prosperous system of farming. Such additional factors as maintenance of fertility, crop rotation, reseeding, labor distribution, water requirements, supply of livestock and equipment, division of risk, capital, personal preference, etc., must also be considered.

Accepting the facts as thus interpreted, the committee presents Table XI to show the approximate average net returns per acre of all crops grown, based on the percentage of the farm land utilized by each crop. This computed figure is obtained by multiplying the present net return per acre, as determined in Table X, by the percent of farm land utilized by that crop, as shown in Table V.

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TABLE XI. INDICATING AVERAGE NET RETURNS PER ACRE ON CROP RATIO BASIS\*

Crop	Percent of land, 1926 (From Table V)	Present net return per acre (From Table X)	Average re- turns per aver- age acre based on percent of land utilized by the crop
Alfalfa hay .....	31.00	\$10.39	\$ 3.22
Other hay .....	2.40	No data	-----
Pasture .....	45.00	†11.94	5.37
Wheat .....	9.20	7.32	0.67
Barley .....	2.00	1.45	0.03
Oats .....	1.40	1.57-	0.02-
Rye .....	1.00	5.15-	0.05-
Potatoes .....	4.00	48.47	1.93
Clover seed .....	0.15	66.22	0.10
Garden truck .....	0.25	No data	-----
Miscellaneous crops and idle land .....	2.00	No data	-----
Vegetables .....	.20	No data	-----
Totals .....	98.60	-----	\$11.25

\*By crop ratio basis is meant the relation one crop has to another in respect to amount of land utilized in its production.

†Based on average pasture. Good irrigated pasture will return double this amount per acre.

II. CAN THE SITUATION BE IMPROVED?

From Table XI it is indicated that the average net returns per average crop acre, as computed, based on present crop ratio or percent of farm land devoted to each crop is \$11.25.

It will be noted that this figure is very close to the minimum net return of \$12.00 per acre, as found by the committee, to be necessary to pay interest on investment, overhead labor, and managerial costs.

Suggested Changes in Land Utilization

It appears to the committee that this average return per acre, for the project, may be increased by increasing acreage devoted to certain crops and decreasing acreage devoted to other crops, such changes being made gradually and with due regard to the collective interests of the district as well as to the many internal management problems on the individual farm. Increasing yield per acre would also increase net returns without changing the acreage.

Table XII gives a suggested crop ratio and the average returns per acre on the project based on changed percentages of crop land devoted to specific crops. These changes, if carried out on the whole project, would increase the average net returns per average crop acre of farm land by the amount of \$7.44 per acre over the present returns.

TABLE XII. PERCENTAGE OF CROP LAND SUGGESTED FOR VARIOUS CROPS AND PROBABLE AVERAGE ACRE RETURNS

Crop	Suggested percent of land for crop	Present net returns per acre (From Table X)	Average returns per average acre based on suggested percent of land utilized for that crop
Alfalfa hay .....	25.0	\$10.39	\$ 2.59
Other hay .....	2.4		
Pasture .....	40.0	*11.94	4.78
Wheat .....	7.0	7.32	.51
Barley .....	2.0	1.45	.03
Oats .....	1.0	1.57	.02
Potatoes .....	10.0	48.47	4.85
Clover seed .....	9.0	66.22	5.95
Miscellaneous crops and idle land .....	3.6		
Total .....	100		\$18.69

\*Based on average pasture. Good pasture acreage should not be decreased.

A slight adjustment in acreage, as indicated on the average, may increase returns materially.

**Profitable Use of Man Labor**

On the average, the most profitable farms have employment for available labor the year around. The approximate labor required for the crops suggested in Table XII is shown in Table XIII.

TABLE XIII. APPROXIMATE HOURS MAN LABOR REQUIRED FOR CROPS

Crop	Suggested percentage of land (Table XII)	Approximate number acres per farm	Total man labor required (approximate).
Alfalfa hay .....	25.0	<i>Acres</i> 22	<i>Hours</i> 627
Pasture .....	40.0	34	340
Wheat .....	7.0	6	48
Barley .....	2.0	2	19
Oats .....	1.0	1	9
Potatoes .....	10.0	8.7	852
Clover seed .....	9.0	7.8	273
Approximate total hours.....			2168

Considering 3000 hours as a full year's work and allowing some time for general overhead labor, considerable time above that required for crops will still be available for other enterprises. This surplus labor may be applied profitably to livestock enterprises such as dairying, poultry, farm sheep, or hogs.

**III. SELECTION OF ENTERPRISES**

From the analysis made by the committee (as indicated in Table VI) potatoes, clover seed, pasture, alfalfa, and wheat appear to be the best crops for producing revenue. The livestock enterprises of dairying, poultry, farm sheep, and hogs are all physically adapted to the project and with reasonable management are profitable and sound.

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According to reclamation reports on the main division of the project, 20 percent of the farms have no poultry, 24 percent have no cows, 75 percent have no farm sheep, and 64 percent have no brood sows.

Having determined the enterprises which are known to be profitable, the immediate problem of the farmer is to select a combination of those enterprises which under his particular conditions will produce the largest net profit from his entire farm business.

**TABLE XIV. EXAMPLES OF GOOD FARM ORGANIZATION**

Summary of the Business of Seven Successful Farms on the Klamath Reclamation Project, 1926.

	Farm 1	Farm 2	Farm 3	Farm 4	Farm 5	Farm 6	Farm 7
	Potatoes, grain, alfalfa.	Dairy, potatoes, alfalfa, grain.	Farm sheep, dairy, potatoes, alfalfa.	Potatoes, clover, grain, alfalfa.	Poultry, dairy, potatoes, grain.	Dairy, farm sheep, hogs, alfalfa.	Dairy, poultry, alfalfa.
<b>Utilization of land</b>							
Total acres in farm.....	130	447	165	187	40	80	100
Potatoes—(acres) .....	36	21	55	23	3½	—	—
Alfalfa—(acres) .....	30	125	15	45	—	55	20
Pasture—(acres) .....	15	18	70	22	4	20	60
Grain—(acres) .....	44	29	—	43	30	—	20
Miscellaneous—(acres).....	—	—	—	10	½	—	—
Total acres cropped..	125	193	140	157	38	75	100
<b>Capital invested</b>							
Land and buildings.....	\$19,500	\$16,500	\$33,000	\$23,550	\$ 6,000	\$ 8,000	\$ 7,500
Livestock .....	\$ 622	\$ 4,775	\$ 5,232	\$ 1,588	\$ 1,303	\$ 4,532	\$ 2,800
Machinery and equipment .....	\$ 2,200	\$ 3,620	\$ 1,970	\$ 875	\$ 1,357	\$ 1,340	\$ 1,669
Feed and supplies.....	\$ 300	\$ 1,300	\$ 850	\$ 500	\$ 500	\$ 950	\$ 462
Total investment .....	\$22,622	\$26,195	\$41,052	\$26,013	\$ 9,160	\$14,822	\$12,431
<b>Farm receipts</b>							
Potatoes .....	\$12,867	\$ 7,421	\$10,500	\$ 5,084	\$ 1,400	—	—
Grain .....	\$ 960	—	—	\$ 630	—	—	—
Hay .....	\$ 1,150	\$ 1,320	—	\$ 1,600	—	—	—
Clover seed .....	—	—	—	\$ 840	—	—	—
Total crops .....	\$14,977	\$ 8,806	\$10,500	\$ 8,154	\$ 1,400	—	—
Farm sheep .....	—	—	\$ 2,755	—	\$ 430	\$ 430	—
Dairy .....	—	\$ 2,946	\$ 1,450	\$ 650	\$ 290	\$ 3,250	\$ 2,125
Poultry .....	\$ 150	\$ 420	\$ 132	\$ 225	\$ 2,238	\$ 75	\$ 1,248
Hogs .....	—	—	—	\$ 216	\$ 305	\$ 550	—
Total livestock .....	\$ 150	\$ 3,366	\$ 4,337	\$ 1,091	\$ 2,833	\$ 4,305	\$ 3,373
Miscellaneous .....	—	\$ 65	—	—	\$ 560	—	\$ 275
Total receipts .....	\$15,127	\$12,172	\$14,837	\$ 9,245	\$ 4,793	\$ 4,305	\$ 3,648
<b>Farm expenses</b>							
Current operating expenses .....	\$ 5,460	\$ 3,143	\$ 7,615	\$ 3,010	\$ 2,015	\$ 1,400	\$ 1,764
Unpaid family labor.....	\$ —	\$ 850	\$ 600	\$ 600	—	—	—
Livestock decreases .....	\$ 15	—	—	—	—	—	—
Depreciation .....	\$ 420	\$ 475	\$ 497	\$ 265	\$ 277	\$ 396	\$ 358
Total expense .....	\$ 5,895	\$ 4,468	\$ 8,712	\$ 3,875	\$ 2,292	\$ 1,796	\$ 2,122
Farm income .....	\$ 9,232	\$ 6,704	\$ 6,121	\$ 5,370	\$ 2,501	\$ 2,509	\$ 1,526
Interest on investment at 5 percent.....	\$ 1,131	\$ 1,310	\$ 2,052	\$ 1,300	\$ 458	\$ 741	\$ 611
Labor income .....	\$ 8,101	\$ 4,394	\$ 4,073	\$ 4,070	\$ 2,043	\$ 1,768	\$ 1,015

In order to present some concrete example of successful farms on the project, which are using profitable enterprise combinations, the committee has made a complete farm management survey of a number of farms, from which seven profitable farms are selected as examples of good farm organization. These are not set up as model farms. Their operators have merely adopted combinations of enterprises which under reasonable management are enabling them to get ahead. There are probably other farms on the project equally or more successful, but the seven selected serve to illustrate the importance and profitability of some farm management principles which have a direct bearing on profits in farming.

**Good Farm Organization**

Table XIV shows the organization of seven profitable farms, including utilization of the land, capital invested, farm receipts, farm expenses, and labor income. These farms are examples of some good types of farm organization now operating on the Klamath Reclamation Project.

**TABLE XV. FARM MANAGEMENT PRINCIPLES CONTRIBUTING TO SUCCESS OF FARMS IN TABLE XIV**

	Sound enterprise combinations						
	Potatoes, grain, alfalfa (1)	Dairy, potatoes, alfalfa, grain (2)	Farm sheep, dairy, potatoes, alfalfa (3)	Potatoes, clover, grain, alfalfa (4)	Poultry, dairy, potatoes, grain (5)	Dairy, farm sheep, hogs, alfalfa (6)	Dairy, poultry, alfalfa (7)
<b>Size of business</b>							
Gross receipts .....	\$15,127	\$12,172	\$14,837	\$ 9,245	\$ 4,795	\$ 4,305	\$ 3,648
Total crop, acres .....	125	193	140	157	38	75	100
Total investment .....	\$22,622	\$26,195	\$41,052	\$26,013	\$ 9,160	\$14,822	\$12,431
Number of cows .....	1	27	18	4	5	17	21
Number of hens .....	60	150	100	80	510	50	300
Number of ewes .....			220			42	
Number of sows .....				2	1	3	
<b>Receipts per unit</b>							
Receipts per cow .....		\$ 109	\$ 81	\$ 162		\$ 191	\$ 101
Receipts per hen .....		\$ 2.80		\$ 2.80	\$ 4.39		\$ 4.16
Receipts per ewe .....			\$ 12.50			\$ 10.24	
Receipts per \$100 invested:							
In dairy stock .....		\$ 72	\$ 68	\$ 112		\$ 95	\$ 92
In poultry .....		\$ 280		\$ 280	\$ 335		\$ 370
In farm sheep .....			\$ 118			\$ 83	
In hogs .....				\$ 77		\$ 440	
<b>Gross income per crop acre</b> .....	\$ 121	\$ 63	\$ 106	\$ 59	\$ 126	\$ 57	\$ 36
<b>Net income per crop acre</b> .....	\$ 74	\$ 35	\$ 44	\$ 34	\$ 66	\$ 33	\$ 15
<b>Economy of production</b>							
Expense at \$100 gross income .....	\$ 39	\$ 36	\$ 58	\$ 42	\$ 48	\$ 42	\$ 58
<b>Total expense per crop acre</b> .....	\$ 47	\$ 28	\$ 62	\$ 25	\$ 60	\$ 24	\$ 21

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Attention should be called to the fact that the returns on these farms producing potatoes may be higher than average since the 1926 yield was good and prices slightly higher than average. The business analysis of these farms covered only the 1926 crop.

The success of the seven farms listed in Table XIV may be attributed to the following important principles of good farm management:

- (1) Selection of sound combination of profitable enterprises.
- (2) Large volume of business.
- (3) High production per unit.
- (4) Economy of production.

The extent to which these elements contributed to the success of these farms is outlined in Table XV.

#### Adjusting Present Farm Organization to Increase Income

From the analysis made the Committee believes there are many farmers on the project who could materially increase their incomes by making minor adjustments in the organization of the farm. Some minor adjustment in the business may increase the returns, or in some cases it may be profitable to reorganize the farm completely.

#### IV. OUTLINE OF ADAPTED ENTERPRISE COMBINATIONS

The objective in the selection of a combination of enterprises is to obtain the greatest income for the labor of the farmer and his family, and for his investment. This may be accomplished in general by the adoption on individual farms of enterprise combinations which will accomplish the following results:

- (1) Employ to full capacity, the year around, all available labor on the farm.
- (2) Minimize the risk of one-crop farming.
- (3) Utilize all waste and by-products of the farm, as well as all fixed resources, such as buildings, labor, equipment.
- (4) Make possible a large gross volume of business.

In selecting the enterprise combinations for a particular farm, the major enterprises should be supplemented by sufficient minor enterprises to utilize the remaining supply of labor. All enterprises should be in harmony with the collective interest of the district. The following list of enterprise combinations will be found applicable to the respective types of individual farms on the project.

1. *Major enterprises:* Dairy and Poultry.  
*Minor enterprises:* Potatoes-Alfalfa-Grain.
2. *Major enterprises:* Dairy-Farm sheep.  
*Minor enterprises:* Alfalfa-Hogs.

3. *Major enterprises:* Potatoes-Alfalfa-Clover.  
*Minor enterprises:* Farm sheep or Dairy or Poultry.
4. *Major enterprises:* Dairy-Poultry-Alfalfa.
5. *Major enterprises:* Farm sheep-Alfalfa-Potatoes.  
*Minor enterprises:* Dairy-Poultry or Hogs.
6. *Major enterprises:* Range sheep or cattle, Irrigated pasture and Alfalfa.

On each farm, the plan should include production of enough alfalfa hay to meet requirements and sufficient irrigated pasture to supply farm needs. On all farms livestock should be kept to supply fertility and to maintain a steady income the year around. A good home garden should be produced to supply family needs.

## V. PRODUCTION STANDARD

The successful farm will obtain better than average yield per acre or per head of livestock. The production standards given in Table XVI are set up as a goal toward which to work. Many of the more successful farms have already passed these standards, but many farms still remain below them.

TABLE XVI

Item	Present average production (estimated)	Production standard toward which to work
<b>Crops</b>		
Alfalfa hay (tons) .....	3	4
Potatoes (bushels) .....	200	400
Wheat (bushels) .....	16	30
Barley (bushels) .....	20	40
Oats (bushels) .....	25	50
Rye (bushels) .....	10	25
<b>Livestock</b>		
Butter-fat per cow (pounds) .....	180	300
Eggs per hen (commercial flocks) .....	160	200
Percent lamb crop from farm flocks .....	100	120
Wool per sheep (farm flocks) (pounds) .....	10	12

## VI. FARM ACCOUNTS PROFITABLE

Farmers on the project will find it profitable to keep a record of financial transactions so that weak spots in the business may be located. Improvements in the business can be made best when the facts are known. The simple farm account book issued by the Extension Service, Oregon State Agricultural College, properly kept and analyzed by the farmer is the fact-finder for his farm. It reveals hidden facts not readily visible in any other way, yet which may mean profit or loss for the year's work. Common business judgment, if not economic necessity, will encourage the farmer to strengthen the weak spots in his business once they have been definitely located.

VII. GENERAL ECONOMIC PROBLEM

**Standardization and Processing**

The trend of all business endeavors points to standardization of products, preparing them to meet the demands of the buying public, thus promoting larger consumption. Competition being very keen on all markets in large consuming centers, producers must give more attention to grading and delivering to the market standardized high quality products.

**Distribution and Marketing**

At the present time the marketing of farm products in Klamath county does not present a serious problem. California is the principal market for potatoes and the potential surplus production of dairy products, while the local demand largely handles other products.

**Credits and Finance**

The present sources of credit to farmers are as follows:

- (1) Charge accounts at stores.
- (2) Local banks.
- (3) Federal Farm Loan Association.
- (4) Joint stock Land Bank.
- (5) Private loan companies.
- (6) World War Veterans State Aid Commission.

It is the belief of this committee that farmers in general could strengthen their credit in the following manner:

- (1) File a credit statement based on farm accounts kept by farmers.
- (2) Talk plans over with banker.
- (3) Borrow only for production purposes.
- (4) Pay cash and obtain discount.
- (5) Work out with existing agencies a plan properly to fund the farm business on a long-time loan basis.
- (6) Live within income.

It is the belief of this committee that in general bankers are in position to render great service to the community and especially to farmers:

- (1) By recognizing farming as the ultimate base of prosperity.
- (2) By keeping in close touch with farm conditions and the farmers' problems.
- (3) By making farmers' notes, in so far as possible, correspond to time of growing crop.

The committee believes that farmers should trade where they can obtain cash discounts.

Respectfully submitted,

U. E. REEDER, Chairman, Pine Grove  
G. J. HILYARD, Klamath Falls  
R. E. GEARY, Klamath Falls  
A. C. COOLEY, Salt Lake City  
J. W. KERNS, Klamath Falls  
LESLIE ROGERS, Klamath Falls  
L. P. SABIN, Klamath Falls  
R. S. BESSE, Secretary, O. A. C.  
Committee on Farm Management.

# Livestock Committee Report

## I. RANGE SHEEP

### The Range Sheep Situation

The range sheep business seems to be in a substantial condition and so far as return is concerned, for a period of years, has been very satisfactory. While it is true there have been lean years which have not brought a profit to the sheepmen, the average return for a long period has been very good. There are in the United States close to 41 million sheep, as compared with nearly 44 million in 1913. Competing countries show about the same relative proportion.

Wool production, imports and consumption, in the United States are shown in Table XVII.

TABLE XVII. WOOL PRODUCTION, IMPORTS AND CONSUMPTION IN THE UNITED STATES, 1913, 1920, AND 1925

Year	Production	Imports	Consumption
	<i>lbs.</i>	<i>lbs.</i>	<i>lbs.</i>
1913 .....	296,175,000	147,954,000	444,052,000
1920 .....	277,905,000	246,982,000	516,042,000
1925 .....	301,060,000	322,184,000	622,970,000

The consumption of lamb and mutton remains practically the same, approximately 5 pounds per capita.

Records show that while there are fewer sheep in the world today than formerly, there are more mutton and wool in proportion. This is explained by the fact that through careful selection a heavier fleece is now produced, together with a heavier carcass than was true in the past.

### Range Sheep Recommendations and Conclusions

Klamath county, according to estimates, carries 100,000 sheep. According to the Range Sheep Committee, this fully utilizes all the available grass for this purpose in about the proper balance.

The average wool clip for the county is approximately 9 pounds. This is considered entirely possible on all sheep. When it is considered that some sheep in the county shear 11 pounds and better, there must be others that shear below the average. It is possible through breeding and selection to increase this fleece weight without any great amount of labor and expense.

The lamb crop should average at least 80 to 85 per cent at weaning time for efficient production.

It is the opinion of the Range Sheep Committee that lamb fattening offers an opportunity for expansion as the feeds and climate are ideal and the market outlet to San Francisco is very satisfactory.

The Committee wishes to state, however, in connection with lamb fattening, that the beginner needs to start in a small way and gain experience. Where he is not in a position to stand the loss of his feed, he had better not venture as there are occasional years when the enterprise shows a loss. Over a period of years the good years will more than make up this loss.

A standard ration for this section is a pound of barley per lamb together with what hay will be cleaned up. Very satisfactory results are being had from chopping the hay, as it lessens the waste. The Committee wishes to emphasize the importance of selecting good lambs and making them fat, at a weight not to exceed 90 pounds at the ranch.

It is the feeling of the Committee that sheepmen should pay careful attention to the selection of bucks with which to improve their flocks.

The summary of costs of producing range sheep in the county presented in Table XVIII is considered a fair average condition.

TABLE XVIII. KLAMATH COUNTY PRODUCTION COST AND INCOME FOR RANGE SHEEP

	Costs	
	1,500 head	per head
<b>Expenses</b>		
1 herder 12 months at \$125 per month including board .....	\$1,500	\$1.00
1 camp tender 12 months at \$125 per month including board .....	1,500	1.00
Extra help at lambing—2 men for 2 months at \$125 per month including board .....	500	0.30
Interest and upkeep on camp tender's outfit .....	360	0.24
Shearing and packing wool .....	525	0.35
Cost of summer and winter range .....	2,625	1.75
Hay, 250 pounds per head at \$10 per ton .....	1,875	1.25
Ram service .....	375	0.25
Taxes .....	225	.15
Interest at 8% .....	1,020	.68
Losses 10 % (150 head) .....	1,260	.84
Depreciation at \$1.75 per head—135 head .....	1,725	1.17
Totals .....	\$13,490	\$8.98
<b>Income</b>		
1,200 lambs, 70 pounds at 10 cents .....		\$7.00
Wool, 9 pounds at 30 cents .....		2.70
Total income per head .....		\$9.70

## II. FARM SHEEP

Farm sheep offer an opportunity for increasing returns on irrigated farms. They afford an income from the farm that comes when there are no other cash crops to sell.

Where there is acreage suitable for pasture, it is recommended that farm flocks of sheep be considered. It is also recommended that farmers consider the improvement of their pastures. Good pastures will carry 4 ewes and their lambs per acre for the season. Farmers should realize the importance of providing pasture before they buy the sheep.

The number of sheep to keep on the farm varies greatly with the type of farming and the farmer's experience in handling sheep. The committee does not feel that enough information is available to state the number that can be run on the average farm. It should, however, be at least 25 ewes.

## III. BEEF CATTLE

### The Beef Cattle Situation

The present outlook for beef, so far as market and supply are concerned, is better than it has been, although the industry is still faced with

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high production costs. The supply for the United States and for Oregon for three representative years is shown in Tables XIX and XX.

TABLE XIX. BEEF CATTLE AND CALVES ON FARMS AND RANGES— UNITED STATES AND OREGON, 1913, 1920 AND 1925

Year	Number of head	
	United States	Oregon
1913	27,400,000	452,000
1920	35,900,000	469,000
1925	33,678,000	450,000

TABLE XX. TOTAL BEEF AND VEAL CONSUMED IN THE UNITED STATES

Year	Beef	Veal
	lbs.	lbs.
1913	5,852,000,000	487,000,000
1920	6,713,000,000	814,000,000
1925	7,166,000,000	1,004,000,000

The per capita consumption of beef and veal is 63 and 9 pounds respectively for the United States.

Oregon's total income from beef cattle annually amounts to about 30 million dollars, or 29 per cent of the total income from agricultural products.

Klamath county had a beef cattle population of 18,834 head with an assessed valuation of \$359,810 in 1926.

The tendency at the present time is for the market to demand cattle 1,000 pounds or under.

**Beef Cattle Recommendations and Conclusions**

It is the opinion of the Beef Cattle Committee that Klamath county is at present fully utilizing the range in this section and that it would be unwise to increase the present number under existing feed conditions.

The livestock section of this conference believes that all cattle should be finished for market before being shipped out, as is now being done.

Further expansion in the cattle fattening business will depend on the acreage in hay, and in the demand for this hay by the dairy and the sheep industries.

Where grain is available at a reasonable cost, it is recommended that it be fed in connection with cattle fattening, as it results in a better finish and requires less time than feeding hay alone. It should be borne in mind, in this connection, that the most economical beef production is made on grass and when possible cattle should be kept on pasture. It is therefore recommended that pasture improvement be considered in connection with such lands as are suitable for that purpose.

The average calf crop in Klamath county is about 65 percent. It is the feeling of the Livestock Committee that this percentage can be increased by using more bulls and young bulls; also by providing a better distribution of bulls on the range. Breeding on fenced pastures is considered a big advantage in securing a higher percentage of calves.

It is recommended that the tuberculin testing be continued and encouraged on all beef cattle kept on farms.

The Committee indorses the work of the California marketing association as it operates in Klamath county. It is our feeling that it is accomplishing a good work in improving the cattle marketing situation. It is tending to emphasize the importance of finish and quality in cattle marketed.

It is recommended that cattlemen look to the breeding of their beef herds so that the best quality can be furnished, which, in turn, will aid in establishing a reputation for Klamath county cattle in such a way that prices will be improved. Let us work toward the goal that Klamath county cattle will be a trade-mark on the markets concerned.

The Committee is in full accord with the campaign now being put on to emphasize quality beef, and it is felt that the stamping of all grades of beef, according to quality, under proper regulation will be a great aid to the beef industry. It is further recommended that the citizens of Klamath county be encouraged to ask for quality beef locally instead of having to put up with low grades of beef now found in some markets. Good beef comes from beef-bred cattle. It should show a white fat, a cherry red color in the lean, and an intermingling of streaks of fat with the lean.

#### IV. HOGS

The hog situation over the United States changes quickly, depending on the feed supply and prices. The consumption of pork in the United States amounts to about one-half a hog a year per person.

Oregon does not produce as many hogs as are needed for local consumption by about 50 percent. On the other hand, feed grains are scarce in the state and a great deal has to be brought in each year to take care of the needs. It is considered a safe practice to produce at least enough hogs on Klamath county farms to take proper care of the farm wastes, except in the Tule Lake region where conditions are favorable for the production of several thousand hogs annually due to plenty of waste grain. Some grain in addition will be required for the best results. This grain should be home grown.

Markets for hogs and pork are very favorable in Portland and in California points, besides a limited local market.

Respectfully submitted:

E. M. HAMMOND, Chairman, Merrill  
MICHAEL BARRY, Merrill  
HUGH O'CONNOR, Merrill  
L. C. SISEMORE, Fort Klamath  
HARRY E. WILSON, Malin  
W. C. DALTON, Malin  
A. L. MARSHALL, Olene  
JACK HUNT, Klamath Falls  
JOHN TAYLOR, Merrill  
H. A. LINDGREN, Secretary, O. A. C.  
Livestock Committee.

# Poultry Committee Report

## I. INTRODUCTION

This group has made a study of the poultry industry from many angles and will attempt to incorporate in this report the possibilities of expanding the industry; and to present definite methods of poultry farm management which, if followed, will make poultry keeping a safer and more profitable phase of agriculture in Klamath county.

### **Poultry Keeping is a Business**

Poultry keeping when intelligently managed has proved a profitable business during each year of agricultural depression which followed the war. Whether a specialized business or side-line industry of 400 to 500 hens, poultry keeping is a business of many details. When known principles of management are ignored, there is no reason to assume that any greater number of producers will succeed in the poultry business than in any other business.

According to the United States census report for 1924, Klamath county produced \$133,417.00 worth of eggs and poultry. It ranks eighteenth among the counties of Oregon in value of poultry products. The county produces less than two-thirds of the eggs needed to supply the demands of local consumption. During the year 1926 Klamath county imported \$95,000.00 worth of eggs and poultry.

Expansion of the poultry industry in the county has been slow and has not materially reduced imports made necessary by the food needs of an increased population. A large volume of undergrade eggs is shipped into the county. Practically all of the best grade eggs produced by local commercial flocks find an outlet among the large consumers, leaving the more inferior grades produced by small farm flocks to be handled by the retail trade. Raising the local standards of quality through grading and candling and through larger, well managed flocks, would reduce outside competition and strengthen local prices.

### **Few Large Flocks in the County**

The marketing problem is complicated by the present distribution of the hen population and the comparatively small number of farmers who can supply eggs of quality in any volume regularly to given home markets. Many dealers and retailers prefer to order their needs from outside sources rather than risk irregular supplies from the small farm flocks of the county. This condition would be improved through the operation of a local marketing agency and through having access to cold storage facilities for a short term storage.

Approximately 20 percent of the farms in the county keep no fowls; 24 percent have 50 or less; 26 percent have 50 to 100; 24 percent have 100 to 300; 4 percent have 300 to 500; and only 2 percent have 500 fowls or more. This condition is not in keeping with profitable poultry keeping in a county so greatly underproduced.

Climatic conditions, availability of high producing stock, abundance of green feed, local grains, good roads and an underproduced home

market are reasons given for recommending an expansion of the poultry industry, provided such expansion is guided by the principles of development and marketing as briefly outlined in this report.

## II. POULTRY RECOMMENDATIONS

### 1. Farm Flocks of Not Less Than 400 Laying Hens

On farms where labor is available throughout the year, where green feed can be provided, and where capital is available for necessary outlay, it is recommended that a flock of not less than 400 laying fowls be developed as a side-line issue.

### 2. Not Less Than 1000 Hens for Commercial Flocks

As a major farm activity when one man expects to derive his major income from poultry, it is recommended that a minimum unit of 1,000 laying fowls be developed as soon as experience warrants.

### 3. Reduce Present Flocks to Home Needs If Time for Care is not Available

On farms not interested in poultry keeping and where other farm work does not provide surplus labor, it is recommended that such flocks as are now carried be reduced to the small number necessary to meet the needs of the home table.

### 4. Purchase Chicks Early

Commercial egg producers must have the benefit of fall and winter prices to get a fair average price for their year's production. They must get fall and winter production in order to get the longest period of production before molting season.

It is strongly recommended that producers secure chicks early enough in the spring to be mature and into flock production by October. From March 15 to May 1 is suggested as the most suitable time to secure chicks under local conditions.

### 5. Buy All Chicks at One Time

It is false economy to attempt to brood and range together chicks of different ages.

It is better business, for example, to secure 500 chicks at one time where 200 pullets are desired, than to attempt to secure 500 chicks from two or three hatchings of small capacity incubators.

It is recommended that producers secure all chicks at one time where only one brooder equipment and one range are available.

### 6. From 5 to 10 acres Needed for Each 1000 Hens

Many poultry farms, successful for a few years, have been compelled to quit business because of soil contamination dangers. This results when the same area is used year after year for brooding and ranging large numbers of growing fowls.

Poultry keeping on a commercial scale on one-, two-, and three-acre tracts of land is a hazardous and generally a short-lived enterprise. Real

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estate agencies are not justified in exploiting such small tracts for permanent intensive poultry farms.

It is recommended that commercial poultry farming should not be encouraged on less than from 5 to 10 acres of tillable soil for each unit of 1,000 hens where young stock is to be raised on the farm each year. On small farms, a system of field rotations must be worked out to make poultry farming a success over a period of years. Lack of acreage is a great factor in poultry farm failures.

### **7. Vigorous, Disease-Free Pullets Must be Raised**

Poultry producers will succeed according to their ability to rear pullets to maturity that are vigorous, fat and free of intestinal parasites and inflammation. Clean soil for brooding and ranging growing stock must be provided. To meet conditions on various farms, three brooder equipment arrangements are suggested for careful study.

(a) On farms where the acreage is large and where only a reasonable number of chicks are to be brooded each year, the portable brooder house (see Station Circular 52) is recommended.

(b) On farms of limited acreage where a large number of chicks are to be brooded, a permanent brooder house of larger dimensions may be desired in order to reduce the labor overhead. In such case, the house should be so located on a given area that two or more yards may be provided. Under this arrangement only one yard is to be used each year in its logical turn. Where the yard is small, the danger of disease is lessened by covering the close-in runways with sand or gravel to a depth of about three inches.

(c) Where permanent brooder houses are built, there is no safer way to protect the future prosperity of the business than to have complete control of sanitary conditions through the construction of a small concrete or blacktop outside yard.

### **8. Follow O. A. C. Plan in Building Range Houses**

As soon as the pullets are old enough to go without artificial heat and are roosting on the perches they should be removed from the brooder house and brooder yard and put out on clean range. Brooder houses soon become crowded and the pullets suffer from lack of ventilation.

It is recommended that producers guide their construction of range houses according to the plans set forth in Station Circular 54.

### **9. Laying Houses of Proved Type are Best**

Too many laying houses are constructed according to some untried hobby rather than according to a standard type of house that has proved satisfactory under local climatic conditions. A good poultry house is necessary for the permanent home of the pullets when they are ready to move in from the range.

It is recommended that producers guide their construction of new laying houses by the plans set forth in Station Circular 51.

All bulletins mentioned, and others, may be secured from the office of the County Agricultural Agent.

### 10. Green Feed is Important

Green feed is one of the four major classes of poultry feeds necessary for growth, body maintenance, and production. It increases the efficiency of all other feeds fed, supplies vitamins, and adds bulk to the ration. Green feed should be fed liberally. Alfalfa is the leading source of green feed throughout the county. To supplement winter feeding of alfalfa, it is recommended that a supply of root crops be provided.

### 11. Considerable Capital Required

Poultry propaganda is misleading and too little has been said relative to the value of experience and capital.

The poultry group desires to present the following statements as a basis for drawing conclusions relative to the business aspects of poultry raising.

It is better to develop a commercial flock of poultry gradually than to plunge. Without previous experience the brooding of 500 chicks will be found a reasonable experiment. From this number there should be at maturity approximately 200 pullets. This number will provide plenty of building and feeding expense and experience for the average beginner's first year.

Costs and results vary with individuals. On the average, the beginner should have some idea of the approximate outlay of cash necessary to purchase 500 chicks, construct the necessary equipment, and feed the pullets up to the point where the 200 pullets begin to bring in an income. It will require an outlay of cash of approximately \$3.00 per pullet, excluding the cost of land or home. The first year's expense for this number is highest because of the initial cost of buildings and equipment. This expenditure is prorated as follows:

Brooder house; brooder; equipment; incidentals (per pullet) .....	\$ 0.25
Feeds, litter, cost of chicks, fuel, range house, mortality losses to six months of age, etc. ....	1.25
Permanent laying house, material, equipment, fencing, supplies .....	1.50
Approximate total .....	\$ 3.00

With the above overhead investment, plus interest, taxes, and depreciation costs, it is necessary to work out a definite system of management that will make the poultry enterprise safe over a period of years.

Under average good management, the producer should get an average egg yield of approximately 180 eggs or better, or an average gross return of \$4.50 per hen with eggs at an average price for the year of 30 cents. It will cost in feed, absorbing mortality losses, etc., approximately \$2.50 per hen per year. The gross profit of \$2.00 per hen on a commercial egg basis minus the legitimate overhead charges should return the average man a labor return of \$1.50 per hen.

F. M. TROUT, Chairman  
L. ALVA LEWIS  
NELLIE C. WHITLATCH  
T. N. CASE  
MRS. WM. CHEYHE  
F. W. SEXTON

Committee

# Rabbit Raising Committee Report

## Status of the Industry

Raising domestic rabbits for commercial purposes is new in the United States, but it is rapidly being recognized as one of our important industries.

The demand for dressed rabbit in Klamath Falls has been developed in the past year from practically nothing to more than 100 rabbits, or about 250 pounds, per week.

There are about 30 breeders in Klamath county at the present time. Most of them operate on a small scale, having in all less than 3000 head, including young stock.

Based on rabbit consumption in sections more fully developed, there is an available market for at least 500 rabbits per week in Klamath Falls.

Further than this, rabbit meat can be shipped to other cities at a good profit. There is really no limit to the future growth in this county.

According to the United States Department of Commerce, the United States imported in 1925 a total of 105,505,506 rabbit pelts valued at \$22,165,732. Less than 2 percent of the pelts used that year were produced in the United States.

The climate and conditions in Klamath county are ideal for the production of good fur. Even in summer the nights are cool.

Unprime pelts of the poorest grade bring from 35 to 80 cents per pound (about 6 pelts per pound). The present price for prime pelts ranges from 25 cents to \$2.50 each, depending on color and actual fur quality.

One of the outstanding features of this industry is the small space required.

## Recommendations

We recommend the raising of rabbits by people employed in the city or on small tracts where space is limited. Pens can be built in tiers 3 feet high. A space 12 by 36 feet will house 25 does and their young. From 30 to 50 does can be cared for by one person in his spare time. A commercial rabbitry of from 150 to 300 does and their young can be handled by one person.

Earnings from a small stock of rabbits vary, but we find that the average is \$1 per month per doe the year around.

We have found that on a straight grain and hay ration the rabbit does not produce a good fur. A balanced feed of barley, oats, and other grains with bone and oil meals is recommended.

We recommend that beginners start with from 2 to 5 does and get accustomed to handling the rabbits. Then, after a few months, the stock may be increased.

Signed:

H. R. MILNER, President,  
Klamath Rabbit Breeders Association  
LURA R. CUMMINGS, Secretary.

# Truck Crops Committee Report

## **Acreage in Truck Crops in Klamath County**

In the year 1926, there were about 70 acres of truck crops in the county. Most of them were in the immediate vicinity of Klamath Falls. This acreage produced approximately one-fourth of the vegetables consumed in the city of Klamath Falls during 1926.

The value of truck crops in Klamath county in 1926 was approximately \$50,000.

## **Truck and Small Fruit Crops That Can be Expanded for Local Consumption**

Truck crops that can be expanded for local consumption are peas, sweet corn, celery, onions, strawberries, and raspberries.

Expansion of all vegetables can gradually increase with the increase of population in the city.

Certain vegetables are produced in sufficient quantities for local consumption or to the extent which conditions justify, considering harvesting, storage, marketing, and weather conditions. The list includes beets, carrots, spinach, radishes, turnips, lettuce, cabbage, squash, green beans, and cauliflower.

## **Soils Suitable for Truck Crops**

Black sandy loam that is well drained is the principal soil that is now used for commercial truck crops in this section.

## **Distance for Truck Crops from the Market**

Farmers desiring to grow truck crops should not locate farther than eight miles from the place where they wish to sell their products.

## **Time to Plant**

Due to differences in soil types, air currents, and elevations throughout the county, no definite time can be set for planting vegetable crops. This is a problem for each individual grower to determine for his own locality.

It is not advisable, unless one has considerable capital, to install glass houses for the production of early vegetables.

## **Fertilizers**

Barnyard manure has so far given the most satisfactory results. It should be applied rather heavy so as to keep up the fertility of the soil. Commercial fertilizers have been tried out in a small way, but heretofore have given no results. It is recommended that further work be carried on in experiments with commercial fertilizers. On sour land it is advisable to apply limestone at the rate of about two tons per acre. Sulfur has aided in keeping down cutworms where applied around cab-

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bage plants and has proved beneficial when applied to onions at the rate of about 500 pounds per acre.

### **Diseases**

The committee asks the state college experiment station to try to find a means to combat spinach blight, onion maggot, and wireworms.

### **Quality of Product**

The committee recommends that local truck growers produce vegetables of high quality and of the kind the local trade uses. The tendency has been to produce vegetables of too large a size for domestic consumption.

The committee recommends that local dealers support their home industry in vegetables and buy local products in preference to low quality vegetables from outside districts.

W. H. HAWKINS, Klamath Falls, Chairman  
G. W. NITSCHHELM, Klamath Falls  
F. C. MARKWARDT, Klamath Falls  
JOHN CORTEZ, Klamath Falls  
W. D. TUCKER, Klamath Falls  
C. W. HAMILTON, Klamath Falls  
V. L. PARKS, Klamath Falls  
W. W. LAWRENCE, Klamath Falls, Secretary  
Vegetable Crops Committee.

# Some Facts About Klamath County Agriculture

Klamath county was organized from part of Lake county in 1882. The story of agricultural development that has taken place since that date can be read from summaries of United States census data which have been assembled by the Extension Service, Oregon State Agricultural College. On following pages will be found tables that trace by census periods some of the more important aspects of Klamath county agriculture.

It should be noted that the censuses of 1925 and 1920 relate to January 1 of those years and the crop years 1924 and 1919. The census of 1910 relates to April 15, 1910 and the crop year 1909.

TABLE XXI. KLAMATH COUNTY POPULATION STATISTICS  
(United States Census)

Census year	Per sq. mile	Total		Rural	
		Number	Increase	Number	Percent of total
			%		%
1890	.44	2,444	-----	-----	-----
1900	.68	3,970	16.0	3,970	-----
1910	1.40	8,554	115.5	5,796	67.8
1920	1.90	11,413	33.4	6,612	57.9

TABLE XXII. NUMBER OF FARMS AND VALUE OF FARM PROPERTY IN KLAMATH COUNTY  
(United States Census)

Census year	Number of farms	Total farm values				Average values per farm		
		All farm property	Land	Buildings	Implements and machinery	Live-stock	All property	Land alone per acre
1890	332	\$ 1,743,300	\$ 1,230,940	\$ 64,890	\$ 447,470	\$ 5,251	-----	
1900	453	1,992,808	\$ 807,780	\$ 241,130	98,690	845,208	4,399	\$ 3.65
1910	926	12,053,776	9,168,541	688,745	350,939	1,845,551	13,017	20.18
1920	992	16,105,080	9,590,129	1,696,613	848,302	3,970,036	16,235	26.84
1925	789	13,213,082	9,031,681	1,693,285	806,544	1,681,572	16,747	26.48

TABLE XXIII. ACRES IN FARMS AND IMPROVED LAND  
(United States Census)

Census year	Number of farms	Acres in farms			Percent land area in farms	Percent farm land improved	Average acreage per farm	Average improved acres per farm	Total land area of county
		Improved	Unimproved	Total					
		Acres	Acres	Acres	%	%	Acres	Acres	Acres
1890	332	75,370	62,471	137,841	3.9	54.68	415.0	227.0	3,532,800
1900	453	72,239	149,315	221,554	5.9	32.7	489.1	159.5	3,746,560
1910	926	176,564	277,776	454,340	11.8	38.9	490.6	190.7	3,839,360
1920	992	152,742	204,591	357,333	9.3	42.7	360.2	154.0	3,839,360
1925	789	141,199	199,849	341,048	8.9	41.4	432.3	179.0	3,839,360

Note: Improved acres in 1925 made up of crop land and plowable pasture.

TABLE XXIV. LIVESTOCK DEVELOPMENT IN KLAMATH COUNTY  
(United States Census)

Census year	Total val- ue all livestock	Num- ber of farms report- ing	All cattle		Beef cattle		Dairy cattle		Sheep		Swine	
			Number	Value	Number	Value	Number	Value	Value	Number	Number	Value
1890	\$ 447,470	442	15,592	13,916	23,751	1,943	1,668	7,737	301	1,194	2,245	
1900	839,984	850	25,694	27,707	3,166	1,943	1,668	16,339	82,337	4,572	\$32,686	
1910	1,827,855	931	30,873	2,053,614	32,228	\$1,768,022	4,391	\$285,592	96,642	1,021,935	4,151	62,787
1920	3,928,348	789	36,679	873,739	24,374		6,279		54,363	498,279	4,027	35,840
1925	1,681,572		30,653									

TABLE XXV. PRODUCTION OF FORAGE CROPS IN KLAMATH COUNTY  
(United States Census)

Crop year	Total		Alfalfa			Grain hay			Wild hay			
	Acres	Tons	Acres	Tons	Tons per acre	Acres	Tons	Tons per acre	Acres	Tons	Tons per acre	
1889	18,001	17,361		.96								
1899	36,898	45,238	1.23	2,790	7,319	2.6	11,028	11,740	1.06	22,092	24,972	1.1
1909	55,440	75,300	1.36	6,635	19,735	3.0	14,340	18,004	1.25	30,953	31,143	1.0
1919	69,961	92,007	1.3	14,849	36,717	2.5	28,602	27,199	.95	17,474	16,323	.89
1924	46,229	71,856	1.5	17,279			12,164			12,446		

TABLE XXVI. PRODUCTION OF CEREAL CROPS IN KLAMATH COUNTY  
(United States Census)

Crop year	Wheat			Oats			Barley		
	Acres	Bushels	Bushels per acre	Acres	Bushels	Bushels per acre	Acres	Bushels	Bushels per acre
1889	2,043	17,032	8.3	1,013	13,638	13.4	571	10,690	18.7
1899	3,551	38380	10.8	1,025	14,850	14.5	538	9,830	18.4
1909	11,172	184,306	16.5	2,823	79,138	28.1	4,358	123,260	28.3
1919	9,807	107,696	11.0	3,308	82,717	25.0	3,291	79,397	24.2
1924	2,446	37,192	15.2	1,008	24,104	23.9	902	18,289	20.2

TABLE XXVII. DAIRY PRODUCTS, KLAMATH COUNTY  
(United States Census)

Census year	Value	Receipts from sales
1899	\$ 31,597	\$ 14,469
1909	62,146	45,032
1919	197,457	168,057
1924	255,189	

TABLE XXVIII. KLAMATH COUNTY FROST DATA  
(United States Department of Agriculture Weather Bureau Reports)

Station	Years of record	Elevation (feet)	Date last killing frost in spring	Date first killing frost in fall	Average date last killing frost in spring	Average date first killing frost in fall	Average length of growing season	Shortest growing season		Longest growing season	
								Length	Date	Length	Date
Chiloquin	1909-1922 12 yrs.	4,200	†	†	June 6	Sept. 6	92	42	1909	155	1912
Klamath Falls*	1894-1922 27 yrs.	4,100	June 24	July 27	May 14	Sept. 27	136	78	1916	191	1901
Merrill	1906-1922 17 yrs.	4,070	‡June 24	Aug. 20	May 18	Sept. 20	125	64	1908	168	1910
Yonna	1907-1922 14 yrs.	4,146	§		June 20	Sept. 3	75	45	1912	129	1909

\*Records for 1896-97 omitted at Klamath Falls.  
 †Killing frosts every month during 1916, 1921, and 1922 at Chiloquin.  
 ‡Killing frosts every month during 1921 at Merrill.  
 §Killing frosts every month during 1916, 1921, and 1922 at Yonna.