Migration and Settlement

ON THE

PACIFIC COAST

REPORT No. 4

BY
CARL P. HEISIG
AND
MARION CLAWSON

UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF AGRICULTURAL ECONOMICS
IN COOPERATION WITH
OREGON AGRICULTURAL EXPERIMENT STATION
AND
FARM SECURITY ADMINISTRATION

WASHINGTON, D.C. JANUARY 1941

ACKNOWLEDGMENTS

Special assistance in the initiation of the study on which this report is built was given by Davis McEntire of the Bureau of Agricultural Economics and by J. C. Moore, State BAE Representative for Oregon. Information and suggestions of much value were supplied by a number of local people, particularly by R. M. McKennon, Malheur County Agricultural Extension Agent; William Young, Malheur County Supervisor, Farm Security Administration; and C. C. Ketchum and Fred Schlapkohl, resident engineers of the Vale and Owyhee projects respectively, Bureau of Reclamation. Collaboration on various phases of the study by personnel of the Farm Security Administration and of Oregon State College is recognized, in particular that by Leslie Sorenson and Leland N. Fryer of the Farm Security Administration, and Curtis Mumford, Head, Department of Farm Management, Oregon State College.

Appreciation is expressed for the hearty cooperation given by the 134 farmers who supplied the information on which the report is largely based.

Harold Brogger and Earl Franklin of the Bureau of Agricultural Economics obtained the detailed farm-survey records.

This publication is one of 12 proposed reports dealing with the problems of migration and settlement on the Pacific Coast. The number assigned (Report No. 4) reflects the logical place of this report in this series. This is the first to be completed (January 1941). The study of these problems of migration and settlement is being undertaken jointly by three divisions of the Bureau of Agricultural Economics. The studies have three major segments: State-wide surveys of migration to the Far Western States; detailed field surveys on a sample basis of the economic situation and prospects of migrants who have relocated in these States; and an appraisal of the more important public policies affecting the settlement of the migrant group.

FOREWORD

Migrations of displaced rural families from the Great Plains and other regions to the Pacific Coast States during recent years has attracted widespread attention because of (1) the volume of the movement and (2) the critical problems of readjustment encountered both by the migrants and by older residents of the areas into which the migrants have gone. The severity of the problem varies with the locality in which settlement takes place, the opportunities available for employment, and the types and resources of settlers. The resettlement of the migrants and their absorption into the economic life of the communities into which they go constitute an important problem of public policy.

In an attempt to picture migration to the Far West and to determine the implications of the movement, a study was undertaken by the Bureau of Agricultural Economics and cooperating agencies. Three divisions of the Bureau in cooperation with the Farm Security Administration and the State Agricultural Experiment Stations of Oregon, Washington, and Idaho are conducting the study. Other public agencies have collaborated. This study of migration to the Far West has been made up of three elements: (1) measurement of the volume of migration, its sources, and destination, and the character of people; (2) studies of migrants in typical rural situations into which they have gone, including migrant farm laborers, settlers on cut-over lands, and settlers on newly irrigated land; and (3) studies of the effect of various governmental programs upon migration, and of the impact of migrants upon local governments and local governmental programs. A series of reports will present the results of this study.

The following report deals with settlement on a new irrigation development during recent years. Many conditions found on the Vale and Owyhee projects of eastern Oregon may be expected to be duplicated on future reclamation projects. Desirable features of settlement on these projects should be encouraged on other projects where they will fit. Experiences of settlers in farm development help solve the problems of public agencies charged with the guidance and development of new agricultural communities.

This report is divided into three major sections: (1) Suggestions for Economic Development of Future Reclamation Areas, (2) Digest of Analysis, and (3) Detailed Analysis of the Vale and Owyhee Projects, Malheur County, Oregon. For those not interested in details or supporting evidence of the generalized statement, the first two sections form a complete unit. The third section gives a more complete statement of the local area description, outlines the method of study, and gives details of the findings.

CONTENTS

NEW FARMS ON NEW LAND

A Study of the Economic Situation of Settlement
on the Vale and Owyhee Reclamation Projects,
Malheur County, Oregon

By
Carl P. Heisig, Agricultural Economist, and
Marion Clawson, Field Representative,
Bureau of Agricultural Economics

SUGGESTIONS FOR ECONOMIC DEVELOPMENT OF FUTURE RECLAMATION AREAS

Widespread opportunities for settlement on irrigation projects have existed in many parts of the West. Recently, settlement opportunities on such projects have become less numerous because most of the easily accessible irrigable land had been taken, although important additions to irrigation agriculture have been made. Now under construction are such developments as the Black Canyon project in Idaho, the Roza Division of the Yakima project and the Columbia Basin project in the State of Washington, and the East Mesa unit of the Imperial Valley project in California. These and others will offer additional opportunity to misplaced farmers of the Far West and to rural migrants from other regions.

Aside from considerations of reclamation as a national policy or the impact of such developments upon the agriculture of older established farming areas, these projects offer problems of public policy directly concerned with settlers. Newly irrigated lands are one of the means for accommodating part of the influx of migrants. Therefore, an appraisal of the opportunities offered, the problems encountered by settlers in the development of a new farm, the financial needs during early years of settlement, and prospects for eventual success, are of primary concern to many public agencies, other interested parties, and the settlers themselves.

Planning the development of a reclamation area, particularly a large one, involves engineering, soil analysis, and other technical physical sciences, as well as considerations of such problems as transportation, location of towns, and public services. The suggestions that follow do not pretend to represent such complete project planning. They are made from an economic viewpoint, particularly from the viewpoint of the individual farmer and his plans and problems. In any program that may be evolved, the interests of the settler and his family must receive primary consideration.

Let it be assumed that the physical, engineering, economic, and social feasibility of the project have been thoroughly investigated and

have been found to be satisfactory. Construction work is started. What can the economist and farm management specialist suggest, as a result of experience elsewhere, that will facilitate developments and advance the success of the project? Such suggestions and their background are presented in the following discussion.

Type of Farming

What kind of farming is most likely to succeed? Two considerations enter here: the natural factors which determine what crops and livestock can be grown, and the economic factors which determine the crops and livestock that will be grown. On the economic side, it is somewhat easier to say which crops have the least chance of success than it is to say which have the best chance.

Fruit has been grown on many reclamation developments in the past, but most established fruit areas of the West are now experiencing materially lower incomes than they had in earlier years and some of them are in actual distress. Trees are being pulled more rapidly than they are being planted, in many parts of the West. The situation has been somewhat worse for apples than for other fruits. Foreign outlets for Western apples, which have been very important in the past, are likely to be severely curtailed for some years. Production of citrus fruits is expanding rapidly in the United States, so that all other fruits face increased competition from citrus fruits. This situation offers no hope of success to large new areas of fruit. Small new areas might find a market for superior yields, quality, and out-of-season production for special markets.

The situation for most truck crops is little better than for fruit. When established areas with established market outlets, where farmers fully understand the technical problems of production, are having difficulty in obtaining reasonable farm incomes, the outlook for new areas of truck crops is not very good.

Many past irrigation developments have produced feed crops for wintering range animals. Rangelands of the West are fully stocked, and in many areas some reduction in range-livestock numbers will be necessary, to protect the range. Perhaps a shortened grazing season, with consequent lengthened feeding season, would relieve the load on rangelands and also provide an outlet for farm-raised feeds. But farm feeds are more costly than range feed, so the possibilities of changes of this type consequently will be severely restricted. Fattening of range-livestock for market may provide one outlet for feeds produced on reclaimed lands.

From a social standpoint, it may be well to prevent the adoption of crop systems that entail sharp peak demands for labor. The perplexities of the surplus migrant labor problem which usually attends such systems will often offset any increase in farm incomes. Most newly reclaimed land will be used for feed crops such as hay, pasture, and grain and for cash crops such as sugar beets, alfalfa, and clover seed. Farm livestock will consume the feed crops produced. In most instances, reclamation in the next decade or two is going to mean increased farm

livestock--particularly dairy cows, hogs, and poultry. Competition with established areas will be encountered for these products, but the market for them is nation-wide and the volume of production is large. National agricultural programs may offer restrictions or inducements to certain products.

Physical Limits of Farming.- Physical factors such as length of growing season, soil types, slope, and rainfall are generally recognized as important. In the past, development of farming on reclamation areas has taken place without adequate consideration of conservation of the soil. The topography of the land to be irrigated varies greatly in different parts of most reclamation projects, and farm size and cropping programs must be adapted to topography and soil. On an area like the Vale and Owyhee projects, some farms will be able to follow a highly diversified cropping program with considerable freedom of choice of crops, whereas others can consider only a very few alternative cropping systems. The feed crops raised will go far toward determining the livestock system of the farm. On most reclamation projects there is some irrigated land which can be used only for pastures or other perennial crops, if severe soil erosion is to be avoided.

A cropping system that will maintain yields will have to provide for weed control and the maintenance of soil fertility. Maintenance of fertility is not a pressing problem during the first years of settlement, as the growth of alfalfa or other legumes provides some nitrogen and usually brings increased yields. With longer cropping, depletion of the original mineral content of the soil will become more serious. Crop rotations and the use of manure will then be helpful in maintaining crop yields. Weed control will become a more serious problem after areas have been farmed for some years.

Within the general pattern of farming as determined by market outlets and natural factors common to the entire area, individual farms should vary considerably in organization and type, in order to make the best adaptation to the natural conditions of the particular farm.

Size of Farm

Equally important with considerations of the most desirable type of farm are those of best size of farm. Once subdivisions have been carried out in a new reclamation area, changes can be made only with difficulty and expense. Consolidation is particularly slow and expensive. Correct division into farm units in the original settlement is much more satisfactory than later efforts to adjust farm sizes.

When dividing a new reclamation area the aim might be to create farms that will produce a certain net income, or farms that will produce maximum returns to the farm operators, or that will produce a maximum income per acre, or some other basis might be used. The various bases that might be established would not necessarily be contradictory, but neither would they lead to identical results.

Public policy regarding farm size has been expressed fairly well in the various acts that authorize reclamation development. Emphasis has been placed upon family-size farms, and restrictions have been placed on the development of large farms. A family-size farm is assumed to be large enough to produce an adequate living for the farm family.

In the discussion that follows, it is assumed that adequate family incomes from farms operated chiefly by the farmer and his family are desirable and can be obtained. The reclamation restrictions on maximum acreage per operator are assumed to limit farms to family farms, and to exclude large commercial-farming developments. At the same time, the high costs of reclamation make it highly desirable that farm incomes also be high.

Family-Size Farm.- A more fundamental consideration of minimum farm size than any acreage measure is this: Farms should be at least large enough to provide full employment for the farmer and his family during the peak season of work. If there is a sharp seasonal peak in labor demand, farms might well be large enough to provide full employment at other times in the year, and seasonal labor could be employed during the periods of peak demand. In some fruit areas, for instance, the desirable farm size is one that allows the operator to do most of the work except at picking time. If regularly established, dependable sources of employment are available off the farm, part-time farms may be satisfactory. Farms that do not fully employ the operator and his family at some season are definitely too small. This does not deny, but rather assumes, such other factors of good farm organization as well-designed cropping systems, efficient lay-out of buildings and fields, and use of livestock to consume farm feeds.

Farm income for a given type of farm was fairly closely related to PMWU 1/ per worker on the farms in the Vale-Owyhee area. Judging by the experience in that area, it is possible to set up some rather definite standards of minimum farm size. General farms, with cash crops and livestock, should be large enough to provide at least 175 PMWU per adult worker, and preferably 200 or more PMWU per worker. Cash-crop farms should be large enough to provide at least 140 and preferably 170 or more PMWU per worker. Special-crop farms, under conditions particularly well-suited to the particular crop, should provide at least 120 and preferably 150 PMWU per worker. These standards are on the basis of full-time adult workers. If more than one full-time adult worker is on a farm, the size should be increased accordingly. The work of partly grown boys can be reduced to adult equivalents, considering their ages, the time they spend in school, and the opportunities for employment on the farm. For instance, on a dairy farm, a 14- and a 16-year-old boy, both going to school, would probably be equivalent to one full-time adult worker. They could help with the chores morning and evening and

---

1/ PMWU - a productive man work unit. A 10-hour day of productive employment, at average rates of performance, constitutes a PMWU. See Note 2, Appendix, for a definition of the term and the rates of performance used in calculating amounts of work on each farm.

on Saturdays, and would be available for work during vacation time.

In any program for subdivision of irrigated areas into farm units, some provision should be made for farms of different sizes (within limits of 40 to 200 acres) to fit the varying capacities of farmers. Some variation may also be achieved by the farmers themselves in the intensities at which they can or will operate. Some farmers are good managers, employing their own time, hired labor, and capital to good advantage; others cannot accomplish nearly so much. Sometimes physical disabilities lessen the amount of work a farmer can do. Size of the operator's family is an important factor. A family of growing boys may make dairying or sugar-beet raising both possible and desirable, whereas a childless farmer might be interested in neither. The most appropriate organization for a young, physically active, ambitious farmer who has had to incur considerable debt in order to get started differs greatly from the organization that is most appropriate for this same man in middle age when his boys are able to help with farm work, and from that most appropriate in later years when the family is grown and gone, when he is no longer so physically active, and when the mortgages have all been paid off.

Farms - 40 and 80 acres.- A 40-acre farm, all irrigable and nearly level, with perhaps 8 acres of sugar beets each year, some irrigated and highly productive pastures, with the remainder of the land mostly in alfalfa, and with sufficient dairy cattle to consume the farm-raised feeds, would have 210 to 230 PMWU, depending somewhat upon crop yields. This is a fairly adequate size of unit for one man, whose children are unable to help with farm work. A small amount of hired labor would be required for harvesting and for thinning and weeding the sugar beets. A commercial poultry plant would add to productive employment on this farm. Sale of hay or keeping of beef cattle instead of dairy cows would lower the PMWU about one-third (this size of enterprise would usually be considered as too small). A 40-acre farm that is not all irrigable, or one on which sugar beets could not be grown because of soil or slope conditions, would provide less opportunity for employment. If truck or fruit crops can be grown profitably, farms smaller than 40 acres will provide fairly full employment for one man. A 40-acre general farm is the smallest unit that will provide full employment for one man, and it can do this only when operated rather intensively under favorable conditions.

An 80-acre farm, with perhaps 70 acres irrigable, some of it rather steep, and used for grain, hay, and seed crops, with some farm livestock but almost no dairy cattle, and with a large part of the crops sold, would have from 175 to 200 PMWU. This farm would be smaller, based on opportunity for employment, than the intensively operated 40-acre farm. There would be opportunities for additional employment, by substituting alfalfa for part of the grain, or alfalfa for part of the clover seed, or by feeding all of the crops on the farm instead of selling them, or by substituting dairy cattle for beef or dual-purpose cattle. If all these changes were made, this farm would have 330 to 360 PMWU. It would provide employment for the farmer and two half-grown sons and would require a small amount of seasonal hired labor. The possibilities of adjustment of the 80-acre farm, as compared with the 40-acre farm, are considerably

greater. Differences in family size, age, or the ability of the farmer can be taken care of on the 80-acre farm more readily than on the 40-acre farm. A community with a large proportion of 80-acre or larger farms would have far greater possibilities for adaptation to different economic and population conditions than a community primarily of 40-acre farms.

The above examples are illustrative only. They show that total acreage within the farm boundaries is a poor measure of economic size. Careful and detailed consideration of each particular situation is necessary before a judgment can be made as to appropriate farm size. An arbitrary decision to divide an entire area into one or two sizes of farms, along legal subdivisions and without regard to natural conditions, is certain to result in many uneconomic and inefficient units. Some general principles regarding farm subdivision can be laid down, but detailed study in the field is necessary for effective subdivision.

Credit

Most settlers on new land will not have enough capital to develop their farms fully. Men with ample capital generally prefer to buy farms in established farming areas. If the settler with inadequate capital is going to succeed, he must have credit from some source. On most reclamation areas there has been a demand for adequate credit. Various public agencies have an interest in seeing that the settler is adequately provided with credit, so the project will be successful and people will have satisfactory living conditions.

The settler on new land who has little capital, and the agency that finances him, must choose between a small family farm with smaller income possibilities and smaller debt, and a larger farm that will produce more income but will necessitate heavier indebtedness. There are various ways in which a settler can hold his capital investment to a minimum. He may get along with poor buildings that he puts up himself. He may do all his land clearing with his own labor. He may build up his livestock numbers from his own herd. All of these measures will lengthen the time required to bring the farm into full production, and most of them will mean a lowered scale of living, at least for a few years.

The settler should have enough credit to erect necessary buildings, including a comfortable but modest house. A high-priced house will give the farm family a good place to live, but it may take too much of their income to pay the interest on the extra debt. If the farm is a success, the home can be improved from current income. Adequate credit for prompt development of the land into a productive farm, but without excessive indebtedness for items that can be satisfactorily postponed, gives promise of the most successful record of repayment.

Settlers Should Have Sufficient Cash or Credit.- Settlers in new reclamation areas have usually been handicapped by inadequate cash or credit for development. This has meant poor housing and inadequate living for the farm family, and retarding of farm development.

One approach in dealing with this problem would be for public-credit agencies to advance enough credit to permit rapid development of the farm and to provide adequate living facilities for the family during the development period as well as later. For an 80-acre farm this might require a $6,000 investment distributed approximately as follows: $1,800 for a dwelling; $250 for a well and pump; $600 for outbuildings; $800 for land; $750 for clearing, leveling, ditching, and fencing; and $1,800 for operating credit.

If an investment of this size were advanced as credit it should be made as part of a complete settlement plan that involves adequate supervisory assistance until the farmer has become familiar with the area and with irrigation farming. Payment would have to be delayed during the early years of the settlement period. A long-term, low-interest payment plan would have to be developed.

An alternative approach to the problem is a more gradual development of the farm plant, but one that involves more liberal use of credit than usually has been available to settlers in reclamation areas. This involves gradual clearing and leveling of land, substitution of family labor for hired labor in constructing the buildings, and more modest but still acceptable housing conditions, particularly during the development period. On the other hand, this approach makes it possible for most settlers to assume the responsibilities of managing a full-time irrigated farm somewhat on an apprenticeship basis. If adequate supervision and credit (on a long-term, low-interest basis) are not available, this approach will be the only alternative to the unsatisfactory progress resulting from lack of credit. Even under the delayed development plan, for a reasonably adequate farm setup the settler must have at least $4,000 in cash or credit available for investment within the first 2 years of settlement. A smaller sum than this will severely handicap the settler.

In the Vale-Owyhee area it was possible to obtain irrigable land for an average of about $10 per acre. In most reclamation areas, values of raw land will be low, since the speculative element is largely kept out by the Bureau of Reclamation's anti-speculation policy. Dwellings can be erected for widely varying sums depending on the size and type of house, number and kinds of facilities provided for, and the extent to which the settler does the work himself. An adequate house built immediately upon settlement will cost at least $1,000 for materials alone. If any smaller sum is spent for housing, it is of the utmost importance that the first dwelling be of a flexible type which can be added to in later years when the settler has increased resources and more time is available for building a better house.

Some settlers in the Vale-Owyhee area have started out with "basement houses." A basement house consists of a finished basement to which above-ground floors can be added later. Such dwellings, although far from adequate as permanent housing, if properly constructed are warm and dry in this climate. If the families are not large, these basements provide fairly satisfactory accommodations for a few years. They are much superior to the crude shacks in which many families are living.

For settlers with small resources, they have the added advantage of being susceptible of improvement without loss of previous investment, whereas the shack-type of dwelling can hardly be improved without alteration in the basic design and structure.

If a flexible building program is adopted, in which only part of the eventual dwelling is built at time of settlement, $500 should be the minimum cash outlay for materials, with an additional $500 expended at a later date. It may be noted that even this low minimum is considerably higher than the average value of dwellings now used by the new settlers included in the present survey.

From a social point of view, however, it would probably be preferable to advance settlers sufficient long-term credit to permit the building of an adequate house immediately upon settlement, rather than to hold to a bare minimum, expecting later improvements. Other farm buildings will depend upon livestock needs, but the cost probably will average at least $600. Necessary machinery, livestock, and other items will cost at least $1,600 for a general type of farm. Some cash costs will be involved in clearing land. Farm operations the first year or two will probably be at a loss, and cash is required for family living.

The absolute minimum of money required to develop farms in new reclamation areas will vary with many factors, such as cost of land, type of buildings and machinery needed, size of farm, amount of livestock kept, and difficulties of preparing land. Careful study will be required in each area to learn this minimum. If farms vary considerably in size, so will capital requirements. Various unforeseen events, either on the farm or within the farm family, may necessitate capital in excess of the minimum.

It seems evident that certain principles should be followed in extension of credit to settlers on new land. If an agency is going to make any credit available to a settler, it should be prepared to make enough available. Insufficient credit will not bring an efficient productive unit, and both borrower and creditor will lose. If credit is to be extended, it should be available when needed, which generally means very shortly after settlement. The plan for repayment of the loan should be reasonable in the light of the settler's probable income, year by year. To set up a repayment plan that cannot be met gives the borrower a bad credit rating, discourages him, and makes the creditor believe that he is being cheated. But it should also be recognized that too liberal a credit plan is likely to destroy the initiative of the settler, result in high costs of other loans, and impair any attempt to select settlers.

Repayment Plan Must Be Reasonable.- The amount of loan repayment that can be expected each year depends upon probable income and upon settlers' willingness to repay debt. The obstacles to be overcome in getting farms in productive condition determine the rapidity with which farm income will rise. Sagebrush clearing takes some time, though lands previously dry-farmed can be put into cultivation more quickly than sagebrush lands. The amount of leveling necessary makes a great deal of difference in the time required to bring a farm into full production.

Where the soil is largely sand and topography is rough, a great deal of work, considerable expense, and several years will be necessary to bring all the land into cultivation. Where slopes are not excessive and a true soil development makes extensive leveling unwise, less expense and time will be involved. Transformation of raw land into a productive irrigated farm is a major undertaking and is likely to encounter unexpected obstacles at any time.

The experience of new settlers on the Vale and Owyhee projects provides a valuable guide as to probable repayments. The first crop year and the settlement period that precedes it require considerably more outlay of money than is received in income. The second crop year also requires an outlay of money that is larger than the income, but the difference is much less marked than during the first crop year. In the third and fourth crop years some farmers will still be spending money in excess of current income, whereas others will be paying off indebtedness or adding to cash on hand. Little principal will be repaid until after the fifth crop year. A few farmers may need additional investment credit even in these years. The amount borrowed and its repayment depend on the level of living of the farm family. On the Vale and Owyhee projects it was very clear that new settlers were sacrificing their living conditions considerably in order to lessen the amount to be borrowed and in order to increase the amount of repayments. Although it is probably desirable that people heavily in debt should live frugally in order to increase their assets, it certainly is not socially desirable that the level of living should be too depressed. Public-credit agencies would probably be severely criticized if they insisted on a repayment schedule that seriously impaired the settlers' living.

A desirable credit plan for a new reclamation area would provide a repayment plan based on estimated income and expense by years. Such a plan should be conservative. Records should be obtained from both borrowers and persons who are able to finance their own improvements, and such modifications should be made in repayment plans as farm incomes seemed to justify.

In older settled areas, a sound loan is one upon which interest is paid currently and on which principal payments are made frequently, often yearly. In new reclamation areas, a different definition of soundness is required. A loan may be sound, even though no interest is paid and more is borrowed each year, if improvements are made to offset the increased loans and if the farm is being placed in condition to produce a larger income. Loans might well be made with requirements that certain acreages be cleared or seeded to some crop, or that livestock numbers be increased a given amount. Fulfillment of these objectives would be considered satisfactory fulfillment of loan conditions. Supervision of such loans would be essential, in order that the lending agency could be sure its equity was protected.

In general, most of the settlers will require some credit, and a large part of them will need public-agency credit. The comparatively low equities of many settlers, the relatively large debts, and the time interval between extension of credit and its repayment, as well as the

fairly high risks involved, make it highly desirable that some public agency be in a position to extend the necessary credit. The needs of many settlers for advice and assistance make loan supervision desirable. The Farm Security Administration, or some agency organized on similar lines, seems particularly well qualified for credit extension to new settlers on reclamation projects.

Land and Water Policies

The Bureau of Reclamation or any other agency responsible for the development of a new irrigation area can guide the course of development by its policies regarding the use of land and water.

Natural Boundaries.- One basic consideration, and one which should have attention before settlement begins, is subdivision of the area into farms on the basis of natural boundaries, and not on the basis of customary legal subdivisions. Farms formed by legal subdivision lines are not natural units. They impose handicaps on farm operation in the way of odd-shaped fields, irrigating through one or more neighbors' farms, and circuitous routes from farmstead to field and return. The combined effect is a considerable hardship on some farms, impairing both income and land values. There can be no doubt that subdivision of irrigated areas into farm units along natural boundary lines will increase farm operating efficiency, but it must be admitted that there will be many difficulties in such subdivision.

One argument brought against this plan is that it would make road location difficult and that roads would be longer and more crooked. A combination of natural and legal boundary subdivision would meet this objection. Main roads, at intervals of 2 or 4 miles, could be straight, following section lines. Local roads would follow natural boundaries, generally drainage courses, but occasionally the tops of ridges. Road construction along these lines would be cheaper than straight-line roads, grades would be fewer and more gentle, and far less irrigable land would be devoted to roadways.

Another argument against subdivision by natural boundaries is that it would be difficult to carry out unless the Government owned all the land. Difficulties when the land is owned by many private persons are by no means insurmountable. For one thing, ownership units before irrigation development, whether for grazing, dry-land farming, or speculation, are almost sure to average considerably larger than the farm units developed under irrigation. Within ownerships, subdivision could easily be along natural boundaries. Technical assistance in subdivision and careful appraisal of tracts in separate ownership would greatly facilitate subdivision and the exchange of tracts for the purpose of getting natural operating units. Whatever the system of subdivision may be, the final farm unit will have been subjected to some changes by the owners made to fit their individual preferences.

No Land Speculation.- The present policy of the Bureau of Reclamation is to discourage speculation in land. This is done by requiring that

at least one-half the excess sales price over appraised value must be paid in cash to the Bureau, to be applied on the indebtedness for construction of the irrigation system. Restrictions are also placed on the price at which raw land may be sold. All provisions against speculation in land values should be continued, and in many instances strengthened. Critics of the restrictions on raw-land prices have pointed out that it is extremely difficult to know accurately the price at which raw land is sold, without intensive investigation. There is nothing to prevent the sale of a tract of irrigable land at the established price, with a simultaneous sale of nonirrigable land at a price far in excess of its real value. The story is sometimes told of farm-products sales in Germany when restrictions were placed on maximum prices at which farmers could sell; the hog buyer bought the load of hogs at the standard price and the farmer's dog at a fancy price. If the dog escaped from the buyer while on the way to town and returned to the farm never to be recovered, the law still had not been violated by sale of hogs above the legal price.

Government purchase of all irrigable land, with subsequent resale to actual settlers, would have many advantages. Raw land could be bought at actual appraisals, completely stopping speculation of this kind. The area could be divided into natural operating units. Farm and area planning would be greatly simplified. Restrictions regarding land use and sale could be written into sales contracts, wherever restrictions were clearly necessary, and finally, raw-land cost could be added to reclamation cost, thus materially easing the credit problem of the settler. Raw-land prices will rarely average as high as $10 per acre, while reclamation costs will generally exceed $100 per acre, so that the cost of raw-land purchase would not be large in proportion to other reclamation costs.

Water Charges.- The Bureau of Reclamation or other land-administering agency can do a great deal to promote desirable land and water use by the way in which it levies water charges. The customary method is to levy a flat annual per-acre charge which entitles the farmer to a given amount of water, and then to levy a charge for all extra or surplus water actually used. If the base charge is reasonable and the charge for extra water is graduated steeply upward, the result of this method is promotion of efficient and careful use of water. If extra water can be freely bought at a cost per acre-foot as low as or lower than the cost of water provided for the flat per-acre base charge, there is no incentive to conserve water, with the result that much is wasted, a smaller area is irrigated than could be irrigated with better management, lower lands are ruined by waterlogging, and excessive leaching occurs. Water can be substituted for labor within wide limits. If water is cheap, there is a tendency to irrigate the quickest way, even when considerable water is wasted. This is particularly the case when labor is hired and the operator balances the cost of water against the cost of labor.

Rate of Development Within Projects

One factor affecting the rate at which a project should be developed, after construction has reached the point where water can be made avail-

able, is the supply of settlers. Tardy development means high costs per acre developed, since a large share of the project operating cost is fixed. Development of the Vale and Owyhee projects has been very rapid, owing to lack of employment elsewhere, to migration from other areas because of drought and related conditions, and to available public-agency credit. These factors continue to operate, at least to some degree. Settlement on reclamation areas in the next 5 to 10 years probably can be as rapid as is desired, at least if settlers are given adequate credit by some public agency. Settler selection, if that seems desirable, can be practiced only when the supply of settlers is greater than the rate of project development.

Reclamation development should be closely geared to market outlets. For many farm products, markets are predominantly local. This is particularly true of hay and pasture, to a lesser extent for other crops. Unless livestock production expands step by step with increasing feed-crop production, prices of these crops will fall precipitously. Although the production of a reclamation area may be small in comparison with that of the region, State, or even the county, it may represent a very great increase locally. Increasing the hay production in the Vale-Owyhee area, while livestock numbers lagged behind, brought depressed hay prices for both old and new settlers.

Market outlets are frequently influenced by marketing and processing facilities. Sugar-beet production depends upon the availability of a sugar factory. If beets are shipped for some distance, the farmer gets a lower price. A local sugar factory depends upon an adequate acreage of beets. The national program with respect to sugar, and particularly the provisions with respect to "base" acreage for a new area, are very important in setting the rate of expansion in sugar beets. Development frequently must move in a series of relatively large increases followed by a period of no growth. Similar situations prevail with creameries, packing plants, and canning factories. Although in general a consideration of market outlets means slow reclamation development, it may mean a speeded-up development in order to justify some marketing or processing plant. Increased production under these circumstances may mean more efficient operation of the marketing system, with consequent price increases to farmers. In any event, reclamation development and market outlets should be coordinated carefully.

The problems of counties, school districts, and other local governmental units in a period of rapidly increasing crop acreage are similar to the problems of the settlers on these lands. Each looks forward to the day when income will be increased, but in the meantime each is sorely pressed to find the cash for necessary improvements. Rapid settlement calls for many new roads and new schools, and increases the duties of county officials. Assessed values rise slowly and new settlers are in no position to pay large taxes. Yet everyone wants better roads--needs them badly. One of the most frequent dissatisfactions expressed with the Vale-Owyhee area was with respect to the dust. Ungravelled roads had several inches of dust in most places, which rose in a cloud with each passing vehicle and became mud in the places where water overflowed the road. Serious consideration should be given to the extension

of low-interest-rate credit to counties and school districts in order to ease their problems of financing in the period of most rapid settlement. The matter of local governmental revenues becomes particularly acute when the reclamation development is very large in comparison with the present development of the area. This will be the case on the Columbia Basin project.

Determination of the best rate of reclamation development is almost as many-sided a problem as determination of the pattern and desirability of any development. The preceding paragraphs deal with some phases of the problem and ignore other important phases on which the results of this economic study do not bear.

Settler Selection and the Settlement Process

Since a major objective of reclamation is to provide homes, emphasis will naturally be placed upon farm operation by owners. Even if all farms were settled by owners, some tenancy would normally arise as present owners were succeeded by sons, other heirs, or purchasers. Some tenancy, particularly of some types, is not undesirable and should be expected. Research directed toward equitable and satisfactory tenure relations may be needed.

Some degree of settler selection is desirable from the viewpoints of settler, reclamation agency, and credit agency. A person unsuited to irrigation farming has not been benefited if he undertakes raw-land reclamation and fails. Failures are undesirable to the reclamation and credit agencies and to the community at large. It is difficult to define and measure the qualities necessary for success in reclamation of new land. Farming experience, particularly under irrigated conditions, is desirable; so is a minimum amount of capital. Yet some persons succeed with very little of either. Ability and willingness to do hard work, managerial capacity, and a spirit akin to that of the early pioneers are valuable assets.

If irrigation water is provided by one public agency, credit provided by one or more public and many private agencies, and land is for sale by many private persons and corporations, it is virtually impossible to exercise much settler selection. An abundant supply of prospective settlers gives the opportunity for settler selection, and yet may actually defeat it. When many people are seeking opportunities for earning a living that are limited in number, the poorest business men among them may bid up the price of land to the point where better judges will refuse to buy. Anti-speculation provisions will partly eliminate this situation. When public agencies are furnishing both irrigation water and development credit, they are justified in so selecting settlers as to bring about the most successful development of the area. The whole process of settler selection would be greatly simplified and made more effective if the raw land were owned by the Government.

Settlement on a large reclamation project should be by districts or units, with virtual completion of settlement in one district before another is opened. Many of the earlier projects were opened for settlement

over too large an area, with resultant scattered development, high road and school costs, and high expenses of operating the irrigation system. Development by districts is now generally accepted as a sound practice.

In selection of settlers and in development of areas, some consideration should be given to essentially sociological factors. For instance, the most desirable age distribution of settlers in an area should receive some thought. If all settlers are approximately the same age, whether young or old, the community will be distinctly abnormal. The time will come when all farmers will be old; school buildings will be overflowing at one time and empty at another. Settlement in an area should have an age distribution at least approximating that of old established communities. Another factor to be considered is the pattern of community life. Race, religion, and cultural background help to determine the pattern of community institutions. A considerable share of settler discontent on some projects is traceable to the lack of satisfactory community groups. At best, the settler on a new area has many difficult adjustments to make; their impact will be lessened if some features of his community life resemble those of the place where he formerly lived.

Recreation areas would be a valuable addition to community life. They could be established with little expense in some of the gullies and canyons at the edge of the irrigated areas, where waste water from irrigation usually runs, and willows and some other trees naturally grow. If the local people would provide some labor, a small cash expenditure would create attractive grounds for picnicking, camping, and other recreation.

Special Technical Assistance to Settlers

Special advice and instruction from public agencies is required in the settlement process. Many settlers are unfamiliar with irrigated agriculture; others will have had no experience with particular crops or livestock. The accumulated experience of the agricultural colleges, the Department of Agriculture, the Bureau of Reclamation, and other agencies should be made available by some form of extension education and supervisory assistance. The educational assistance in a new area should be several times greater than that in an established area. The cost would be negligible compared with the other costs incurred. Some of this assistance could be provided most advantageously by the credit agency, but settlers who can finance their own development would also need special assistance.

Organization of a farm for irrigation, and the first few irrigations, may require more knowledge and skill than many settlers have. The possibilities of serious damage through unwise use of irrigation water are great. When the settler is putting up his farm buildings, he is determining his farmstead lay-out for many years. A little advice at this time might save him a vast amount of later labor. Most settlers are anxious to erect the best buildings they can with the money available, and frequently do their own building. Assistance in planning the dwellings, barns, and other buildings would be very worth while. So might

instruction in building. It is probably safe to estimate that settlers in the Vale-Owyhee area have had need for more special assistance and advice in the first 5 years of settlement than they will require in the next 20 years.

If proper assistance were available to all settlers, there would still be wide variations in family living, owing to differences in the ability and willingness of the families to do things for themselves. Many settlers have previously developed skill in carpentry, plumbing, masonry, and similar trades which they can use in adding to their own conveniences and in adding to their incomes by work on neighboring farms or in town. The family diet can usually be bettered if the family will raise a garden and preserve its products. Distinct differences will also occur in the ability of farmers to see and do the many odd jobs which can add to the value of the farm and to the convenience of farming operations.

DIGEST OF VALE-OWYHEE AREA ANALYSIS

When irrigation water is brought to raw land, a long series of complex and interrelated changes is started. The changes affect the land, the farm as a business enterprise, the farmer as an income producer, the family as a social group, and the community as a whole. An analysis is here given of these changes and the problems they cause on the Vale and Owyhee projects in Malheur County, Oregon, where more than 1,000 new farms have been established since 1930. More than 700 of these were started in the 3 years, 1936, 1937, and 1938.

Farm Development Following Settlement

From the time the new settler first moves onto his tract of raw land until the time when a fully developed and improved farm exists, many changes occur. Some are obvious to the casual observer and some are less apparent. Most noticeable is the increase in crop acreage. Land clearing and seeding is the most urgent task facing the new settler. The average farmer on these projects who had produced but one crop on his land in 1939 had been able to clear 44 acres in time to plant that year. This usually represented some effort during the fall or even summer months of the preceding year, as well as clearing work during the winter and spring. In following years, the acreage cleared and seeded increased somewhat more slowly, to an average of 55 acres the second year, 67 acres the third and fourth years, and 74 acres on farms operated 5 years or more. By that time most of the irrigable land was cleared. Some of the first clearings were leveled and prepared more carefully in later years. After the first year, the need for putting up buildings and carrying on regular farm operations slowed down the clearing rate.

Almost equally noticeable is the change in use of cropland. Grain

was the most common crop the first year, 56 percent of the cropland being used to grow small grains that were likely to bring an immediate income. Alfalfa and clover were frequently seeded with the grain, the latter serving as a nurse crop. The acreage in grain decreased somewhat, particularly after the second crop year, and with an increasing total crop acreage the proportion of cropland used for grain declined to about 20 percent by the third year. The acreage of alfalfa increased rapidly until the third year, but apparently remained about constant thereafter. Clover acreage also increased during the first few years; clover seed was an important crop on many farms. Sugar beets were rarely found until the fourth or fifth year, as the raw lands needed organic matter and nitrogen which could be introduced only by rotations and legumes. The acreage of irrigated pasture increased from 7 percent of the cropland during the first year to 25 percent on farms cropped for 7 or more years.

There was an increase in livestock numbers with increased length of settlement. During the first months before a crop is produced, no farm-raised feed is available for livestock. The average farmer during the first crop year had 10 animal units of productive livestock--3 dairy cows, 6 other cattle (including young animals), a few hogs and chickens. Part of the feed for these animals had to be bought. The number of animals did not increase much the second crop year, but thereafter increased rather rapidly, reaching 33 animal units of productive livestock on farms in operation 7 or more crop years. Even these farmers had fewer livestock than they expected to keep in the future, so this adjustment perhaps had not run its course. Increases in livestock were approximately the same for each class of stock. The lag in livestock increases, as compared with increases in cropland acreage, brought a serious disparity between available feed supply and opportunities for disposal on the farm. Livestock numbers increased slowly, because most farmers could not afford to buy animals, and large increases by raising one's stock require several years.

Marked increases in crop yields came with longer periods of settlement, owing to increased organic matter in the soil, to better soil tilth, to better leveling for more efficient irrigation, and to better cropland preparation. The crop-yield index rose from 87 on farms producing their first crop to 122 on farms in operation 8 or more crop years. The increase in crop yields, nearly 50 percent in 7 years, increased the income from farming materially. Crop yields on the newly settled lands, which lie largely on the benches, will probably never reach the yields obtainable on the older adjacent districts located on the valley floors. The yield index on farms in the older districts averaged 132 in 1938.

On the new lands, as measured by total crop acreage, use of cropland, numbers and kinds of livestock, and crop yields, the farm organization seemed to be approaching that of the older adjacent districts, as the farms became older.

Limiting Factors in Farm Development

Size of Farm.- Three-fourths of the farms in the Vale-Ontario[2/] areas ranged from 30 to 99 irrigable acres, but acreage alone is not a good measure of farm size because of variations in type of farm and other factors. The amount of productive employment furnished the operator is a more satisfactory measure of farm size than is acreage in crops. Crop farms furnish less opportunity for productive employment than do livestock farms, if the acreage of the farm is the same in each case. For example, the average livestock farm included in this study had 48 acres of crops, as compared with 71 acres on the average crop farm; yet the number of productive man work units (or average days of productive employment) were 227 on the average livestock farm and only 249 on the average crop farm.

Livestock.- Livestock were an important factor in successful farm organization in the Vale-Owyhee areas. Not only did they provide increased productive employment of the farmer and his family, but they provided a market for farm-produced feed. In 1938, the average livestock farm did not keep quite enough livestock to consume all the hay raised, but the average crop farm was unable either to feed or to sell nearly one-third of the hay it raised. In the long run, crop farms will be forced to keep more livestock or adopt a different cropping practice. The livestock farms have an additional advantage in the manure production which aids in maintaining soil fertility.

Farm Lay-out.- A well-designed farm lay-out economizes operation. Many farmers were handicapped because of improper location of farm boundaries. Boundary lines parallel to section lines often isolate small pieces of irrigable land, cause inconveniences in irrigation, unnecessarily occupy valuable irrigable land, and increase costs of farming. Many farmers knew that their farms were poorly laid out. They had found it much easier to buy land divided on the usual legal subdivision basis than to buy land divided on the basis of natural features. Often they had not realized the handicaps until they started to farm.

Cropping System.- A good cropping system is essential for good farm organization and management. On the new farms of this area, however, the chief concern was to get the irrigable land into any crop. Cropping systems had received less attention. On the basis of results obtained in 1938, the most profitable crop and livestock system appears to be the inclusion of sugar beets in the rotation after several years of alfalfa or clover, with enough livestock to consume most of the feed grown on the farm. The most satisfactory cropping system varies with topography. On farms with a large percentage of relatively steep land,

---

2/ The term "Vale-Ontario" is used to designate all irrigated areas included in the area studied, both newly developed areas and areas under irrigation for several years. The term "Vale-Owyhee," as used in this report, refers only to those portions of the irrigated areas included in the new Vale and Owyhee reclamation projects which have been brought under irrigation since 1930. These new areas are adjacent to older irrigated areas (fig. 1, p. 26).

permanent pastures and alfalfa must be grown most of the time. On a farm with level or gently sloping land, the possibilities for different cropping systems are greatly increased and uniform rotations can be practiced over the entire farm. Most farmers on the new lands have been so busy clearing the land that they have given little thought to preventing soil erosion and maintaining fertility. These problems will doubtless come to the front as the area becomes older.

Farm Income

Length of settlement had the most effect on size of farm income in 1938. Farm incomes vary in direct proportion to the number of years of development. Farms operated for 1 crop year (because of their relatively small acreage in crops, their low yields and small number of livestock) had a family farm income 3/ of only $130. Farms operated for 2 crop years increased their family farm income to $310. The additional 11 acres in crops, 3 extra animal units, and slight increase in crop yields were factors in this larger income. Farms in operation 3 or 4 crop years obtained a much larger family farm income--$944 on the average. Crop acreage had increased by 12 acres, livestock numbers were 50 percent higher, and crop yields were 28 percent higher than on the farms in operation 2 crop years. Family farm income of $1,357 was reported by farms in operation 5 to 7 years. Again, more crop acres, more livestock, and higher yields were responsible for the increase. Farms in operation 8 or more years reported no larger incomes than those in operation 5 to 7 years. Approximately full development apparently was reached about the sixth crop year after settlement.

This proportionate variation of farm income is consistent with the growth of farm size and farm experience. But it is not believed that this relationship depends in any way on differences in kinds of land available to early and late settlers. These projects were opened up by divisions as water was made available and there is no evidence that the last divisions opened for settlement were any more or less productive than the first.

Average farm income for all farms surveyed was rather low. Yet if one considers only farms in operation 5 or more years, family farm income was fairly high, averaging approximately $1,300 return to the farm operator and family for labor and interest on investment. The average farmer had little capital, and yet these incomes compare well

---

3/ Family farm income is gross farm receipts (including inventory increases of crops and livestock) minus farm expenses (including depreciation on buildings and equipment and inventory decreases, but not including irrigation construction charges, interest payments, or unpaid family labor). It is the amount available to the operator and his family for their own labor and for interest on investment, from which can be paid family living expenses, interest payments, and capital investment or savings. It does not include the value of farm products used in the home.

with those received in older good farming areas. The increased income of the older settlers was doubtless responsible for many of the high hopes held by the new settlers. Settlers on the older irrigated lands in the same vicinity obtained a family farm income of $937, but they were paying construction assessments and higher taxes than the newer settlers.

Within groups of settlers who have operated for the same number of crop years, the most important determinants of farm income were size of operation and type of farm. The best measure of size was productive man work units, which summarized the effect of differences in crop acres, kinds of crops, numbers of livestock, and kinds of livestock. If all livestock farms are considered without respect to length of settlement, the average family farm income for farms of 100, 200, 300, and 400 productive man work units was $12, $437, $861, and $1,285 respectively. Approximately the same relation existed between farms of any one length of settlement. Farms with only 1 or 2 years of crop production generally were small in size, none exceeding 250 productive man work units, except where additional cleared land was rented. Similar relationships existed for crop farms, except that net farm income did not increase proportionally after farm size reached 300 productive man work units. This may have been due to the necessity of hiring more labor on the larger farms.

Farms of the same age and size had important differences in the 1938 family farm incomes owing to differences in type of farm. Sugar beets were the most profitable crop grown on a large acreage. Grain farms had the lowest incomes of any group. Many of these farms were very new, but even when comparisons are made for farms of the same age, grain farms made a poor showing. Livestock farms produced more income than did crop farms of the same acreage and age, because they offered a greater chance for profitable farm employment, a better market outlet for farm-raised feed, and better opportunity for sustained fertility. Livestock farms in operation 3 or more crop years averaged family farm incomes per crop acre that were $4 higher than on crop farms of similar length of settlement.

Cash Difficulties.- Family farm income may be misleading in areas of new settlement. The average client of the Farm Security Administration on a farm for the first crop year had a family farm income of $106; if estimated increases in value of land as a result of development work are added to his family farm income, his total income was $697; yet he spent $892 more in cash on his farm than he received in cash, and had to support his family as well. These differences are a result of the large investments of cash that must be made in early years of settlement and the necessity for building up inventories of livestock and feed. Increases in land value are difficult to estimate accurately, and may never be realized. Hence it seemed wiser to omit them from calculations of family farm income. The differences among total, cash, and family farm incomes became less with increased length of settlement, and were less for non-FSA farmers than for FSA clients. The FSA farmer usually had less capital and needed to make greater investment in livestock and machinery.

The average FSA client who was on his farm for the first crop year borrowed more than 40 percent of the total cash that was available to him in 1938. The average FSA client who was on his farm the second year borrowed more than 20 percent of his available funds. These borrowings were necessary if he was to improve his farm. The non-FSA farmer borrowed some money but financed most of his investments by spending the cash he had on hand. Cash from farming was less than half the total cash available for farmers operating for the first crop year, but by the third crop year cash farm income was the source of more than four-fifths of the cash available.

Financial Progress

During the first year or two, financial progress was confined chiefly to improvements to land, such as clearing, leveling, and seeding. With increased length of settlement, gains from land improvement became less and gains such as increased livestock, better buildings, and more feed on hand became greater. Settlers had less cash and fewer liquid assets at the end of 1938 than they had at the time of settlement. They had invested all their money and had borrowed more; but their farms had increased in value to such an extent that their net worth had increased. The average settler in 1938, even the longer established one, was still pressed for cash to make improvements and to repay debts. Family living expenses still had to be held to a minimum, for the increased net worth was all in the farm. A large part of the increased net worth came from a willingness to increase the farm productive plant at the expense of family living.

The average settler who obtained a loan from the Farm Security Administration had a net worth of $1,565 at time of settlement. The average settler who did not borrow from FSA had a net worth of $3,188 at time of settlement. The 18 farmers included in the survey who had been on their farms 5 years or more had increased their average net worths by $5,800, of which less than $1,500 was due to increased land value. This increase was more than a doubling of net worth in 5 to 8 years, and for this group of farms amounted to an average of about $900 annually since time of settlement.

The rate of financial progress varied considerably between farms, and on a few farms that had been settled only 1 or 2 years there was an actual decrease in net worth of the operator. In part, progress depended upon net worth at time of settlement and ability to borrow. The man with some money could develop his farm faster and borrow less than the man with less money. During the first year or two, increased net worth came about largely by applying labor to land improvement. Later, cash was needed to make improvements. Size of family, ability to do hard work, chance for off-farm employment, willingness to forego better living conditions and family needs, were factors affecting progress of individual farmers.

Credit

Credit needs were inversely proportional to the net worth of the settler. The man with few assets had to borrow money to develop his farm. Approximately half of all the new farms in the Vale-Owyhee area were financed, in part at least, by the FSA. The average settler who was on his farm for the first crop year, and who was able to borrow from FSA, borrowed $1,047 from FSA and $25 from other sources during 1938. He paid $158 on indebtedness, including land-purchase payments, making a net borrowing of $914 for the year. The average settler who was on his farm the second crop year, and had borrowed from FSA, borrowed a net amount of $247 in 1938. Most of this money came from FSA. The average settler who was on his farm 3 or 4 crop years and was an FSA client had net repayments of $72 in 1938. Some of these farmers were net borrowers that year. Not until farmers had been operating 5 years or more were net repayments substantial.

Settlers who did not find it necessary to borrow from FSA contracted small loans, most of which were repaid during the year. On the average these farmers were net borrowers the first 2 years of settlement, and made substantial repayments only after 5 or more years settlement.

Most of the FSA loans were set up for substantial net repayments during the first and second years of the loan. The fact that it was impossible or unwise for the farmers to make repayments of these loans the first and second years indicates the need of longer term credit. New settlers were unable to obtain credit from the Federal Land Bank. The Land Bank has refused to make loans in the area until the amount of the construction charge levied against the land is known. The Farm Security Administration represented the chief source of credit for the settler who had few assets.

The People and Their Living

Most of the settlers in this study came from the Western States, although substantial numbers were from the Great Plains. For the most part, the settlers operating farms are middle aged, over half of them being from 35 to 54 years old. About 15 percent were less than 35 years old and more than 20 percent were in excess of 55 years. More than 75 percent of all settlers were farming before they settled here, and about 90 percent had some previous farming experience.

Although most of the new settlers were making substantial additions to their net worth, many of them were hard pressed for cash and compelled to live at low levels. Houses were generally small and cheap, poorly built, and had few conveniences. Overcrowding of dwelling space was common. Settlers who were borrowing funds from the Farm Security Administration spent an average of $425 for family living during 1938. Dwellings of these settlers were valued at an average of $398, with 2.6 rooms to accommodate an average family of 4.7 persons. The average settler not borrowing from the FSA spent $540 cash for family living and had a house valued at $686 containing 3.4 rooms for 4.8 persons. Major

items of equipment for family comfort and convenience (such as electrical refrigerators, running water, indoor toilets, and furnaces) were almost unknown among the very recent settlers but increased in frequency with added length of settlement. In many cases houses were added to or were improved as length of settlement increased and income permitted.

Notwithstanding the prevailing low levels of living, optimism and few complaints typified the new settlers for they looked forward to the time when they could enjoy incomes like those of the older settlers. Farmers in the nearby older irrigation districts spent an average of $798 for family living, even though they had somewhat smaller families (an average of 4.3 persons). Expenditure per person was somewhat more than twice as great as for FSA clients in the new districts. Expenditures for family living exceeded $600 for 75 percent of the farm families in the older irrigation districts, for 33 percent of the non-FSA families in the new areas, but for only 17 percent of the FSA families in the districts. Expenditure for family living was closely related to net farm income, which in turn was dominated by length of settlement.

Prospects for future improvement in living conditions do not disguise the prevalence of poverty and hardship during the development period of the new farms. The numerous families who had less than $400 to spend on family living, and more particularly, those with less than $300, were in many cases inadequately supplied with goods and services necessary for health and decent living. Nearly two-thirds of the FSA clients were living below the levels of expenditure established by that agency as minimum for the maintenance of health.

The level of living could have been improved to the minimum acceptable standard of FSA by extending more credit to settlers, so that the increases in net worth could have been translated into cash and thus made available for family living.

Market Outlets

Nearness of newly irrigated lands of the Vale and Owyhee projects to older established areas with adequate highway and railroad facilities and established market outlets has obviated many marketing problems encountered in the development of a community that is more or less isolated from other settlement. For those products that are normally shipped out of the area, the increased production of the new areas has resulted in a larger volume of goods that probably can be marketed at a lower cost per unit. Livestock, dairy products, and alfalfa and clover seed have ready access to markets through cooperative and private establishments. A sugar-beet factory completed in 1938 provides an outlet for almost 20,000 acres of land in nearby areas of Oregon and Idaho, including new lands in the Vale and Owyhee projects.

For those products that cannot economically be shipped to other markets, the increased production on the new lands has brought about a serious marketing problem. Hay must be consumed locally, perhaps largely by dairy cattle. Livestock numbers have not increased as rapidly as hay

production, and so there is a surplus of hay. Increasing hay-consuming livestock on irrigated farms, or decreasing the acreage of alfalfa hay, would take care of this surplus. Winter feeding of breeding herds of range livestock from surrounding areas does not offer an additional outlet as the range is now fully stocked. Fattening of beef or lambs may be an outlet for part of the increased hay and other feed production.

A rapidly developing agricultural area almost inevitably will be exposed to such maladjustments of feed supply in relation to demand for farm feeds. The seriousness of these maladjustments may be alleviated by orderly growth of irrigation projects, by a complete understanding of the problem, and by proper assistance to farmers (such as extension of credit for specific purposes). Apparently little consideration has been given in the Vale-Owyhee area to these factors.

Activities of Governmental Agencies

The Bureau of Reclamation and the Farm Security Administration are the two most important Federal agencies in the area. The former has provided irrigation water to all new farms and supplemental water to most of the farms on the older area. The latter agency has provided credit for farm development to several hundred new farmers, generally those with least resources.

Bureau of Reclamation provisions regarding speculation, size of holdings, settler selection, and water charges have affected and will continue to affect settlement patterns, farm organization, and family income.

Farm Security Administration loans to settlers have made possible more rapid settlement than might otherwise have occurred, have given many who have small means the chance to become farm operators, and have reduced family hardships during the early years of settlement.

The Agricultural Extension Service has provided instruction and advice on irrigation and farm-operation problems to those unfamiliar with the area and the agriculture. Such services are invaluable to many settlers, especially during the first few years of settlement.

Local governmental agencies have been faced with a serious problem in providing school facilities and local roads before there is any appreciable increase in local taxation revenues. These problems would be even more serious in a new development that is isolated from old established areas.

Ability of Farms to Repay Debt

Experience on the Vale and Owyhee projects indicates little ability to repay debt charges before about the fifth year of settlement. Debt repayment is dependent upon incomes from farm production in excess of essential farm and family living expenses. Proper attention to correct

farm size and kind of farming enterprise adapted to each individual's capacity increases the size of farm income and the ability to repay debt and reclamation construction charges.

Under a general livestock-and-crop-farming system such as that in the Vale-Ontario area, the gross value of crops per acre is likely to be less than $45 per acre. Under 1938 conditions, farms in operation 5 or more years had a gross farm income of about $38 per crop acre. With a repayment plan of 5 percent of gross value of crops, construction repayments probably would not exceed $2.50 per acre per year, and might be $2 or less. Construction charges have not yet been assessed on either project, but probable charges if based on a 40-year repayment plan would materially exceed $2.50 per acre. Unless farmers pay greater charges than 5 percent of gross value of crop production, a longer period than 40 years appears to be necessary.

Experience has been insufficient on the new project areas to indicate clearly the debt-paying ability of the farmers. Type and size of farm, standard of family living, and the prevailing price level are important variables that will eventually determine the level of repayment.

DETAILED ANALYSIS OF THE VALE AND OWYHEE PROJECTS, MALHEUR COUNTY, OREGON

The Vale and Owyhee reclamation projects located in eastern Oregon (fig. 1) are the most recently settled large-scale irrigation developments in the West. Conditions under which these projects have been settled and the public policies in effect are the most recent experience available and so will be most nearly comparable to the situations that may be expected to prevail on future developments. A study actually made during the developmental period should provide information on settlement which will be of value in other areas. Experiences of the more successful settlers may be of material assistance currently to those farmers on the Vale and Owyhee projects who are less familiar with the problems or less fortunate in their results.

Description of the Area

Natural Conditions

Climate.- The Vale-Ontario irrigated areas are in a semi-arid part of the Snake River Basin. Precipitation averages about 8 inches annually with the greater portion falling during the fall, winter, and spring months, much of it in the form of snow. Rainfall is usually insufficient for dry farming, though there has been dry farming on what is now the Dead Ox Flat Division of the Owyhee project. Irrigation is a necessity for successful crop farming.

Winter temperatures are moderately low and summer temperatures are rather high. Variation between mean winter and summer temperatures is greater than in the coastal region of Oregon, but not so great as in most of the Great Plains regions.

Summers are characterized by a high percentage of clear, sunny days, with relatively high temperatures, though the nights are generally cool. Average length of growing season varies from about 125 days at Harper and Vale to 169 days at the Kingman station near the Snake River. Most crops adaptable to northern temperate climates grow readily, though crops requiring more than about 4 months for maturity are not generally grown. The high proportion of cloudless days makes for relatively quick maturity of crops, but occasional late frosts in the spring limit the growth of crops that are susceptible to frost damage. Climatological data for the area are summarized in appendix tables 36 and 37.

Topography and Soil.- Lands in the older irrigation districts are uniformly level or gently sloping and lie in the valley floors near the Malheur, Owyhee, and Snake Rivers. Soils in these valley floors are generally deep silt loams and are of good quality where drainage is sufficient.

Fig. 1 LOCATION OF AREA STUDIED

U. S. DEPARTMENT OF AGRICULTURE NEG. 38689 BUREAU OF AGRICULTURAL ECONOMICS

FIGURE 1

Most of the lands irrigated from the new developments of the Vale and Owyhee projects are on benches, which are relatively smooth areas lying from 50 to 200 feet above the river valleys. Generalizations with regard to topography and soils may be misleading, as these higher lands vary considerably. Large areas on both the Vale and Owyhee projects are gently sloping, while other areas are rolling to rough in topography, occasionally interspersed with deep drainage channels leading downward from the higher hill country.

Bench soils are usually not as deep as the valley soils. Surface soils may vary from 6 to 18 inches in depth, underlain with a thin limestone layer. This limestone layer ordinarily disintegrates under continued irrigation and very little "hard-pan" exists in any of these areas, so drainage is good. The soils are low in organic matter and nitrogen, a condition common to most desert soils. Irrigation problems are intensified during the first year or two of cultivation because of the tendency of such soils to puddle and wash easily when water is applied. A cropping system that will build up the soils during the early years of development is necessary before high yields can be expected.

Irrigation, Water Supply, and Drainage.- Water supplies for irrigation of the area are obtained from the Malheur, Owyhee, and Snake Rivers. The Vale project 4/, an undertaking of the Bureau of Reclamation, is supplied with water from the Malheur River. The Warmsprings Reservoir, located on the middle fork of the Malheur River about 60 miles west of Vale, provides storage of 190,000 acre feet of water; and the Agency Valley Reservoir, located on the north fork of the Malheur River about 18 miles northeast of the Warmsprings Reservoir, has a storage capacity of 60,000 acre feet. These two reservoirs serve the Vale project and the older Warmsprings Irrigation District which lies along the Malheur River. The two projects embrace approximately 45,000 acres of irrigable land, of which 30,000 acres are included in the recently developed Vale project.

Drainage problems on the Vale project may be minor, for much of the land lies on benches and has adequate natural drainage. The effect on lower-lying lands of water seepage from irrigated lands lying at higher elevations is often detrimental. This problem in the Warmsprings District adjacent to the Vale project was obviated by the construction of drainage canals by the Bureau of Reclamation as part-payment for the Warmsprings dam constructed by the older district. The drainage canals have apparently improved conditions on the Valley floor below the Vale project, and have even resulted in the reclamation of some former alkali lands.

The Owyhee project is also operated by the Bureau of Reclamation. Water storage is provided by the Owyhee Dam, located 30 miles southwest of Nyssa on the Owyhee River. The storage capacity of this reservoir is 715,000 acre feet of water. This is sufficient to provide a normal 2-year supply to the approximately 65,000 acres of new land on the Owyhee project and some 45,000 acres of land in older districts which receive

---

4/ For a delineation of Vale and Owyhee project boundaries and location of older districts see figure 5, page 43.

supplemental water from the Owyhee Reservoir. Approximately 27,000 acres of the above acreage is in Idaho west of the Snake River (fig. 1).

Drainage is not a major problem on the new lands of this project, for most of the land lies on benches. Provision for waste water run-off is sometimes a problem, as waste water from the higher lands may do considerable damage to lower-lying lands unless proper provision is made for drainageways. This problem is particularly acute in steeply sloping areas where it is sometimes difficult to gauge the amount of water needed for irrigation and where excess applications frequently damage land at lower elevations.

The older irrigation districts are the Warmsprings, lying along the Malheur River, and the Ontario-Nyssa, Kingman Colony, Bench, Slide, Advancement, Payette-Oregon Slope Districts and Owyhee Ditch Company adjacent to the Snake River and the lower Owyhee River. The Warmsprings District receives water from the Warmsprings Dam and return flow from the Vale project as provided in an agreement between the district and the Vale project. The other older districts formerly obtained water in large part through pumping from the Snake River. Since construction of the Owyhee Dam, most of the districts have been incorporated into the Owyhee project and receive all or most of their water supplies through gravity flow from the Owyhee Reservoir. The Bureau of Reclamation has constructed a pumping plant on the Snake River south of Nyssa to irrigate approximately 10,000 acres of Owyhee Ditch Company lands in case of water shortage in the Owyhee Reservoir.

Drainage ditches have been or are being constructed throughout the older irrigation districts to provide for removal of seepage and run-off water from the higher lands. These ditches should prevent any rise in ground water level that might otherwise have occurred as the new lands at higher elevations were brought under irrigation.

History of Development

Originally the land area included in these projects was used by range livestock operators. The first irrigation attempts were private ditches taking water from the Malheur River for irrigation of adjacent valley lands for hay production. One of the first organized attempts at irrigation development was the Owyhee Ditch Company, which completed its canal in 1894, taking water by gravity flow from the lower Owyhee River near Mitchell Butte. Construction of the Warmsprings Dam by the Warmsprings Irrigation District, an association of private land owners, was the first large-scale attempt to provide water storage for irrigation purposes. A number of other irrigation districts were formed to pump water from the Snake River. These various developments covered most of the more accessible land that could be developed at relatively low initial cost.

Irrigation of the higher bench lands was beyond the resources of a limited private enterprise. An early attempt was made by a group of private investors to irrigate the bench lands west of Vale, and a dam

was constructed on Bully Creek. Before water was delivered for irrigation, the dam broke because of faulty engineering, and with it collapsed the equity of the bondholders in the irrigation company, most of whom were Eastern people.

Government Projects.- In 1924 and 1925 Congress made appropriations for the construction of the Vale and Owyhee projects. An arrangement was made with the Warmsprings Irrigation District for the purchase of the Warmsprings Dam, in exchange for which the Vale project took over the bonded indebtedness of the district, agreed to supply the district with irrigation water, and arranged to construct drainage canals in the Warmsprings District. The major construction of the Vale project was the canal system, a diversion dam at Namorf, and a storage dam at Agency Valley. Water was delivered to the first unit of the project in Harper Valley in 1930. By the end of 1937 all canals had been constructed to provide for irrigation of the 30,000 irrigable acres included in the project.

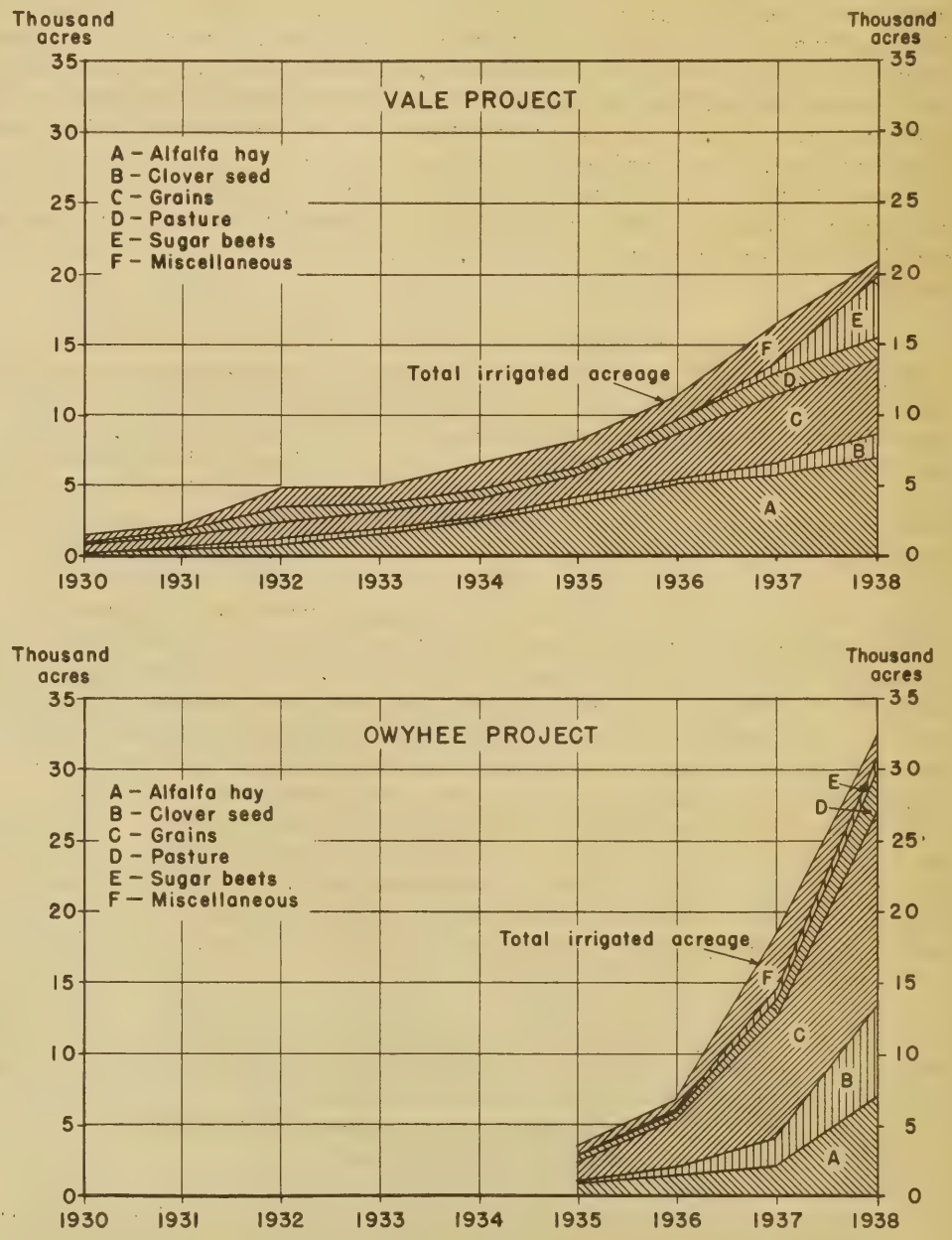
Preliminary construction work on the Owyhee Dam was started in 1927, and the dam was completed in 1932. First deliveries of water were made in 1935 to the part of the Mitchell Butte Division south of the Owyhee River. Water was delivered to Dead Ox Flat in 1938, and all areas on the South Canal except some of doubtful irrigability were provided with water in 1939. Arrangements have been made with all the older irrigation districts along the Snake River for supplying supplemental water from the Owyhee Reservoir.

Settlement on the Vale and Owyhee projects has proceeded at a much more rapid rate than on most other Federal reclamation projects--on which settlement has usually been slow. Development proceeded more rapidly on the Owyhee project than on the Vale project (fig. 2), largely because the areas made available for settlement by canal extensions from year to year occurred in larger blocks on the former project. Almost 56,000 acres of new land were developed from 1930 to 1938, including 2,990 acres of new land in the Gem Irrigation District in Idaho. Much of this development occurred during the years 1936-38. During these 3 years, more than 700 of the approximately 1,000 new farm units of the project lands in Oregon were established, and irrigated acreage increased by 41,299 acres, or 78 percent of the total of 52,869 irrigated acres in 1938 (table 36).

This strikingly rapid development probably was caused by the fact that the projects were developed during a period of low employment and generally depressed conditions in agriculture and industry. Several severe droughts in the Great Plains region encouraged emigration of large numbers of the farming population.

Policies of Bureau of Reclamation Affecting Settlement.- From its experience on previous irrigation developments, the Bureau of Reclamation has evolved a series of policies which tend to affect the nature and extent of settlement of the lands brought under irrigation. One of the early policies of the Bureau was concerned with the selection of settlers for Government-owned project lands that were available for homesteading.

Figure 2. Trend in Acreage of Crops Irrigated; Vale Project, 1930-1938, and Owyhee Project, 1935-1938



U. S. DEPARTMENT OF AGRICULTURE NEG. 38690 BUREAU OF AGRICULTURAL ECONOMICS

FIGURE 2

From lists of applicants for water rights, those people who appeared to have some favorable prospects of success were given prior consideration. Some previous farming experience was required, as well as a minimum of resources--generally $2,000 cash or its equivalent in usable farm resources. These requirements have not always been strictly adhered to and could not be applied to privately owned land, but they have resulted in some selection of better qualified settlers.

An attempt to control land speculation was made on the Vale and Owyhee projects. Before construction of irrigation works was started, land owners within the boundaries of the proposed irrigation development entered into an agreement with the Bureau of Reclamation establishing a maximum sale price of land to settlers on the basis of grades of land determined by an appraisal board. For the best raw desert land the maximum price was $15 per acre. Lower grades of land were priced at lower figures. Allowance was made for improvements added. It was agreed by all owners that any sales or resales made at a price above the appraised value were to be subject to the limitation that at least one-half of the excess price obtained was to be turned over to the irrigation district to be allocated to future construction and operation costs of the particular piece of land involved. These limitations on sales prices apparently have been successful in making it possible for the settler to obtain uncleared land at a moderate price.

A further provision of the Reclamation Act limits to 160 acres the extent of land that one individual may own. Although the size of the operating unit may be larger than this, because of renting of additional land or because of multiple-ownership of an operating unit, the policy of local officials in recommending an 80-acre farm as a desirable family-size unit has had a strong influence in the opposite direction. At present, most of the farms are of the latter size. Whether they remain so depends upon how well the unit fits the particular type of farming that is developed.

Economic Development of the Area.- Early agricultural developments in Malheur County and surrounding areas were chiefly in the direction of range livestock operations. The earlier irrigation developments were based on the needs of the range industry for winter feed supplies. Consequently, alfalfa hay was the major crop, comprising about 75 percent of the irrigated acreage of Malheur County for many years 5/, with other important acreages devoted to grain crops for feeding purposes. Before the recent irrigation development on the Vale and Owyhee projects the supplies of feed in the irrigated areas were in general about enough to provide for the range cattle and sheep in the surrounding range areas.

Since the new project lands have been opened to settlement the supply of hay has increased greatly. Range livestock, on the other hand, have decreased somewhat because of overgrazing of the range and accompanying provisions of the Taylor Grazing Act with reference to controlled use of the range. Because of the distance from deficit-production areas

5/ Bureau of Census, Census of Agriculture, 1900, 1910, 1920, and 1930.

resulting in high freight rates, and because of a quarantine against hay shipments due to past alfalfa-weevil infestations, little or no hay is shipped out. Hay must therefore be fed to livestock locally if it is to be marketed at all. On the new lands there are no practical alternatives to alfalfa or clover growing because of the necessity of increasing the organic content of the soil before growing more intensive cash crops. The great increase in hay supplies has increased competition for the available market so that old settlers as well as new have been vitally affected. Many farmers in older areas who have foreseen the necessity, have wisely gone into the production of products other than hay, or have increased their livestock numbers.

Long-existing trade channels for marketing livestock are present in the local area, so that the development of livestock production on new lands involves no major adjustment in marketing. For the area as a whole, hay must be marketed through livestock, though individual operators may have a cash market for hay. But this cash outlet is decidedly limited. For the dairyman there are several local creameries with previously developed market outlets for butter. New production will of course require increased facilities, but does not demand such drastic changes as might be involved were the new areas entirely apart from older areas. In the summer of 1938 a sugar-beet factory was completed at Nyssa capable of handling the production of nearly 20,000 acres of sugar beets that would come from nearby areas in Oregon and Idaho. This has made possible a large increase in the acreage of sugar beets. The nearness of older established areas with adequate highway and railroad transportation facilities and established market outlets has obviated many of the problems encountered when developing earlier projects that were more or less isolated from developed communities.

Characteristics of Settlers

Availability of new land on the Vale and Owyhee projects attracted settlers from a wide area. The Bureau of Reclamation and the local land development organization wanted to settle the irrigable lands as rapidly as possible once water was available. They actively advertised the advantages of the area, which influenced the type of settler attracted as well as the speed of settlement. Hardships of pioneer life to be expected during the early years of settlement were overshadowed in the minds of prospective settlers by the difficulties and lack of opportunity where they were living at the time.

Origin of Settlers

Although the proportion of the settler group originating in the Great Plains region is not as large as that found in migrant groups in some other parts of the West, it is surprisingly large in view of the extremely different type of farming on an irrigation project compared with that of the Great Plains States. Not only were these migrants forced to change their mode of living and to make new social ties, but they had to learn new methods of work and to adjust themselves to an entirely new and different set of farming conditions. Settlers from

nearby States were largely familiar with irrigation farming and so had a much less difficult task of adjustment.

A greater proportion of the settlers who were clients of the Farm Security Administration came from the Great Plains States than did non-FSA farmers in the new areas (table 1). Only 1 farmer out of 22 recent settlers in the nearby older irrigated areas came from that region. Conversely, a greater percentage of the non-FSA farmers than FSA clients originated in nearby States, and about 25 percent had lived in Malheur County a number of years before settling on their present land, contrasted with none of the FSA clients. Nineteen of the 22 farmers who moved onto farms in the older irrigated areas came from Idaho and three Pacific Coast States (fig. 3).

Table 1.- Origin of settlers who moved onto present farms in 1929 or later, by settler type, Vale-Ontario area, Malheur County, Oregon, 1938

Area or region of origin	FSA clients in new project areas	Non-FSA farmers in new project areas	Farmers in older irrigation districts	Total all farmers
	Number	Number	Number	Number
Northern Great Plains 1/	8	3	1	12
Southern Great Plains 2/	5	6	0	11
Rocky Mountain Area 3/	2	6	2	10
Pacific States 4/	14	11	6	31
Southern Idaho 5/	11	11	7	29
Local 6/	0	12	6	18
Total	40	49	22	111

1/ North Dakota, South Dakota, Nebraska, eastern Montana, and eastern Wyoming.

2/ Kansas, Texas, Oklahoma, and eastern Colorado.

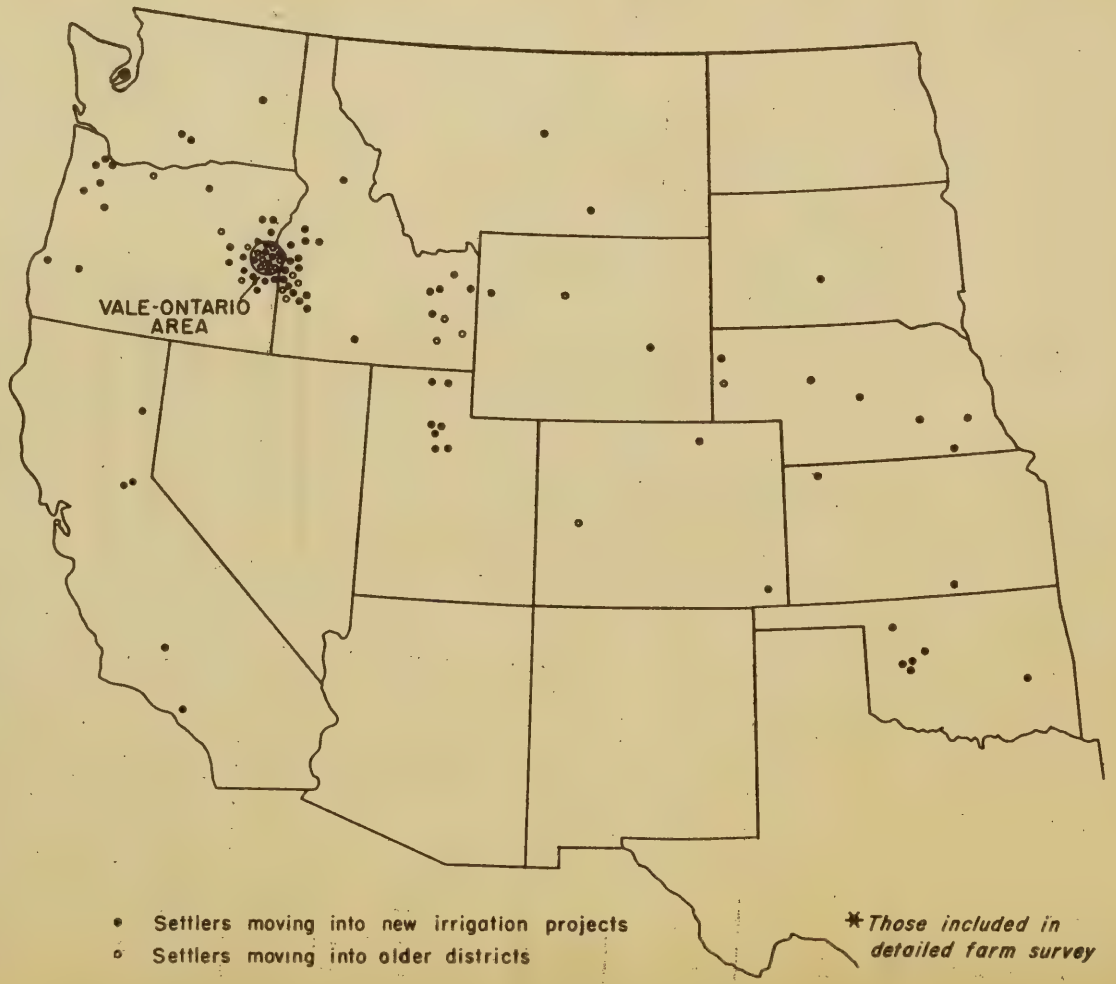
3/ Western Montana, western Wyoming, western Colorado, and Utah.

4/ California, Washington, and Oregon outside of the Vale-Ontario irrigated areas.

5/ Counties of southern Idaho, generally irrigated areas which are relatively near the Vale-Ontario area.

6/ The Vale-Ontario irrigated area included in the study.

Fig.3 PLACE OF ORIGIN OF VALE-ONTARIO SETTLERS*



U. S. DEPARTMENT OF AGRICULTURE

NEG. 38691 BUREAU OF AGRICULTURAL ECONOMICS

FIGURE 3

More than 27 percent of the FSA clients came from Idaho. Non-FSA farmers in new areas and settlers in the older areas who came from Idaho were likewise numerous. The nearness of the Vale-Owyhee area and the similarity of its agriculture to that of the irrigated sections of southern Idaho account for this large group from that State. Of the 378 clients of the Farm Security Administration who had moved into Malheur County from 1930 to 1938 from States other than Oregon, over 46 percent originated in the Great Plains States (table 39).6/

Age and Experience of Operators

About 60 percent of all farmers included in the detailed survey who moved onto farms in the Vale-Ontario area from 1929 to 1938 were in the middle-age group of 35 to 54 years in 1938. Clients of the Farm Security Administration averaged slightly younger than non-FSA farmers, and the latter were somewhat younger than farmers who settled in the older irrigation districts (table 2).

Table 2.- Average age and percentage distribution of operators by 10-year age intervals, FSA, non-FSA, and older district farmers, Vale-Ontario area, Malheur County, Oregon, 1938

Age	All groups	FSA clients	Non-FSA farmers	Older district farmers
Number of operators	111	40	49	22
Average age	46.4	45.4	46.2	48.6
Age distribution:	Percent	Percent	Percent	Percent
Less than 24 years	2.7	5.0	2.1	---
25 to 34 years	12.6	10.0	16.3	9.1
35 to 44 years	27.9	35.0	22.4	27.3
45 to 54 years	32.5	27.5	34.7	36.4
55 to 64 years	15.3	10.0	16.3	22.7
65 years and over	9.0	12.5	8.2	4.5
Total	100.0	100.0	100.0	100.0

Associated with the age of the family head is the size and composition of the farm family. New settlers averaged 4.7 persons per family, while families in the older districts averaged 4.3 persons per family.

6/ This is a somewhat higher percentage than was found in the sample survey, but was in part due to the definition of origin. In that survey the last place of residence of 2 or more consecutive years determined the State of origin. In the data of the FSA less exact definitions were used, and movements of the clients during recent years probably were disregarded to a large extent. Also, a few of the FSA clients were located in parts of Malheur County not included in this study.

Clients of the FSA had more children younger than 10 years of age than did non-FSA farmers, and both groups had more and younger children than farmers in the older districts (table 40).

More than three-fourths of all the settlers had farmed as their chief occupation during the 5-year period preceding settlement on their present farms, either as farm owners, farm renters, or farm laborers (table 3). The rest of the settlers came from laborers and service-industry workers, with only one settler classified as professional or semi-professional in previous occupation. A number of these people had previous farming experience, however. Sixty-five percent of all settlers were tenants, farm laborers, or nonagricultural workers before settling in the area. A few of these became tenants, but for the majority the new lands offered an opportunity to become farm owners.

The sample was too small to furnish exact data as to differences in occupational history among the various settler types. The FSA clients appear to be somewhat more concentrated in the less skilled occupational groups. Only 1 settler out of the 22 who moved onto older district lands had no previous farming experience. On the whole the backgrounds of the settlers had been agricultural, and therefore they should be readily assimilated into a community which is and will remain largely agricultural in character.

Fewer than 40 percent of the operators on the new projects had attended school for more than 8 years. Most operators had from 5 to 8 years of schooling (table 41). Wives of the operators generally had received more formal schooling than the farm operators.

Reasons for Settlement

Sheer necessity and the desire for farm ownership were the main reasons for the migration of settlers now located in these projects. In some areas climatic and economic conditions at the time the migrants left made some sort of move imperative. In other areas the outlook was less dark, but those who moved thought there was a chance for improvement. Drought and other adverse climatic conditions were reported as the reason for leaving by 63 percent of the migrants from the Great Plains States, but these conditions were seldom reported by settlers from nearby States and other far western areas (table 42). Most of those who came from the Far West gave as the principal reason their wish to own a farm or their belief that they would have a better chance in the area selected for their future home.

Farmers, asked why they chose to settle in the Vale-Ontario area rather than in some other part of the United States, gave many answers related to reasons for leaving their former location. The main reasons given by more than 62 percent of the FSA clients were related largely to economic status, such as low land values, low capital requirements, or the opportunity to establish a home (table 43). These same reasons were principal factors for 50 percent of the non-FSA farmers and for 27 percent of those who moved into the older districts. The economic status of

Table 3.- Previous occupation of farm operators classified by settler type, Vale-Ontario area, Malheur County, Oregon 1/

Occupational group 2/	Number of operators			Percentage of total		
	FSA clients	Non-FSA farmers	Older district farmers	FSA clients	Non-FSA farmers	Older district farmers
	Number	Number	Number	Percent	Percent	Percent
Agricultural						
Farm owners	11	20	8	27	41	36
Farm renters	12	14	7	30	29	32
Farm laborers	7	5	3	18	10	14
Total agricultural	30	39	18	75	80	82
Nonagricultural						
Common laborers	2	0	0	5	0	0
Semi-skilled laborers	4	4	1	10	8	4
Skilled laborers	1	4	1	2	8	5
Service-industry workers	3	1	2	8	2	9
Professional or semi-professional	0	1	0	0	2	0
Total non-agricultural	10	10	4	25	20	18
Total all groups	40	49	22	100	100	100
Nonagricultural with previous farm experience	5	3	3	12	6	14

1/ This tabulation does not include settlers who moved onto their present farms before 1929.

2/ Farmers classified according to major occupation during the 5 years preceding settlement.

these three groups at time of settlement was in the order named--lowest for FSA clients and highest for settlers who moved into older districts.

The proportion of those who selected the Vale-Ontario area because they liked the climate, the country, or irrigated farming was 12 percent for FSA clients, 22 percent for non-FSA clients, and 36 percent for settlers who moved into older districts. The more prosperous settlers apparently could give greater consideration to their personal likes and dislikes. About 15 percent of the settlers in the newly irrigated areas chose their area because of nearness to friends or relatives.

Farm Organization

An understanding of the common sizes of farms and the combinations of crops grown is basic for a consideration of the agricultural problems of any area. The kinds of crops grown are generally the result of years of trial-and-error experience. Farm sizes are largely determined by the resources available for the acquisition of land, and by the type of farming followed. The labor supply, kind of crops, and type of livestock influence the acreage that can be operated in one farm unit. Among other factors are farm experience, managerial ability, degree of mechanization, and availability of markets.

Number and Sizes of Farms

Almost the entire area available for settlement in the Vale project, and in the Owyhee project north and west of Adrian, had been settled by 1938. Although much land remained to be cleared and developed in the new area, settlement in the area studied had approximated the ultimate number of farm units. There were about 1,700 farms in 1938, 980 of which were on newly irrigated land (all established since 1930 and the greater number established since 1936). Almost 73 percent of the farms in the new areas had from 30 to 99 acres of potentially irrigable land, and less than 13 percent were larger than 100 irrigable acres (table 4). Land-ownership maps indicated that the most usual size of farm was 80 acres, though many of these units had less than 60 irrigable acres because of slopes too steep for irrigation, shallow soil, high spots, or rocky areas.

Farms in the Warmsprings Irrigation District, an older area, averaged about the same number of irrigable acres, but had relatively more very small farms and relatively more farms over 100 irrigable acres. In the other older districts, the most numerous size group was for farms with less than 30 irrigable acres. These small farms were largely fruit and vegetable farms and units near the town of Ontario.

Relative Importance of Various Crops

Alfalfa was by far the most important crop in the area for many years, because of the market for hay offered by livestock operators in the surrounding range areas. Although the acreage of this crop has increased greatly with the opening up of the new lands, it is relatively

Table 4.- Number of farms in various size groups and districts, Vale-Ontario area, Malheur County, Oregon, 1938

Number of irrigable acres in farm	New project areas		Older irrigation districts		All districts in area included in study
	Vale project	Owyhee project 1/	Warm-springs	All other 2/	
Less than 30 acres	70	58	62	183	373
30 to 59 acres	157	204	68	138	567
60 to 99 acres	134	202	54	107	497
100 to 139 acres	25	41	21	35	122
140 to 179 acres	12	35	15	18	80
180 acres and over	7	12	8	12	39
All farms segregated by size	405	552	228	493	1,678
Total farms in area	414	566	228	493	1,701

1/ Does not include South Canal and Gem Divisions, which lie south and east of Adrian, outside the area covered in the study.

2/ All organized irrigation districts in the area studied other than Warmsprings. The districts included are as follows: Ontario-Nyssa, Kingman Colony, Advancement, Crystal, Payette-Oregon Slope, Bench, Slide, and Owyhee Ditch Company. Data for the Owyhee Ditch Company are on the basis of number of acres irrigated in 1938, but for this district the irrigated acreage should closely approach the irrigable acreage on the farm.

Bureau of Reclamation records at Vale and Ontario, Oreg.; Warmsprings Irrigation District records at Vale, Oreg.; and Owyhee Ditch Company records at Ontario, Oreg. A few farms lying partially in one district or division and partially in another were excluded from the size-of-farm tabulation, as it was impossible to match such parcels to obtain the farm unit.

less important than formerly and in 1938 constituted only about 21 percent of the irrigated acreage in the Vale-Ontario area (table 44). Total hay acreage, largely alfalfa and clover, was 24,710 out of a total of 87,641 acres irrigated in the area (excluding lands of the Owyhee Ditch Company, for which no data by individual crops were available in 1938). The small grains--wheat, barley, and oats--occupied 23,638 acres of the irrigated acreage. Next in importance was clover seed with 8,789 acres, sugar beets with 7,994 acres, and pasture with 7,596 acres. Corn and potatoes were grown on less than 3,000 acres each, and other crops were of only minor importance.

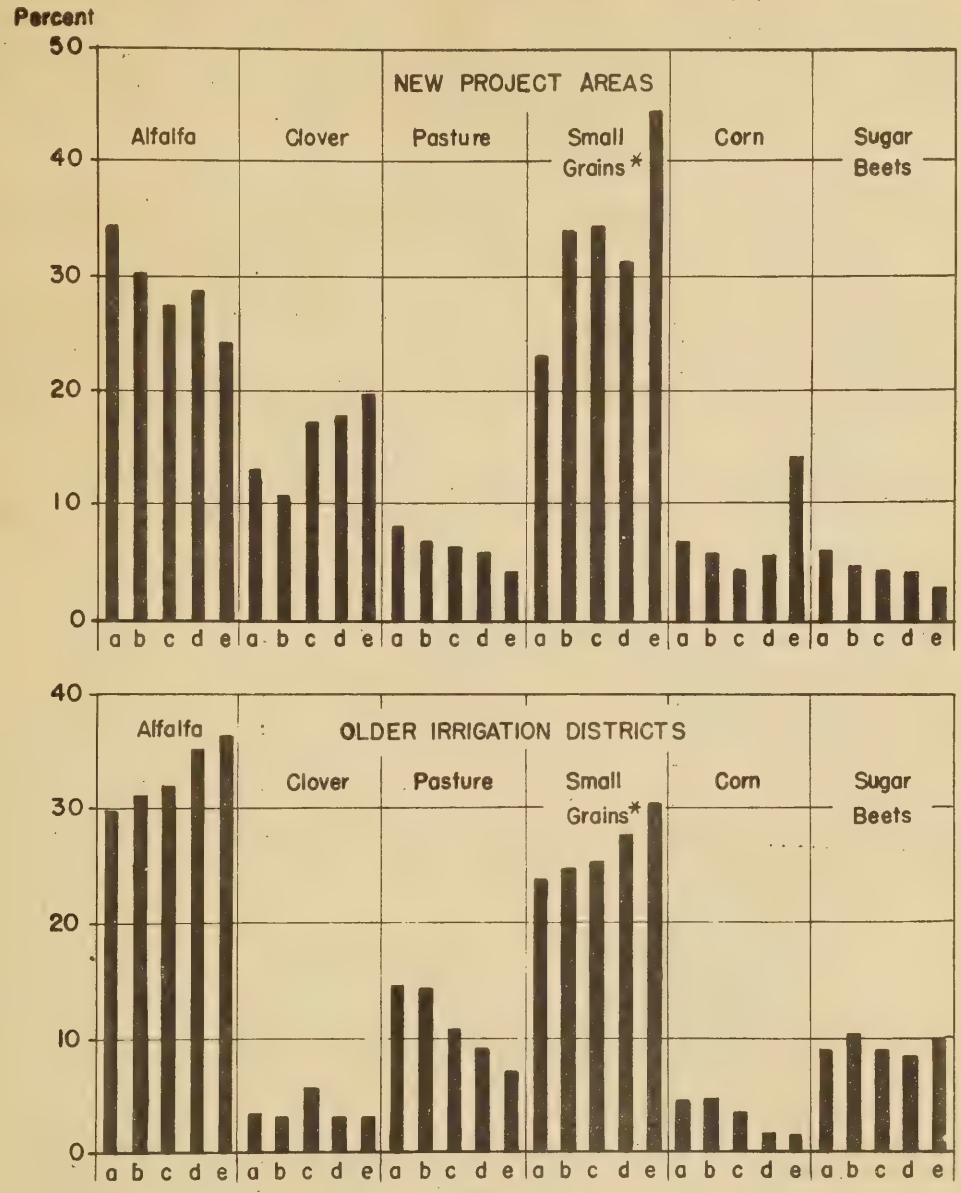
Cropping systems used in the older irrigation districts indicate the type of systems and kinds of crops that may be most adaptable in the newer areas. Alfalfa occupied the greatest percentage of crop acreage, and small grains were next in importance (fig. 4 and table 45). Barley and wheat were the important grains, with oats and corn in a relatively minor position. In the newly irrigated areas the small grains occupied a larger acreage than alfalfa on all but the smallest farms, because of the ease of growing small grains on new land and the use of small grains as a nurse crop for alfalfa and clover.

Clover was ordinarily of much greater importance on the new lands than on the old, probably chiefly because clover seed is a cash crop that can be grown successfully on new land, whereas the more intensive row crops like sugar beets and potatoes do not produce well until the land has had alfalfa or clover for several years. Almost 10 percent of the irrigated land was occupied by sugar beets in the older districts, contrasted with less than 5 percent on lands in the newer areas. Pasture was more important in the older districts than in the new, and in both areas was relatively more important on small farms than on large.

Not all farms grow each of the mentioned crops. Some of the major crops, such as alfalfa, clover, and small grains, are grown on most farms, whereas other crops such as potatoes or sugar beets are found on relatively few farms. The percentage of farms growing the different crops varies between the new and old areas and between various parts of the new areas, depending upon local situations and length of time the land has been developed.

A greater percentage of the farms in the Owyhee project grew small grains and a smaller percentage grew alfalfa than on the older Vale project and the old established irrigated areas (table 46). The relationship of crops grown to length of time land has been operated is particularly marked in the Vale project. Almost 41 percent of the farms in the Harper-Little Valley and the West Bench Divisions, which were first irrigated in 1930 to 1932, reported growing sugar beets, whereas sugar beets were reported on only 12 percent of the farms in the Willow Creek Division which was first irrigated in 1937 and 1938. The older divisions of the new project areas appear to be approaching closely the crop combinations and percentages that prevail in the older established irrigated areas. Unless the present trends are changed, these new districts are likely to develop the type of agriculture now found in the older areas.

Figure 4. Percentage of Total Irrigated Acreage in Each Major Crop in New and Old Areas and in Various Sizes of Farms, 1938



*Small grains are often planted as a nurse crop for alfalfa and clover so there is some duplication of acreage through double cropping.

U. S. DEPARTMENT OF AGRICULTURE NEG. 38692 BUREAU OF AGRICULTURAL ECONOMICS

FIGURE 4

Length of time of development is the important factor determining crop combinations in the new areas. Size of farms is important in the older areas. These relationships are exemplified in the case of sugar beets. In the new areas the percentage of farms growing sugar beets is about the same regardless of size, except for the few largest farms of 180 acres or more, whereas in the older areas sugar beets are grown on 10 percent of the farms with less than 30 irrigable acres, on about 35 percent of the farms with from 60 to 139 irrigable acres, and on 55 percent of the farms with over 180 acres (table 5).

Table 5.- Number and percentage of farms reporting sugar beets, classified by size of farm and type of area, Vale-Ontario area, Malheur County, Oregon, 1938

Number of irrigable acres in farm	Percentage of farms reporting sugar beets		Total number of farms included	
	New project areas	Older irrigation districts 1/	New project areas	Older irrigation districts 1/
	Percent	Percent	Number	Number
Less than 30 acres	10.2	10.8	128	166
30 to 59 acres	13.0	29.7	361	148
60 to 99 acres	16.1	32.5	336	117
100 to 139 acres	15.1	35.1	66	37
140 to 179 acres	12.8	46.0	47	26
180 acres or more	36.8	55.5	19	18
All sizes	14.3	26.4	957	512

1/ Does not include Owyhee Ditch Company.

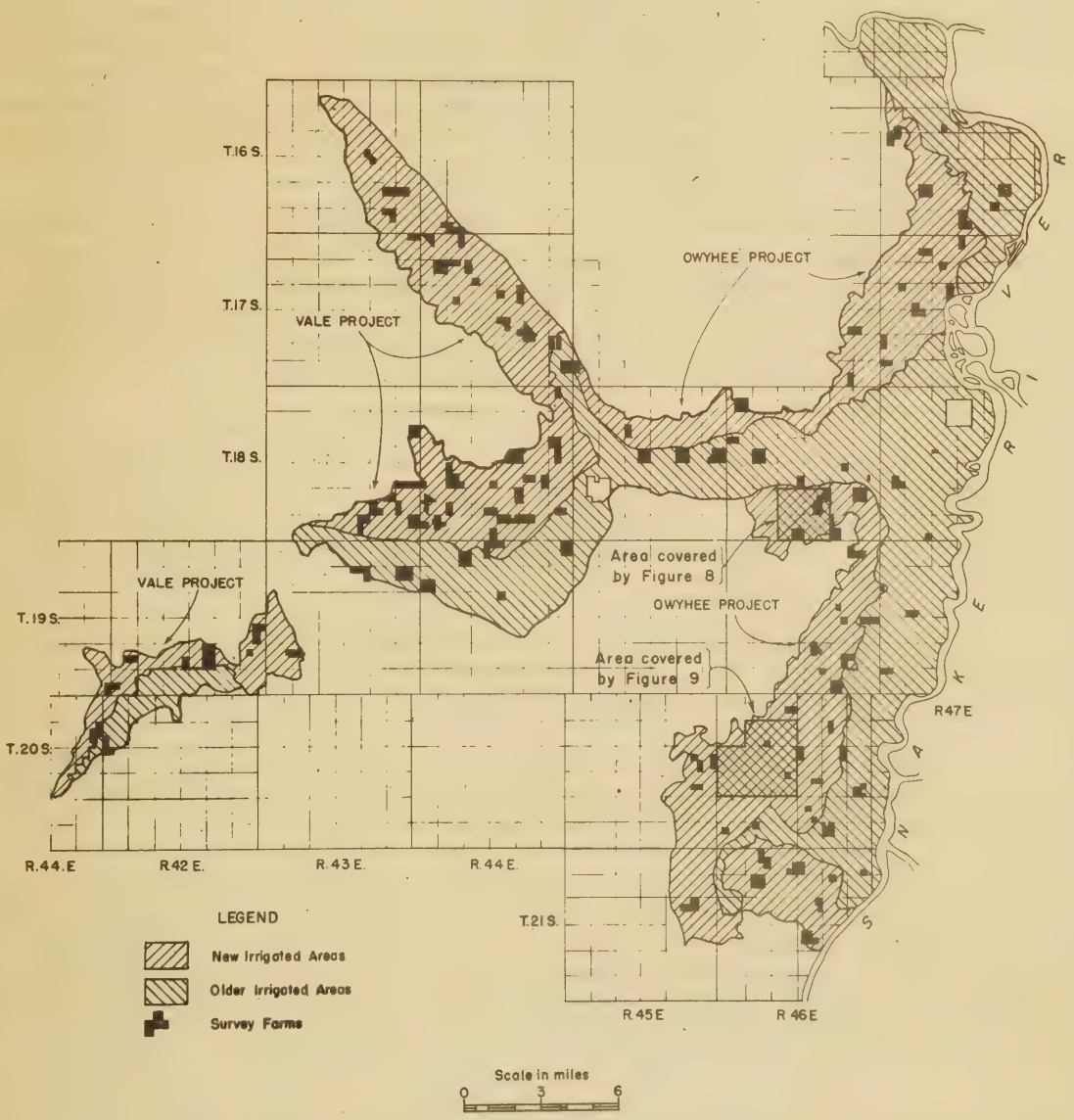
Organization on Sample Farms

Detailed farm-management data were obtained from 132 farmers in the Vale-Ontario area for the farming operations of the calendar year of 1938. A few records were eliminated because of incomplete data and some others because the farm operations were entirely different from those on most farms of the area. The major analysis included 122 records. The surveyed farms were distributed randomly over the area (fig. 5) and included large and small farms in various stages of development on newly irrigated lands and farms in the old established districts. Some farms received assistance from the Farm Security Administration and some were financed largely by the operators themselves. No attempt was made to select on the basis of success of operation.

Type of Farm.- In the Vale-Ontario area, as stated, most farms have a greater percentage of their crop acres in alfalfa and clover than in any other type of crop. Although these crops are of greatest importance, there are many variations of organization on the many farms in the

Fig. 5 LOCATION OF FARMS SURVEYED, VALE PROJECT, OWYHEE PROJECT, AND OLDER IRRIGATED AREAS

MALHEUR COUNTY, OREGON



U. S. DEPARTMENT OF AGRICULTURE NEG. 38693 BUREAU OF AGRICULTURAL ECONOMICS

FIGURE 5

area. It is possible to distinguish a number of types of organization that vary considerably from the general type. Some farms grow alfalfa and clover for sale as a cash crop. Others grow fully as many acres but feed these crops to livestock. Other farms in the area devote most of the crop acreage to grains, while still others get most of their farm income from growing sugar beets, potatoes, onions, or other row crops. These types of farms differ materially in their organization and success of operation. Alfalfa hay was important in all farm types (table 6),7/ though on grain farms new alfalfa seeding occupied more acreage than old alfalfa, because most of those farms were established recently. The large clover acreage was the distinguishing feature of the alfalfa and clover hay and seed farms, and, together with alfalfa, it constituted 76 percent of the cropland. On livestock farms the percentage of the cropland in legumes was from 56 to 61 percent of the total, and on grain, sugar-beet, and general crop farms from 37 to 50 percent. Livestock and livestock-product farms had appreciably smaller crop acreages than those farms that obtained most of their incomes from crops.

On the grain farms almost 74 percent of land in crops in 1938 was planted to grains. Many of these farms were on new land. Grain crops other than corn were often used as nurse crops for alfalfa or clover, so that almost 23 percent of the cropland on this type of farm was double-cropped. Grain acreage was relatively more important on livestock farms than on crop farms other than grain farms, because of the needs of the livestock for feed.

Irrigated pasture was of greater relative importance on livestock farms than on either grain farms or alfalfa and clover farms. Sugar-beet and general crop farms had relatively large acreages of pasture also, probably because these farms were generally older than others and had some livestock enterprises.

Sugar-beet acreage was unimportant except on the sugar-beet and general crop farms. More than 25 percent of the cropland was in sugar beets on sugar-beet farms.

Miscellaneous crops, including potatoes, were of minor importance from an acreage standpoint. On general crop farms, where they were most important, they constituted 12 percent of the cropland.

Cattle and hogs were the two major classes of livestock, with sheep and poultry taking minor places on most farms. Dairy cattle were more important than beef cattle in the farm organization. While winter feeding of range beef cattle and sheep is a good outlet for hay, such livestock were not generally owned in large numbers by the farm operators of the irrigated areas.

7/ All farms having 40 percent or more of gross farm income from the same crop or group of crops or livestock were grouped as a type. Gross farm income included changes in inventory from Jan. 1 to Dec. 31 valued at the rate of average sales prices during the year 1938.

Table 6.- Organization of survey farms, classified by major type of production, Vale-Ontario area, Malheur County, Oregon, 1938

Organization	Alfalfa and clover farms	Grain farms	Sugar-beet farms	General crop farms	Dairy farms	Livestock farms	General livestock & livestock products farms
Number of farms	31	14	12	11	12	23	19
Crops:	Acres	Acres	Acres	Acres	Acres	Acres	Acres
Alfalfa (old)	30.4	7.8	18.1	27.0	18.0	19.0	15.5
Alfalfa (new seeding)	2.5	12.1	2.8	3.8	2.3	5.9	4.6
Clover	25.0	5.7	1.3	9.7	2.9	5.3	7.7
Grain	15.9	46.5	10.8	17.9	10.3	14.6	16.7
Sugar beets	0.4	0.0	16.4	6.4	0.5	1.0	0.7
Other crops	1.7	2.5	5.3	9.7	0.0	2.7	3.2
Total crops	75.9	74.6	54.7	74.5	34.0	48.5	48.4
Land double-cropped	4.1	14.3	3.2	3.1	0.2	1.4	5.1
Irrigated pasture	4.3	2.9	8.2	9.5	4.5	5.2	6.2
Total cropland	76.1	63.2	59.7	80.9	38.3	52.3	49.7
Livestock:	Number	Number	Number	Number	Number	Number	Number
Dairy cows	3.5	2.6	5.2	6.6	7.3	5.8	6.1
All other cattle	11.0	7.0	9.8	15.2	10.9	22.3	15.6
Sheep	1.2	1.8	18.8	11.4	6.0	28.5	0.1
Horses	4.0	2.9	4.3	3.8	4.8	5.4	3.1
Hogs	18.2	18.2	24.9	19.6	10.3	47.3	18.6
Chickens	36.3	37.5	31.9	42.5	48.3	37.3	46.8
Number of PAU:-1/							
Per farm	13.6	10.6	18.2	21.3	16.1	31.5	19.2
Per 100 crop acres	17.9	16.8	30.5	26.2	42.0	59.8	38.6

1/ PAU - productive animal units - do not include horses. The following are the equivalent of 1 animal unit: 1 cow, 2 other cattle, 5 hogs, 7 sheep, 100 chickens.

Grain farms and alfalfa and clover farms had fewer livestock than any of the other types. Sugar-beet and general crop farms had about as many productive animal units per farm as the strictly livestock farms but the density of livestock was less. For each 100 acres of cropland there were less than 30 productive animal units on the crop-farm types, whereas on the livestock farms there were from 39 to 60 productive animal units per 100 acres of land in crops.

Effect of Recentness of Settlement on Farm Organization

When raw desert land is developed, marked changes must be expected during the first few years of settlement. These changes will be of two general types: First, a general increase in productive plant such as more cleared acres, more livestock, and more equipment; and second, a shift in internal organization of the farm from one to another of the various kinds and varieties of crops and livestock.

Raw sagebrush land is generally low in available nitrogen and humus or organic materials. In developing such land good farming practice requires the planting of legume crops as soon as possible. The more intensive crops, like potatoes and sugar beets, do not produce well until the soil fertility and condition have been improved over the original desert-soil composition. This need for soil improvement is generally recognized, but circumstances may force a modification of the desirable program. Need for cash income during the earlier years may mean the substitution of appreciable acreages of grain crops for legume crops during these years, in addition to grains seeded with legumes as a nurse crop. Even these grain crops would yield better if planted after a legume crop, but they probably do better on new land than do other cash crops adapted to such areas.

Indicated Changes on Survey Farms.- The survey farms, when sorted into four groups on the basis of number of years that the particular farm had been in operation as an irrigated farm, furnished a detailed picture of changes during early years of settlement.

The extent of potential cropland in the four groups of farms was much the same, about 80 acres, except for the group of farms in operation for 2 years, which had only 60 acres of potential cropland (table 7). Clearing and preparing land for irrigation and cultivation are apparently done over a period of years, with probably the best land cleared first. Even farms in operation 7 or more years had more than 5 acres of unimproved cropland. New alfalfa seeding was most important on farms in operation only a year or two. Farms in operation 3 or more years had relatively little new alfalfa seeded in 1938. The acreage of alfalfa, however, increased both absolutely and relatively until the seventh year.

On farms in operation 1 year the acreage of land in grain comprised about 25 acres of the 45 acres in cropland in use in 1938. The proportion declined slightly on farms 2 years old and declined sharply in the two older groups. The high proportion of grain during the first year or two is directly associated with the new alfalfa and clover seed-

ings on those farms, as a grain crop is often planted as a nurse crop for the legumes. The grain crops may provide most of the cash income during the early period, particularly if the farmer has difficulty in selling hay crops or in procuring sufficient livestock to consume the hay produced on the farm.

Table 7.- Relationship of length of time farm has been in operation to use of cropland, survey farms on Vale project, Malheur County, Oregon, 1938

Item	Number of years farm has been in operation:			
	1	2	3 to 6	7 or more
Number of farms	8	10	28	6
Average acres per farm:	Acres	Acres	Acres	Acres
Crops:				
Alfalfa	5.3	18.4	32.6	28.1
New alfalfa seeding	8.2	5.5	1.6	0.8
Clover	2.1	2.3	9.7	1.0
Grains (including corn)	24.6	23.8	12.5	19.1
Sugar beets	2.0	---	3.3	13.4
All other crops	5.1	0.4	2.7	0.8
Total crops	47.3	50.4	62.4	63.2
Land double cropped	5.6	1.5	1.0	2.5
Land in crops	41.7	48.9	61.4	60.7
Irrigated pasture	3.3	2.8	7.0	10.8
Total cropland in use	45.0	51.7	68.4	71.5
Irrigable land	79.6	59.3	80.3	77.1

Only 1 of the 18 farms in operation 1 and 2 years had any sugar beets, but almost 19 percent of total cropland was in sugar beets on farms in operation for 7 years or longer. Raw land must usually be in a legume crop for several years before it will produce satisfactory yields of sugar beets. In addition, sugar-beet farming requires more machinery and considerable amounts of operating capital for hire of hand labor in thinning and harvesting. The new settler may find it difficult to get the necessary capital during the early years of settlement. Also, if he is inexperienced in irrigation methods of farming, it may be to his advantage not to grow the more intensive crops until he has had several years of experience.

As a guide to future adjustments in farm organization, farmers were asked what numbers of livestock they expected to keep in the future. The greatest increases over present numbers were planned for those farms in operation only 1 or 2 years. The farms in operation 3 to 6 years already had more than 21 animal units, but expected an increase to an average of 34 (table 8). Some increase was planned on the farms in operation 7 or more years. The group of farms in operation 2 years expected to increase to an average of 28 animal units, but this is directly related to the fact that those farms had only 60 potential crop acres compared with about 80 on the other farms, and it is logical to assume that the extent of potential cropland should have some relationship to the number of livestock that will be kept when the farms are fully developed. The relatively large number of livestock planned by the farmers in operation one year is partially due to the longer forecast and to the fact that the market for hay was unfavorable during the 1938 crop year and farmers were impressed with their need for more livestock.

Table 8.- Relation between length of time farm has been in operation to number of livestock, survey farms on Vale project, Malheur County, Oregon, 1938

Item	Number of years farm has been in operation			
	1	2	3 to 6	7 or more
Number of farms	8	10	28	6
Average number per farm:	Number	Number	Number	Number
Livestock:				
Dairy cows	3.1	3.0	6.1	9.0
All other cattle	6.3	5.9	14.7	26.0
Sheep	1.9	0.1	7.3	3.0
Hogs	14.6	21.5	29.9	48.8
Chickens	41.3	29.9	41.1	20.7
Productive animal units	10.0	10.6	21.3	32.8
Expected future productive animal units	43.5	28.0	34.1	37.5
Horses and mules	2.6	2.5	4.6	8.7

An adjustment of irrigated pasture acreage to the number of livestock was already in evidence. Farms in operation 7 years or more had 15 percent of the cropland in pasture, whereas farms in operation 1 and 2 years had only 6 percent in such use.

Production and Disposition of Hay and Grain Crops

Because of the preponderance of hay and grain crops in the cropping systems, their production and utilization are problems of first magnitude. Even on sugar-beet farms, where hay and grain crops are ordinarily of least importance, alfalfa, clover, and grains occupied more than 55 percent of the land in crops in 1938. Moreover, because limited cash sales of hay can be made locally, it may take several years of experience to convince the farmer that hay crops can be best marketed through livestock.

Originally there was a balance between hay production in the irrigated valleys and demands of range cattle and sheep for winter feed. The new irrigation development and the attendant vast increase in hay production over-supplied the former needs for hay in the local market. As farmers in the older irrigated sections are adversely affected because the new lands compete with the old, there has been a shift away from hay as a cash crop and into other crops and more livestock. New settlers attempt to meet the situation by increasing their livestock, but generally hay supplies tend to increase faster than livestock during the early years of settlement. This lag in livestock numbers is due to the inability of the settler to finance purchases of livestock as well as to the lack of sufficient livestock in surrounding areas.

Variation Between Crop Farms and Livestock Farms.--The problem of disposition of hay and grain crops is more acute on crop farms than on livestock farms. Because of the wide market for livestock and livestock products and the relatively high unit value, there is usually an outlet for these commodities. Hay, on the contrary, can be shipped only short distances because of its bulk and low unit value, and occasionally cannot be sold at any price. Livestock farms in the area produced an average of 67.5 tons of alfalfa and clover hay in 1938 compared with an average of 108.1 tons per farm for crop farms (table 9). The smaller production of hay on livestock farms is directly related to the smaller size of these farms compared with crop farms.

As the data in the table are averages for groups of farms, they show both sales and purchases of feed. On any one farm there probably were not both sales and purchases of hay, though this is possible if hay supplies were short in the spring of 1938 and the farmer had to buy hay to carry his livestock over until the growing season started. By fall he may have had enough hay so he was willing to sell a part of his crop that he did not need for the following winter and spring feeding.

Livestock farmers bought more hay than did crop farmers in 1938, and sold only one-third as much hay--12.8 tons contrasted with 36.2 tons sold on crop farms. More hay was fed on livestock farms than on crop farms, and with the smaller average production, the inventory increase for the year was only 16.7 tons compared with 35.3 tons for the crop farms. Purchases of hay were likely made in the spring of 1938, so should be deducted from inventory increases to show the probable net increase. On this basis, the livestock farms were confronted with only a

Table 9.- Average per farm production and utilization of hay and grain crops in 1938, crop farms and livestock farms, Vale-Ontario area, Malheur County, Oregon

Item	Average per farm		Percentage distribution	
	Crop farms	Livestock farms	Crop farms	Livestock farms
Number of farms	68	54	68	54
Alfalfa and clover hay:	Tons	Tons	Percent	Percent
Produced	108.1	67.5	98.3	90.6
Purchased	1.9	7.0	1.7	9.4
Total supplies	110.0	74.5	100.0	100.0
Sold[1/]	36.2	12.8	33.0	17.2
Fed	36.0	45.0	32.7	60.4
Other use	2.5	0.0	2.2	0.0
Inventory increase	35.3	16.7	32.1	22.4
Total utilization	110.0	74.5	100.0	100.0
Grain crops:[2/]	Bushels	Bushels	Percent	Percent
Produced	659.6	356.8	96.9	86.3
Purchased	21.2	56.6	3.1	13.7
Total supplies	680.8	413.4	100.0	100.0
Sold[1/]	317.7	61.4	46.6	14.9
Fed	185.9	249.6	27.3	60.3
Other use	19.4	11.4	2.9	2.8
Inventory increase	157.8	91.0	23.2	22.0
Total utilization	680.8	413.4	100.0	100.0

1/ Includes landlord's share where land is rented.

2/ Barley, wheat, and corn.

minor problem of hay surplus in 1938, whereas the crop farms averaged well over 30 tons per farm of increased hay inventories. Hay in field stacks, the usual method of storage in the area, can be kept over the second year, but if retained longer it loses most of its value for feed. The situation prevailing in the 1938 season cannot continue indefinitely without large losses to the farmer. A portion of the surplus hay was caused by the relatively mild, open winter of late 1938, making pasture available longer in the fall, but the main cause was the increasing production of hay and other feeds without a concurrent increase in numbers of hay-consuming livestock.

The situation with respect to production and utilization of grain crops was similar to that for hay. Livestock farmers bought 14 percent and fed more than 60 percent of their total grain supplies. On the other hand, only 27 percent of grain supplies on crop farms were fed, contrasted with more than 50 percent sold. The market for wheat and other grains is considerably wider than that for hay, so surplus production of grain crops is not a serious problem, but grain crops are generally considered unprofitable in most irrigated areas. Disposition of hay is the major crop-disposal problem.

Variation by Length of Settlement.- The problem of hay disposition changes drastically during the early years of settlement. Farms in operation 1 crop year have not had time to develop a large stand of alfalfa and so the production of hay for this group of farms was only 31 tons per farm in 1938 (table 10). Farms in operation 2 years produced almost twice as much as the 1-year farms. The quantity fed was also greater, but inventory increases were probably more than needed to care for slowly increasing numbers of livestock.

Table 10.- Average per farm production and utilization of hay, farms in new project areas classified by number of years on present farm, and farms in older irrigation districts, Vale-Ontario area, Malheur County, Oregon, 1938 1/

Item	Farms in new project areas, by number of crop years on present farm:				Farms in older irrigation districts
	1	2	3 or 4	5 or more	
Number of farms	23	33	15	18	33
	Tons	Tons	Tons	Tons	Tons
Production	31.2	58.6	135.1	125.9	122.7
Purchases	4.8	3.9	0.9	9.6	2.5
Total supplies	36.0	62.5	136.0	135.5	125.2
Sold 2/	11.4	6.9	35.6	40.4	42.6
Fed	17.7	29.2	51.7	57.4	51.5
Other use	0.0	4.2	0.0	0.0	0.8
Inventory increase	6.9	22.2	48.7	37.7	30.3
Total utilization	36.0	62.5	136.0	135.5	125.2

1/ New project areas are the lands within the Vale and Owyhee reclamation projects.

2/ Includes landlord's share of crop where land is rented--a minor part of the total.

Hay production was greater on the 3- and 4-year farms than on those farms in operation 5 or more years and was more than twice as large as on the 2-year farms. The inventory increase was likewise greatest for this group of farms. The farms in operation 5 or more years had the largest sales and the largest quantities fed, though they were not sufficient to dispose of the hay produced. A considerable increase in livestock feeding would have been necessary on all farms to provide an outlet for the additions to hay inventories. Farmers in the older irrigation districts were able to sell slightly more hay than farmers on the new lands, but even these farms had a large carry-over of hay in 1938. While it may be expected that over a long period there will be a natural readjustment of livestock numbers to feed supplies, the intervening period of adjustment may impose many hardships on the farmers concerned unless outside assistance and direction are given.

Irrigated Pasture

Most of the farmers seeded their pastures in April and May. The usual seeding mixture included one or two legumes such as sweet clover, white dutch clover, and red clover, mixed with two or three grasses like blue grass, orchard grass, meadow fescue, and brome grass. Most farmers seeded 10 pounds of the seed mixture per acre. The most usual period between seeding and first use of pasture was 3 or 4 months; many waited longer than this period, and a few did not pasture until the year following seeding.

In any area that is dependent to a considerable extent upon livestock production, it is highly desirable to have an abundance of succulent pasture of good quality. This holds particularly for dairy enterprises and to a lesser degree for hogs, beef cattle, and sheep. Good dairy management requires succulent pastures to obtain the maximum number of cows per worker and maximum production of milk at a reasonable cost.

Carrying Capacity.- Data on pasture management and carrying capacities obtained from about 50 farms in the Vale-Ontario area indicate what may be expected in the area. Thirty of the thirty-nine farms reporting on pastures seeded before 1938 used their pastures for 4 to 6 months during the 1938 season (table 11).

Table 11.- Pasture use in 1938, Vale-Ontario area, Malheur County, Oregon[1/]

Number of animal units carried per acre	Number of farms reporting	Number of months pasture was used in 1938	Number of farms reporting
Less than 1.0	4	2.6 to 3.5	4
1.0 to 1.4	21	3.6 to 4.5	10
1.5 to 1.9	5	4.6 to 5.5	10
2.0 to 2.4	4	5.6 to 6.5	10
2.5 to 2.9	2	6.6 to 7.5	4
3.0 to 3.9	3	7.6 to 8.5	1
Total	39	Total	39

1/ Pastures sown in 1938 not included.

Twenty-one of the farms reported from 1 to 1½ animal units pastured per acre of pasture used. These data indicate that the pastures grown in the Vale-Ontario area are of relatively high carrying capacity and are available for a sufficiently long period throughout the year to serve as an important source of feed for farm animals.

The age of pasture is directly related to its carrying capacity. Pastures seeded for less than 6 months before the time of use as pasture provided only 3.8 animal unit months of grazing per acre during 1938 (table 12). Pastures from 1 to 3 years of age had a carrying capacity of between 7 and 8 animal unit months per acre. Pastures 4 years old or over provided 6.2 animal unit months of grazing, indicating a reduction in carrying capacity after about the fourth year.

Table 12.- Relationship between age of pasture and carrying capacity, Vale-Ontario area, Malheur County, Oregon

Year pastures were seeded	Approximate age of pasture in summer 1938	Number reporting	Total acres of pasture	Animal unit months use per acre in 1938
1938	Less than 6 mo.	8	43.5	3.8
1937	1 - 1½ yrs.	15	83.6	7.1
1935 and 1936	2 - 3 yrs.	7	46.5	7.7
1930 to 1934	4 - 8 yrs.	7	47.5	6.2

Advantages of Pasture.- An important advantage of pasture is the relatively small cost in terms of both money and labor that is required, once the pasture has been seeded. During the life of the pasture, which probably should be 5 or 6 years in the Vale-Ontario area, relatively little attention need be given to the upkeep of the acreage. It is believed by those familiar with the area that an acre of good pasture is fully as valuable for feed production as an acre of alfalfa, and the costs in terms of both cash and labor are appreciably smaller for pasture than for alfalfa.

Farmers were asked whether the pasture acreage was adequate or inadequate for the number of livestock kept. Those reporting adequate pasture had an average of 0.47 acres of pasture per hay-consuming animal unit. Those reporting inadequate pasture had an average of 0.24 acres of pasture per animal unit. During the year the former group fed 1.79 tons of hay per hay-consuming animal unit, compared with 2.24 tons per animal unit for the group reporting inadequate pasture. This indicates a saving in hay fed of almost ½-ton per animal unit in favor of farms reporting adequate pasture. In the group of farms that reported adequate pastures, 38 percent reported that no supplemental feed was given to the animals while they were on pasture. No farm with inadequate pasture was

Table 13.- Relationship of number of crop years on present farm to income, organization, and efficiency factors, Vale-Ontario area, Malheur County, Oregon, 1938 1/

(Averages per farm)

Number of crop years on present farm	Farms	Full-time man workers	Crop years on farm	Crop acres	Productive animal units	Productive man work units: Per farm	Productive man work units: Per worker	Crop yield index	Gross farm receipts	Family farm income: per farm	Family farm income: per crop acre
	Number	Number	Number	Number	Number	Number	Number	Percent	Dollars	Dollars	Dollars
Vale and Owyhee projects											
1	23	1.3	1.0	43.8	8.2	150	112	87.5	855	130	2.99
2	33	1.2	2.0	55.3	11.0	188	159	91.9	962	310	5.61
3 to 4	15	1.4	3.5	67.5	16.8	254	176	107.2	1,723	944	13.99
5 to 7	13	1.5	5.3	74.0	27.2	314	216	109.9	2,883	1,357	18.34
8 or more	5	1.6	10.4	73.8	36.9	375	228	121.9	2,705	1,322	17.91
All farms	89	1.3	3.0	58.2	15.1	218	164	97.7	1,441	560	9.62
Older Irrigation Districts:											
All farms	33	1.7	10.2	68.9	29.2	296	180	131.5	2,267	937	13.60

1/ Income calculations do not include a deduction for construction charges, which have not as yet been levied on these projects. These construction assessments, which are essentially an addition to capital investment, would reduce the amount available for farm family living.

able to carry animals through the pasture season without supplemental feeding. Although good livestock-management practice probably would involve some supplemental feed on even the best of pastures, these data indicate possibilities of savings from use of pasture--savings not only in quantities of hay fed but also in the operator's time.

The fact that pasture acreage is larger on the older farms and on those farms where livestock have an important place in the organization of the farm is evidence that irrigated pastures form a valuable addition to the farming system. Lack of success with pastures in this area is probably due more to improper management practices than to poor crop adaptation. Overgrazing may be fully as severe on irrigated pastures as on range and may result in reduced grazing seasonally and a shortened length of life of the pasture. Rotation grazing through division of the pasture into three or more fields provides better control of grazing, and gives the pasture a period of rest for renewal of growth and strengthening of the root system.

Financial Results of Farming

Financial returns from farming are affected by conditions outside the farm as well as by the handling of the farm itself. Some of the external factors are beyond the control of the farmer, but most of the internal factors are partly or entirely within his influence. The latter type of factors are of particular concern to the individual. High physical production rates (crop yields, butterfat per cow, eggs per hen, etc.) are generally considered essential to obtaining high farm incomes under average cost conditions, although only moderate physical production rates may result in high incomes if obtainable with unusually low costs. Equally important is the efficient utilization of available labor. This, in turn, is associated with proper size of farm and a balance of enterprises that will insure a reasonable amount of productive work spread over as large a part of the year as possible. Proper selection and combination of enterprises are essential to high farm incomes. In other words, the type of farming suitable to the area must be understood, and a farm program developed which takes into account the most likely type adapted both to the area and to the abilities and inclinations of the farmer concerned. The above factors apply to newly developed areas as well as to areas long in operation.

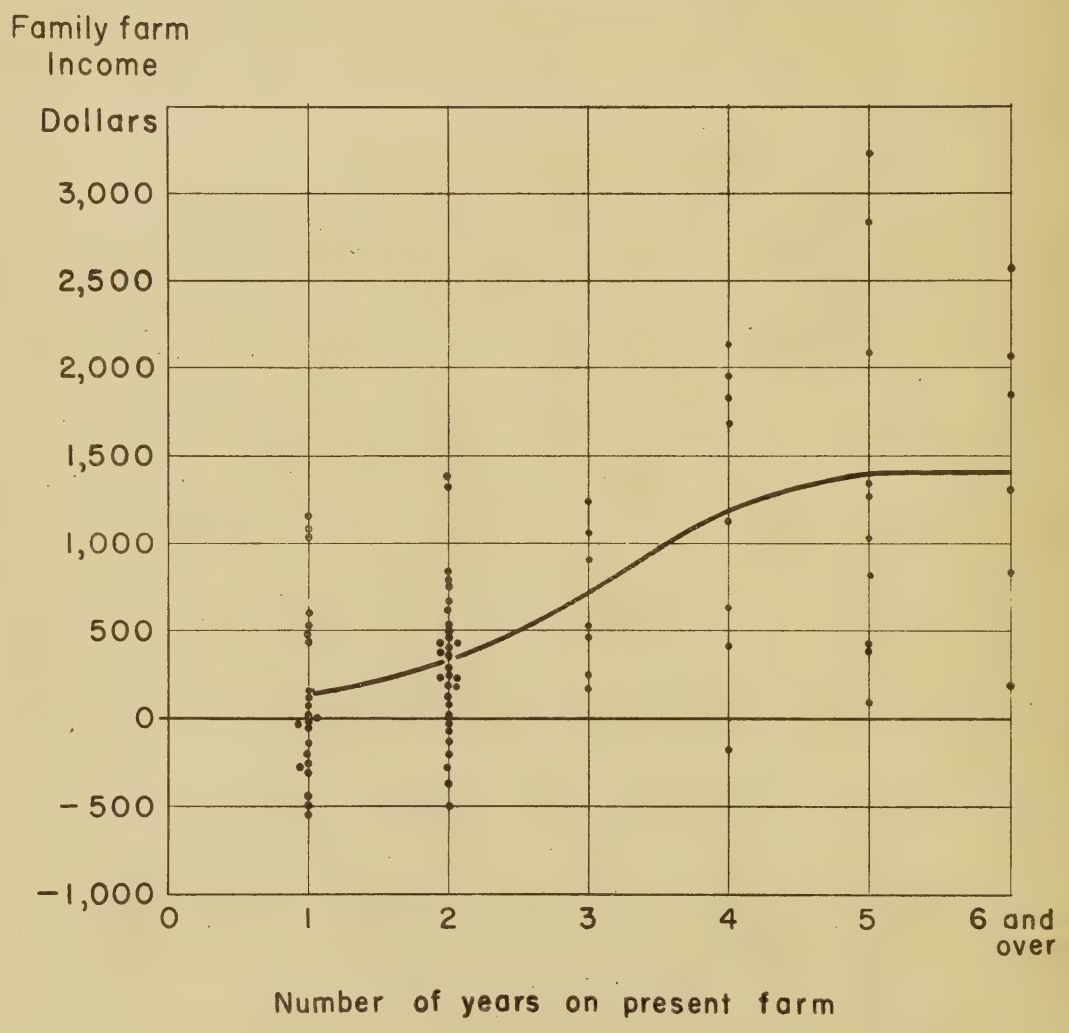
Length of Time on Farm

Clearing of sagebrush land takes time, and construction of farm buildings and fences and getting livestock and equipment require considerable capital which may or may not be readily available to the settler. Large family farm incomes can hardly be expected until several years have passed.

Farms on the Vale and Owyhee projects in operation for 1 crop year had an average family farm income 8/ in 1938 of $130 (table 13 and fig. 6).

8/ Family farm income is gross farm receipts (including inventory increases of crops and livestock) minus farm expenses (including depreciation on buildings and equipment and inventory decreases, but not including irrigation construction charges, interest payments, or unpaid family labor). It is the amount available to the operator and family for work performed and for interest on farm investments. It does not include the value of farm products used in the home.

Figure 6. Relation Between Family Farm Income and Length of Time on Present Farm, New Farms on Vale and Owyhee Projects, 1938



U. S. DEPARTMENT OF AGRICULTURE NEG. 38694 BUREAU OF AGRICULTURAL ECONOMICS

FIGURE 6

Family farm income in 1938 of farms in operation 2 years was $310 and for those in operation 3 and 4 years was $944. Family farm incomes of more than $1,300 were received by farms in operation from 5 to 7 years. It is believed that these figures are not biased by an unfair distribution of good land. The late settlers had fully as good chance to receive good land as the earlier settlers in new areas, because these projects were opened up by divisions and settlement was practically complete in each division before a new one was opened. These data are highly significant. They indicate the probable length of time necessary before a settler can expect to receive full potentialities of income from his farm.

Size of Operation.- It is impossible to account for all the factors that are responsible for the size of family farm income, but some of the more important causes can be traced. The size of farm operation is an important factor and is somewhat related to length of settlement. Size as measured by acres of land depends upon the number of acres cleared and irrigable. If clearing, leveling, and preparation of the soil for crops can be done rapidly, the size of the farm from the area standpoint may be made sufficiently large within a short time. Stocking of the farm with livestock generally requires a considerably longer period, particularly if the farmer is lacking in financial resources and is unable to increase his livestock unit by purchasing his additions. Also, maximum yields cannot be obtained on new land for several years, regardless of the amount of capital assets available.

Farms in operation 1 crop year in the Vale-Owyhee projects had about 44 acres of land in crops.9/ The number of acres of cropland increased to about 74 acres per farm for those farms in operation 5 years or more. Coincident with this increase in number of crop acres was an increase in numbers of productive animal units. From about 10 per farm for those in operation 1 and 2 years, the number of productive animal units increased to 37 for farms in operation 8 or more years.

A measure of the size of farm which takes into account acreage, kinds of crops, and numbers and kinds of livestock, is provided by the use of productive man-work units.10/ Productive man-work units increased from 150 on farms in operation 1 year to well over 300 on those farms in operation 5 or more years. As measured in terms of productive farm-labor

---

9/ Farms in operation 1 crop year (1938) ordinarily had been settled longer than 1 year, for most of these settlers moved onto their farms in the fall of 1937 and some as early as May. Though no crop was produced in 1937, these farmers had a considerable time before 1938 in which to clear land, construct buildings, and generally improve their places. Conversely their expenses from time of settlement to Jan. 1, 1938 may have been appreciable, though not included as a part of the 1938 operation for purposes of this farm survey.

10/ A productive man-work unit is the average amount of work performed during a 10-hour day in directly productive work caring for livestock and producing crops. It does not include time spent on repairing buildings and machinery, caring for work stock, or general upkeep of the farm (appendix, note 2).

accomplishment, the older farms were therefore twice as large as the farms in the early stages of development.11/

Use of Labor.- Size alone does not account, however, for all the differences in family farm income between the farms in various stages of development. Coupled with the size of operation is the productive use of the available labor force. If a farmer is able to spend a larger part of his time in doing productive farm work because he has more crop acres or more livestock to tend or because of a more intensive type of crop or livestock usage, he can expect a higher gross as well as a higher net income. Those farms in operation for only 1 crop year had only 112 productive man-work units for each full-time worker on the farm, whereas farms in operation 5 or more years had enough crop and livestock enterprises to keep each worker busy more than 200 days per year. The older farms, therefore, are in a position to utilize much more fully the available time of an operator and other farm labor.

Soil Productivity.- New land low in organic content and available nitrogen may be increased in productivity by proper soil management. The crop-yield index increased from 87 on farms in operation the first year to 122 for those farms in the newly irrigated areas in operation 8 or more years (table 13). This compares with a crop-yield index of almost 132 for farms in the older irrigation districts, all of which have been in operation for many years. The effect upon family farm income of this continued rise in soil productivity for the first few years can readily be appreciated.

Farm Income.- The result of the various factors that have been discussed is reflected in the value of gross farm receipts for 1938. These increased from an average of $855 for farms in operation 1 year to more than $2,800 for those farms in operation 5 or more years. The difference is even more pronounced when comparison is made on the basis of family farm income per crop acre. For farms in operation 1 crop year, the family farm income was only $3 per crop acre whereas for farms in operation 5 or more years, income per crop acre was about $18 per acre or six times as much per acre as on the most recently developed farms.

The newer areas have an advantage in these comparisons, because they are not as yet paying construction charges and taxes are not so high as those levied against farms in the older districts. The differences in irrigation and tax levies are shown in table 14. Taxes are likely to become $50 to $60 higher when the new area is fully developed, and irrigation charges may be as high as $4 an acre per year. If such charges are considered, the family farm incomes would be about the same in new and old areas.

11/ The first-year farmer may have worked fully as hard as the farmer on a farm that had been operating many years, since he was clearing land as well as doing other work, but his directly productive farm work on livestock and current crop production was much less than the latter.

Table 14.- Average per farm charges for irrigation and for real estate taxes on survey farms in 1938

Area and number of years farm in operation	Farms	Irrigable acres per farm	Irrigation charges in 1938 1/	Real estate taxes in 1938
	Number	Acres	Dollars per farm	Dollars per farm
New project areas:				
1 year	16	68.3	60	19
2 years	31	64.9	69	26
3-4 years	17	80.9	70	29
5-6 years	15	80.9	71	54
7 or more years	6	77.1	58	64
Warmsprings District	11	85.8	171	100
All other older districts	16	72.0	121	89

1/ Operation and maintenance charges only were assessed in new project areas in 1938. In older districts, the assessments included repayment of bonded indebtedness.

The new areas appear to be fully as capable of producing a good farm income as the older areas in the vicinity. The number of crop acres and the number of productive animal units on the farms in operation 5 or more years in the newly irrigated areas were slightly larger than on the farms in the older irrigated areas. The number of productive man-work units per worker was also larger. Crop-yield indexes appear to be somewhat lower for this group of farms than for the farms in the older irrigation districts. These financial results during 1938 were influenced little if at all by the vagaries of price levels during the period of farm development (appendix, note 4).

Size of Farm

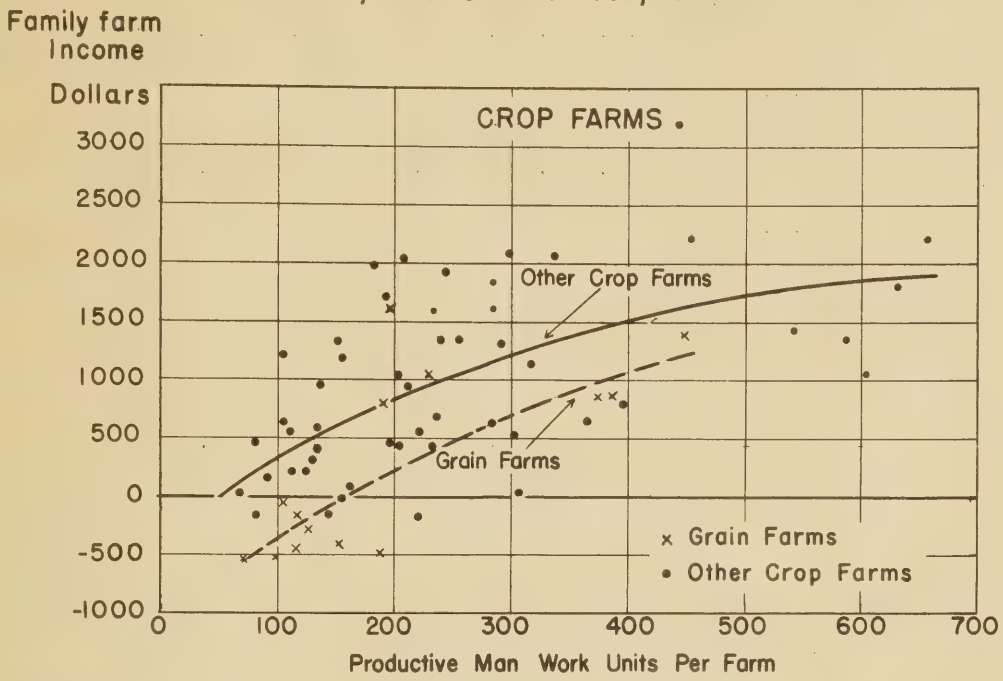
A direct comparison of farm sizes in terms of crop acres is given in table 15. Crop farms with less than 40 acres of crops had a family farm income in 1938 of $347 compared with average family farm incomes of over $1,000 for crop farms with 60 to 99 crop acres and average family farm incomes of almost $1,300 for crop farms with more than 100 crop acres. It cannot be assumed that the increase in family farm income is entirely traceable to an increase in number of crop acres, however, as there was a correlation between number of crop acres and number of productive animal units. In other words, as the number of crop acres increased there was a tendency for the number of livestock to increase so that the family farm income is a joint result of number of crop acres and number of livestock. The relation between family farm income and size of farm operation is shown in figure 7. Also associated with increase in size of farm was a tendency toward greater efficiency in the use of labor as measured by productive man-work units per worker. This measure increased from about 125 man-work units per worker for farms of less than 60 crop acres to over 200 man-work units per worker for farms with 100 or more

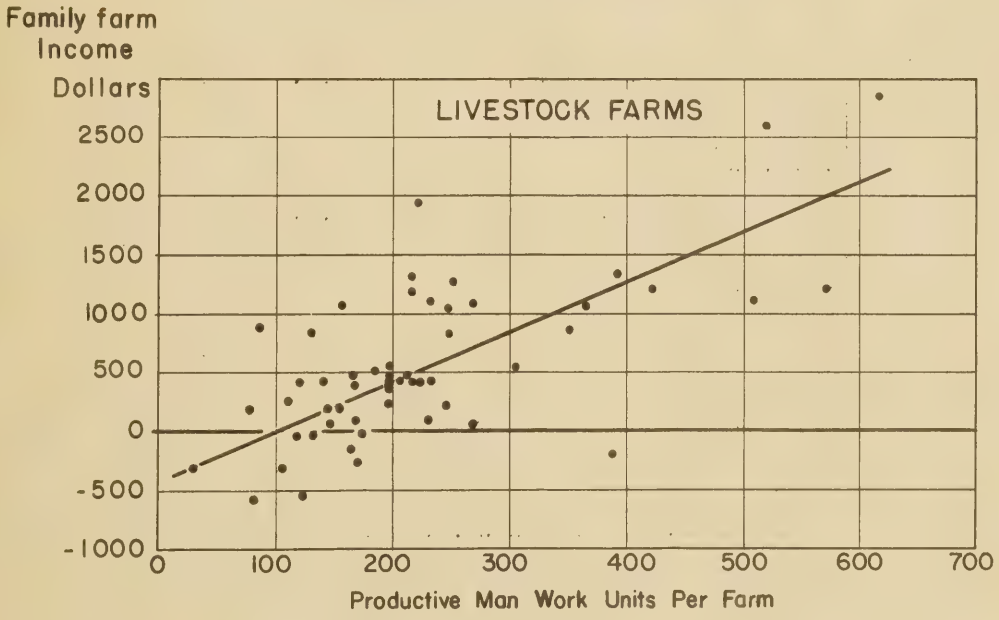
Table 15.- Relation between number of crop acres and income, organization, and efficiency factors, crop and livestock farms, Vale-Ontario area, Malheur County, Oregon, 1938

(Averages per farm)

Farm type and number of crop acres	Farms	Man workers	Crop acres	Productive animal units	Productive man-work units		Crop-yield index	Gross receipts per crop acre	Farm expenses per crop acre	Family farm income
					Per farm	Per worker				
	Number	Number	Number	Number	Number	Number	Percent	Dollars	Dollars	Dollars
Crop farms:										
Less than 40 acres	19	1.1	32.4	8.7	135	122	113.0	34.80	24.11	347
40 to 59 acres	15	1.4	49.3	9.4	171	126	112.9	29.65	19.14	518
60 to 99 acres	19	1.4	74.1	16.3	256	177	114.2	28.73	15.20	1,003
100 or more acres	15	2.2	138.9	27.0	464	211	116.3	22.27	12.97	1,292
All crop farms	68	1.5	71.3	15.0	249	166	114.0	26.87	15.98	776
Livestock farms:										
Less than 40 acres	23	1.1	27.9	15.5	145	130	110.0	31.23	20.54	299
40 to 59 acres	15	1.3	48.4	17.6	202	152	95.1	23.10	13.96	442
60 to 99 acres	14	1.5	71.9	38.8	354	243	94.6	29.19	15.42	990
100 or more acres	2	2.0	114.2	59.7	459	229	125.5	29.00	18.61	1,186
All livestock farms	54	1.3	48.2	23.8	227	175	99.2	27.98	16.55	551

Figure 7. Relation Between Size of Farm Operation and Family Farm Income, Vale-Ontario Area, 1938





U. S. DEPARTMENT OF AGRICULTURE NEG. 38695 BUREAU OF AGRICULTURAL ECONOMICS

FIGURE 7

Table 16.- Relation between type of farm and income, organization, and other factors, Vale-Ontario area, Malheur County, Oregon, 1938

(Averages per farm)

Type of farm	Farms	Crop years on present farm	Crop acres	Productive animal units	Productive man-work units	Crop-yield index	Gross farm receipts: Percentage from crops	Gross farm receipts: per crop acre	Farm expenses per crop acre	Family farm income
	Number	Number	Number	Number	Number	Percent	Percent	Dollars	Dollars	Dollars
Grain	14	2.9	63.2	10.6	200	101.6	53	15.00	12.36	166
Alfalfa and clover	31	5.5	76.1	13.6	253	115.5	69	24.49	13.22	858
Sugar beets	12	6.3	59.6	18.2	238	115.5	73	40.25	23.68	990
General crops	11	10.5	80.9	21.3	313	124.3	66	34.18	20.69	1,090
All crop farms	68	5.9	71.3	15.0	249	114.0	68	26.87	15.98	776
Dairy	12	3.7	38.4	16.1	197	101.9	23	26.95	16.30	408
General livestock and livestock products	19	4.I	49.1	19.2	218	99.2	38	25.09	15.03	494
Livestock	23	3.2	52.6	31.5	250	97.7	22	30.59	17.81	672
All livestock farms	54	3.6	48.2	23.8	227	99.2	27	27.98	16.55	551

crop acres. The larger farms enabled the operator generally to utilize his time more fully and more effectively.

The same general relationships were obtained for livestock farms as for crop farms. That is, associated with increase in number of crop acres was an increase in the number of productive animal units as well as an increase in labor efficiency, that is, productive man-work units per worker. In both groups of farms, the crop-yield index showed no tendency to vary with size of farm.

The family farm income of crop farms averaged about $775 per farm, compared with about $550 per farm for livestock farms. This apparent difference in family farm income in favor of the crop farms was due largely to the greater number of crop acres on the crop farms--71.3, as compared with only 48 crop acres on the livestock farms--and to the greater concentration of relatively new livestock farms in the sample obtained. The greater number of crop acres on the crop farms was partly offset by a larger number of productive animal units on the livestock farms. However, this was not enough to compensate for the difference of 23 or more crop acres.

Livestock farms in operation 1 and 2 years in the new areas had only slightly less family farm income per crop acre than crop farms of the same length of settlement. Livestock farms settled 3 years or more averaged approximately $4 greater family farm income per crop acre than crop farms of similar age, each successively older group showing a somewhat greater difference in favor of the livestock farms. Livestock farms in the older areas averaged $1.63 greater income per crop acre than crop farms of those areas. The difference in actually realizable income was greater than that indicated, because of the much greater increase in hay inventories on crop farms than on livestock farms. These hay inventories were valued at $6 per ton (slightly less than the average price received for sales made during 1938) for purposes of calculating net income for 1938. As it turned out, these inventories could be sold after December 31, only at a smaller price than the average price received during the preceding crop season. Oversupplies of livestock in a local area are much less depressing on prices than are similar oversupplies of hay, because of the much wider market for livestock and livestock products.

Type of Farm

No significant differences in family farm incomes were apparent among the three types of livestock farms--dairy farms, livestock farms devoted largely to meat production, and general livestock and livestock products farms. The livestock farms devoted to meat production had a larger family farm income than the others but this difference in income can be largely explained by the greater number of crop acres and greater number of productive animal units on these farms rather than to any advantages inherent in a particular type of livestock produced (table 16).

Among the types of crop farms, grain farms made by far the least favorable showing (fig. 7). As a group they produced an average family farm income of only $166, whereas alfalfa and clover farms, sugar-beet

farms, and general crop farms averaged for each group more than $850 family farm income per farm.

Grain farming is more typical of the early years of development when it is reasonable to expect low incomes. Grain farms had been settled an average of less than 3 years whereas none of the other types of farms averaged less than 5.5 years. Grain farms had fewer productive animal units and fewer productive man-work units than other types of crop farms. The productivity of grain farms as measured by crop yields was about 15 percent less than other crop-farm types, which again is related to the length of time of development of these farms as compared with the others (table 16). The relatively low prices received for grains during the 1938 marketing season were another important cause for the low family farm incomes.

Previous discussion has shown that as the farms become older, less reliance is placed upon grain as a source of farm income, because those crops are of a more extensive nature and tend to be replaced by crops that produce higher gross values per acre.

General crop farms obtained the largest family farm income in 1938. These farms generally produced sugar beets and other row crops as well as alfalfa, clover, and grain, and had been in operation longer than any of the other types of farms. The sugar-beet farms were only slightly below general crop farms in family farm income and obtained this income on approximately 21 fewer crop acres than did the general crop farms. Both general crop farms and sugar-beet farms had relatively large numbers of livestock in combination with the crop enterprises. Sugar-beet farms produced the highest value of gross farm receipts per crop acre, but also had the largest per acre expense of operation. Nevertheless, the family farm income per crop acre was greater for this type of farming than for any of the other types.

Under the price conditions prevailing in 1938, the sugar-beet enterprise appeared to be most profitable. Whether this condition will be maintained depends upon whether sugar beets continue to hold a relative advantage over other farm crops produced in the area. This in turn depends partly upon national policies with reference to the subsidization of sugar beets, and partly upon the competition with other sugar-beet-producing areas. If national policies are changed so that present subsidies are decreased, sugar-beet growing may not continue to enjoy its present advantages in the area. As such considerations lie in the realm of speculation and are beyond prediction and direct control of the individual farmer, this crop may be considered more speculative than some of the other crops that are less dependent upon a subsidy program. It should also be recognized that the possibilities of expanding acreage are much less than for other crops, at least for the present, because of the quota limitations necessitated in administering the sugar programs. Social difficulties may be encountered if sugar-beet farming is carried on by individual farmers operating large acreages, because of the heavy seasonal demands for labor in such farming. The annual wages of laborers would be small, and the attendant relief or migrant problems throw doubt on the desirability of developing such large-scale enterprises.

Comparison of High- and Low-Income Farms

To emphasize some of the major factors associated with successful farming, a tabulation was made grouping the 10 farms with highest family farm incomes and the 10 farms with the lowest family farm incomes. No farms were included in this tabulation which had been in operation less than 4 years, so factors traceable to recentness of settlement should be largely eliminated. The included farms have attained a certain stability of organization and should already have passed through the pioneering stage of raw-land development. Although this grouping may be technically criticized on the basis that the sort has been made on results obtained, rather than upon factors responsible for these results, it does serve to emphasize the factors that are inherent in the procurement of a relatively large family farm income.

The average family farm income of the 10 farms with highest family farm income was $2,288 in 1938, compared with only $150 for the 10 farms with lowest family farm incomes (table 17). Size of operation was much greater for the more prosperous group, not only on the basis of number of crop acres, but even more so on the basis of number of productive man-work units. The 10 farms with lowest family farm incomes had 38 percent less crop acreage than the other group, but 51 percent fewer productive man-work units. A more intensive enterprise is thus indicated for the farms having highest family farm incomes. This group had more than 49 productive animal units per farm, compared with only 19 for the 10 farms with smallest incomes.

The farms with highest incomes had a larger full-time labor force (1.8 compared with 1.3) and utilized this labor force more productively. The number of productive man-work units per worker was 241 on the more prosperous farms and only 163 on the farms with smallest incomes. Stated another way, each full-time worker on the high-income farms accomplished 241 days of average productive work, while on the low-income farms each worker did only 163 days of productive work.

High crop yields are generally associated with large gross returns. For each of the major crops except wheat, the yields were appreciably higher on the 10 farms with highest family farm incomes. The composite crop-yield index on these farms was 139.3, compared with 98.6 on the farms with lowest incomes. There was no appreciable difference in the average quantity of butterfat produced per cow.

The high-income group of farms required an expenditure of $23 per crop acre for farm operation, compared with less than $19 per crop acre for the low-income group, but a gross value of production of almost $48 per crop acre was obtained on the former and only $20 per crop acre on the latter group of farms. The resulting family farm income per crop acre was $24.74 and $2.61.

Table 17.- Income, organization, and efficiency factors of 10 farms having highest family farm incomes and of 10 farms having lowest family farm incomes, Vale-Ontario area, Malheur County, Oregon, 1938 1/

Item	Unit	Average of 10 farms with highest family farm incomes	Average of 10 farms with lowest family farm incomes
Full-time man workers	Number	1.8	1.3
Cropland used	Acres	92.5	57.4
Irrigated pasture	do.	9.5	6.0
Productive animal units	Number	49.4	19.3
Livestock & livestock products sales	Dollars	2,010.00	601.00
Livestock & livestock products sales per animal unit	do.	40.72	31.19
Butterfat per cow	Pounds	275.0	272.0
Composite crop-yield index	Percent	139.3	98.6
Productive man-work units:			
of crops	Number	230.4	120.6
of livestock	do.	205.9	94.4
Total	do.	436.3	215.0
P.M.W.U. per worker	do.	241.1	162.9
Gross farm income:			
per farm	Dollars	4,417.00	1,155.00
per crop acre	do.	47.76	20.13
per worker	do.	2,440.00	875.00
Farm expenses:			
per farm	do.	2,129.00	1,074.00
per crop acre	do.	23.02	18.71
per worker	do.	1,176.00	813.00
Family farm income:			
per farm	do.	2,288.00	150.00
per crop acre	do.	24.74	2.61

1/ All farms in operation 4 years or more.

Comparison of Various Measures of Farm Income

In the analysis up to this point, farm income has been measured on an accrual basis, which considers the value of inventory increases as a part of farm income and inventory decreases and depreciation on buildings and machinery as a part of farm expense. Capital expenditures for new buildings and machinery thus become a part of annual expense only as they are reflected in the depreciation item. This method of income measurement is a realistic measurement of farming success because it takes into account not only actual cash income and expense but also accruals of assets and ultimate costs such as depreciation. It measures the return from farming that is earned by the farm family and the capital invested in the business. It does not indicate, however, for the particular year what the farmer's cash position may have been. If income is largely an addition to inventories, little cash is available to the farmer for payment of expenses, and consequently he may be in a difficult position, even though he has made important additions to his assets. To the farmer's family, the amount of cash income may be of much greater immediate concern than the amount of family farm income calculated on an accrual basis.

Cash and Accrual Incomes Contrasted.- Differences between farm income measured in terms of cash income and of accrual income are large, particularly during the early years of settlement. Farmers in the new areas who had been on their farms 1 crop year and were clients of the Farm Security Administration actually spent for farming operations in 1938 (including all expenditures made on buildings, fences, clearing, new machinery and equipment, and livestock purchases) almost $900 more than they received from the sale of farm products. 12/

In other words, in order to meet the demands of the farm for operation and capital investment, these farmers had to have access to almost $900 in cash over and above the amount received from the sale of farm products and in addition to the amount needed to care for family living expenses. On an accrual basis, with capital expenditures charged as an annual depreciation item, the family farm income was $106 (table 18). The group of FSA clients that had been on their farms 2 years expended almost $200 more than they received from the sale of farm products. The older groups of farms averaged $378 and $571 family cash farm income from their farm operations.

A somewhat similar situation prevailed on farms in the new areas that received no assistance from the FSA, though the discrepancy between family cash farm income and family farm income was not so great, particularly during the first 2 years of operation. This difference is traceable largely to the fact that these farmers had more livestock, machinery, and equipment at time of settlement than the FSA clients and therefore did not have to make such large cash expenditures to establish a going farm

---

12/ Expenditures from time of settlement in 1937 to Jan. 1, 1938 may have been large for some farmers in this group, but were not included as a part of 1938 operations. Expenses indicated for 1938, therefore, are not synonymous with expenditures made during the first year of settlement.

Table 18.- Comparison of various measures of farm income in 1938, FSA and non-FSA farmers on new project areas and farmers in older irrigation districts, Vale-Ontario area, Malheur County, Oregon

Settler type and number of crop years on present farm	Farms	1938 family cash farm income 1/	1938 family farm income 2/	1938 family farm income plus value of land improvement in 1938 3/
	Number	Dollars	Dollars	Dollars
Vale and Owyhee projects:				
FSA clients:				
1 crop year	8	-892	106	697
2 crop years	20	-185	229	657
3 - 4 crop years	5	378	781	1,264
5 - 8 crop years	7	571	1,260	1,339
All FSA clients	40	-124	454	858
Non-FSA farmers:				
1 crop year	15	-200	142	827
2 crop years	13	62	434	742
3 - 4 crop years	10	547	1,025	1,217
5 - 7 crop years	7	817	1,451	1,452
8 or more crop yrs.	4	672	1,318	1,430
All non-FSA farmers	49	239	683	1,003
Older Irrigation Districts:				
All farmers	33	721	937	997

1/ Family cash farm income is gross farm receipts in 1938 minus cash expenditures, including capital outlays. No account is taken of changes in inventory values or depreciation of buildings and equipment. Sugar-beet payments from AAA received in early 1939 for 1938 compliance are included in gross receipts, but 1937 payments received in spring of 1938 are not included. This measure of income indicates the amount of actual cash received from farm operations during 1938 that is available for family living and for payments of indebtedness.

2/ Family farm income includes changes in inventories of crops and livestock and allows for depreciation charges on buildings and equipment. Unpaid family labor was not considered as an expense. Except for the item of unpaid family labor, this measure of income is the one usually used in farm management analyses.

3/ Same as previous column, except that an estimated value for land clearing and development operations performed during 1938 has been added to family farm income.

enterprise. Much of the difference between the two measures of farm income for farms in operation 3 or more years was due to the increase in farm inventories of livestock and crops. Most farms were building up their livestock numbers and consequently sold less than the actual net production of livestock during the year.

In old established farming communities it is to be expected that family cash farm income and family farm income will be approximately the same for a group of farms, although in any one year some differences should be expected. Livestock numbers have reached a point of stability and the entire net production is sold or used in the home, and crop enterprises should be in a similar state of balance. The farms in the older irrigated areas studied were approximately in this state of balance, though family cash farm income was about $200 less than family farm income. The difference is attributed largely to the difficulties of disposing of the hay crop in 1938, which resulted in large carry-overs even in the older irrigated areas.

Income Accruals Through Land Clearing.- In addition to the production of farm products as a source of income for living and for increasing the value of farm assets, the farmer in a new area is able to utilize his labor and equipment in clearing and improving his land. This possibility is of course greatest during the early years of settlement when potentially irrigable land is being brought into cultivation, and ceases entirely when all land is developed. Although the value of such improvement is not convertible into cash except through sale of the property, it is an addition to net worth and may in later years constitute a large portion of the farmers' savings.

To determine the value of this effort toward improvement is ordinarily difficult. On the Vale and Owyhee projects anti-speculation efforts resulted in the establishment of an appraisal board whose duty it is to appraise land values and improvements in case of resale of land on the projects. The appraisal value therefore has a direct relationship with and effect on actual sale price. As uniform schedules have been adopted by each of the appraisal boards for the various types of improvements, it was possible to arrive at a reasonable value for improvements that have been made on each of the farms surveyed. In general, the value of improvements to land, including clearing of sagebrush, leveling, building field irrigation ditches, and preparing and seeding land, vary from $20 to $25 per acre. Values approximate the costs, including labor, of making the improvements.

On the basis of these rates the value of improvements to land made in 1938 was calculated for each farm. The resulting value figure was added to the family farm income to show the amount accruing to the farmer as a result of his activities in farm production and land improvement during 1938. The value of land improvements for farms in operation the first year averaged about $600, for 2-year farms from $300 to $400, for 3- and 4-year farms from $200 to $300, and for farms in operation 5 or more years less than $100. Farms in the older irrigation districts were already developed, so accruals from land improvements were a minor item.

The three measures of income shown in table 18 indicate the need for a complete understanding of the basis on which income data are calculated. For the immediate, short-run viewpoint, the family cash farm income may be of greatest concern to the farmer, particularly if his current assets are limited. From the long-term viewpoint the measure shown in the fourth column of the table serves to indicate more nearly the ultimate returns to the farmer for his activities during the year.

Source of Funds Used During 1938

The major sources of funds available to the farmer for payment of farm operation and family living expenses and repayment of indebtedness are the following: (1) sales of farm-produced commodities, (2) outside work, (3) borrowings, and (4) use of past savings. A farmer ordinarily expects to receive the greater portion if not all of his income from the farm. Outside work may or may not be available, and is generally not sought if farm income is sufficient to meet farm and living expenses. Loans are obtained for a variety of reasons, but in a going enterprise debt repayments usually are expected to exceed current borrowings except in the case of major investments in farm equipment or land, or in case of emergency. Cash on hand generally is used before borrowing.

In the development of a farm from raw land, the production of commodities for sale can be expected to be small during the first few years. Expenditures during the development period and especially the first year usually are high, so these outlays must be met by supplementing farm receipts with funds from other sources. The proportion of the funds coming from the various sources other than farm sales varies with the type of farmer, available resources and opportunities, and the length of time on the farm.

Marked differences in the proportion of funds from various sources are apparent in groups of farmers sorted on the basis of number of years on the present farm. The availability of cash resources likewise varies, which affects the proportion of funds that must be obtained from borrowing. Clients of the Farm Security Administration in the Vale-Ontario area who had been on their farms only 1 year received 43 percent of their total funds used in 1938 from loans and more than 8 percent from cash savings (table 19). Those farmers who were not FSA clients and had been on their farms 1 year received only 5.6 percent of the required funds from loans and about 31 percent from cash savings. The high percentage of funds derived from borrowing by the clients of the FSA is directly related to the amount and distribution of assets at time of settlement. These people averaged appreciably lower quantities of machinery and equipment and numbers of livestock at time of settlement than the non-FSA farmers. (See page 75.)

The net borrowings of FSA clients who had been on their farms 2 years was only 22 percent of the total funds required. Farmers who had been on their farms 3 to 4 years no longer showed net borrowings as a group; repayments of indebtedness actually exceeded loans made in 1938.

Farm receipts supplied an increasingly larger percentage of total

Table 19.- Source of funds used for all purposes during 1938, FSA and non-FSA farmers classified by number of crop years on present farm, Vale and Owyhee projects, Malheur County, Oregon

Source of funds and type of settler	Number of crop years on present farm: 1	2	3 to 4	5 or more	All groups
FSA clients:					
Number of farms	8	20	5	7	40
	Percent	Percent	Percent	Percent	Percent
Gross farm receipts	32.3	50.4	84.7	78.9	60.2
Outside work	7.1	18.8	1.2	6.1	10.8
Other income	9.3	5.7	11.7	15.0	10.2
Gross income	48.7	74.9	97.6	100.0	81.2
Net borrowings 1/	42.9	22.2	0.0	0.0	17.0
Decrease in cash 2/	8.4	2.9	2.4	0.0	1.8
Total funds used	100.0	100.0	100.0	100.0	100.0
Non-FSA farmers:					
Number of farms	15	13	10	11	49
	Percent	Percent	Percent	Percent	Percent
Gross farm receipts	48.2	86.6	96.0	91.4	79.9
Outside work	12.7	6.9	3.1	4.1	7.1
Other income	2.5	12.2	0.9	4.5	5.5
Gross income	63.4	85.7	100.0	100.0	92.5
Net borrowings 1/	5.6	5.5	0.0	0.0	0.0
Decrease in cash 2/	30.9	8.8	0.0	0.0	7.5
Total funds used	100.0	100.0	100.0	100.0	100.0

1/ Loans received in 1938 minus indebtedness repaid in 1938. Where no figures are given, repayments exceeded borrowings for that group of farms during 1938.

2/ Includes accounts receivable. Where no figures are given there was a net increase from Jan. 1 to Dec. 31, 1938, in cash and accounts receivable.

funds as the length of time on the farm increased. About one-third and one-half of total funds came from farm sales for FSA clients and non-FSA farmers respectively on their present farms the first year. These percentages increased to one-half and two-thirds respectively for farmers 2 years on their present farms. After the third or fourth year, the farms supplied over three-fourths of the total funds used, and in many cases up to 100 percent.

The proportion of total funds from outside work and from miscellaneous sources varied considerably among groups of farms, but was generally greater during the first 2 years of settlement.

Need for Credit

The inadequacy of capital resources of FSA clients who produced their first crop in 1938 necessitated borrowing an average amount of more than $1,000 in 1938 (table 20). Settlers who were not FSA clients had much more machinery, livestock, and cash at time of settlement, and so did not have the credit needs of the other group of farmers.

Farmers in the older irrigation districts had larger borrowings than the non-FSA farmers in the new areas. This borrowing on the older farms consisted to a considerable extent of short-term loans for operating purposes, generally of only a few months' duration. This situation was particularly true on those farms producing sugar beets--an intensive crop requiring relatively large cash expenditures for hired labor.

Repayments of principal on past commitments were of importance even on the farms only recently established, but borrowings exceeded loan repayments. Many loans contained a repayment plan involving relatively large payments the first few years of farming operation. These loans either were delinquent or were forcing unnecessary hardships upon the settlers. Experience in the area indicates the need for a loaning policy on the part of credit agencies which requires only nominal payments the first few years and no substantial payments until about the fifth year after settlement. Indebtedness must be liquidated out of farm earnings, and these earnings during the first 3 or 4 years are required to establish a going farming enterprise. Not until after these first years of settlement can any appreciable contribution to debt reduction be made.

Experience has indicated that after the developmental period has been passed the settlers' repayment records have been satisfactory.

Financial Position and Progress

Assets of most farmers consist largely of tangible items such as land, buildings, machinery, livestock, and household equipment. Cash, bank deposits, and cash value of life insurance are generally of lesser importance. Encumbrances against these assets decrease the equity of the farmer, so that his net worth is usually a smaller item than the sum of all assets under his control. Net worth represents the financial position of the farmer, and may be small even though the assets over which he has control are large.

Table 20.- Average per farm loans received and debt repayments made in 1938, FSA and non-FSA farmers on new project areas and farmers in older irrigation districts, classified by number of crop years on present farm, Vale-Ontario area, Malheur County, Oregon

Settler type and number of crop years on present farm	Farms	Loans received in 1938			Repayments of principal in 1938 1/	Excess or deficit of principal repayments over loans received
		From FSA	From other sources	Total		
	Number	Dollars	Dollars	Dollars	Dollars	Dollars
FSA clients (new areas)						
1 crop year	8	1,047	25	1,072	158	-914
2 crop years	20	319	47	366	119	-247
3 to 4 crop years	5	80	115	195	267	+ 72
5 or more crop years	7	202	29	231	486	+255
All FSA clients	40	414	48	462	209	-253
Non-FSA farmers (new areas)						
1 crop year	15	0	274	274	197	- 77
2 crop years	13	0	202	202	126	- 76
3 to 4 crop years	10	0	132	132	218	+ 86
5 or more crop years	11	0	650	650	838	+188
All non-FSA farmers	49	0	310	310	326	+ 16
Farmers in older districts						
1 crop year	3	0	836	836	860	+ 24
2 crop years	6	0	386	386	346	- 40
3 to 4 crop years	4	9	532	541	612	+ 71
5 or more crop years	20	0	482	482	733	+251
All farmers in older areas	33	1	503	504	659	+155

1/ Includes mortgage and land-purchase contract payments.

Net worth therefore should not be considered alone in evaluating financial position. For instance, two farmers may have equally small net worths, yet the values of their tangible assets may be entirely different. One may have little or no liabilities, in which case assets are necessarily small also. The other may have large amounts of assets offset by large liabilities which results in a small net worth, yet the assets enable him to make an entirely different showing in farming operations than the farmer with both small assets and small liabilities. The ability to borrow in order to obtain control over certain farming assets may be of great benefit, particularly in an undeveloped community. However, access to capital funds through borrowing generally has some relation to previous accumulations of assets by the prospective borrower and, ordinarily, loans obtained are a fraction of the value of the asset used for security.

Changes in net worth should serve as an indication of the degree of success of farming in the locality. Likewise the condition of assets and liabilities of settlers on new lands has an important bearing upon the probable future success of these settlers, and affects the rapidity of progress and the kind and severity of the problems encountered during the developmental period.

Assets and Liabilities at Time of Settlement.- Anti-speculation provisions of the Bureau of Reclamation made it possible for settlers in the new project areas to acquire sagebrush land at prices ranging from $5 to $15 per irrigable acre, depending upon the quality of the land. An average 80-acre unit cost about $800 for raw land with from one-third to one-half as a usual down payment, though many transactions were made with smaller down payments. An additional outlay is needed for buildings and equipment, and, although dwellings may be modest, livestock, machinery, and other equipment must be adequate for reasonably successful operation. These initial expenditures are increased by the operating and family living costs between time of settlement and the time when the farm is producing crops for sale in sufficient quantities to return something more than cash operating expenses. Moderate amounts of available capital resources are imperative.

The amount and distribution of assets influenced the course of action followed by the settlers on the new lands, most of whom had money troubles. Generally those with small assets were forced to borrow. Clients of the Farm Security Administration who owned farms on new lands had an average net worth of $1,565 at time of settlement, whereas non-FSA farmers had an average net worth of $3,188 (table 21). The latter group had about $200 more machinery and equipment, $650 more livestock, and $450 more cash at time of settlement than did the FSA clients. This would indicate the need to borrow about $1,300 to bring the FSA clients on a par with the other group. About $1,000 was the average amount loaned to FSA clients in the area.

Settlers who moved into the older irrigation districts had an average net worth at time of settlement of $5,000, more than $3,000 of which was in the form of cash and accounts receivable. Many of these had settled several years before the settlers came to the new lands, but

Table 21.- Average value of assets and liabilities of farmers at time of settlement -- classified by type of settler and tenure of operator, Vale-Ontario area, Malheur County, Oregon 1/

Item	Owners and part-owners			Renters		
	FSA clients in new areas	Non-FSA farmers in new areas 2/	Farmers in older irrigation districts	FSA clients in new areas	Non-FSA farmers in new areas	Farmers in older irrigation districts
Number of farms	36	44	29	4	4	4
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
Farm assets:						
Machinery and equipment	247	426	348	56	420	18
Livestock	207	865	756	140	2	212
Other farm property	73	160	278	2	12	0
Total farm property	527	1,451	1,382	198	434	230
Cash & accounts receivable	646	1,107	3,047	40	438	58
All other assets	549	1,121	731	178	639	717
Total all assets	1,722	3,679	5,160	416	1,511	1,005
Total liabilities	157	491	159	219	44	68
Net worth	1,565	3,188	5,001	197	1,467	937

1/ The financial statement was obtained for the period immediately preceding the purchase of land or other property on the present farm. No land values are thus included in the statement of farm assets except for one or two farms in each of the owner groups where the land was bought several years before time of settlement. These values are included in "other farm property." Real estate owned elsewhere is included under "all other assets"; value of household property comprises an important part of this.

2/ One farm included in this group in previous tables was omitted because of incomplete information on value of assets and liabilities. This farm is likewise omitted in tables 23 to 26.

even those who settled in the older districts in recent years were in a stronger financial position than settlers on new lands. Most of the recent arrivals could not afford to buy farms in the older, developed areas because of the large down payment demanded for farms that are developed. These farms had an average value of almost $11,000 on December 31, 1938.

Tenancy is of minor importance in the area, particularly in the newly developed sections. Farmers who have sufficient resources (and the amount required is not large) prefer to buy land and develop their own farms. Thus the increases in values through development accrue to the operators rather than to a landlord. Only 12 of the approximately 130 were tenants. Usable assets of those 12 such as cash, livestock, and equipment at time of settlement were small, which probably accounts to a considerable extent for the tenure status. Whether a large number of farmers could have become renters on the new lands is problematical, as this presupposes the willingness of landlords to construct buildings and make some improvements on new land. In view of the limited resources of many settlers, a logical assumption seems to be that, in the absence of FSA loans, settlement would have proceeded at a slower pace on the Vale and Owyhee projects. Although tenancy is infrequent, it will doubtless continue to exist, and perhaps increase, as the older owner-operators begin to retire from active farming.

A number of the settlers now owning farms had extremely low resources at time of settlement. Thirteen of the FSA clients and five of the non-FSA farmers each had less than $1,000 net worth at time of settlement (table 22). The farm Security Administration has generally confined its loans to the more needy cases, though on the basis of financial position at time of settlement there appears to be some need of extending credit to other cases. However, assets at time of settlement can be considered as only one gauge of need, because opportunities, such as outside employment, may have changed the need for loans since settlement. In addition, some farmers, even though severely pressed for money, prefer to eke out an existence without going into debt; others similarly pressed probably were unable to qualify for an FSA loan.

Table 22.- Distribution of FSA and non-FSA farmers by net worth at time of settlement, owned farms on Vale-Owyhee projects in operation 5 years or less, Malheur County, Oregon

Net worth at time of settlement	Number of farms: FSA clients	Non-FSA farmers
Less than $500	5	1
$500 - $999	8	4
$1,000 - $1,999	12	8
$2,000 - $2,999	4	10
$3,000 - $4,999	6	6
$5,000 - $7,499	0	7
$7,500 or more	0	2
All farms	35	38

Financial Position December 31, 1938.- Two types of change occurred in the financial condition of farmers from time of settlement to the end of 1938: First, there was a definite increase in net worth closely associated with length of settlement, and second, there was a shift in type of asset from a relatively large amount of liquid, readily convertible assets to a high proportion of permanent, less easily convertible assets such as land and buildings. The amount of assets in land, buildings, equipment, and livestock increased rapidly with a concurrent decrease in the amount of cash and accounts receivable and an increase in liabilities. At time of settlement all owner groups averaged more cash and accounts receivable than liabilities, indicating that liabilities could have been repaid immediately. At the end of 1938 liabilities generally far exceeded cash and accounts receivable. Land-purchase contracts, mortgages, and loans for purchase of machinery and equipment were the most important liabilities.

Total assets of clients of the Farm Security Administration were $5,435 per farm at the end of 1938 and total liabilities were $1,685 (table 23). This compared with assets of $1,722 and liabilities of $157 at time of settlement of these same farmers. Assets of non-FSA farmers in the new areas generally were greater and liabilities less than those of FSA clients. Net worth of farmers in 1938 usually was directly associated with length of time on the farm and with net worth at time of settlement. For instance, assets were larger for each group as the length of settlement increased, except for the group of [illegible] FSA clients on their farms 2 years. These farms had lower assets in 1938 than the 1-year farms, largely because their assets were much lower at time of settlement.

Table 23.- Average assets, liabilities, and ratio of liabilities to assets, farm owners classified by settler type and number of crop years on present farm, Vale-Ontario area, Malheur County, Oregon, December 31, 1938

Settler type and number of crop years on present farm	Farms	Assets	Liabilities	Ratio liabilities to assets
	Number	Dollars	Dollars	Percent
FSA clients (new area)				
1 crop year	8	5,740	1,788	31.1
2 crop years	16	4,162	1,599	38.4
3 or 4 crop years	5	6,499	2,221	34.2
5 or more crop years	7	7,239	1,380	19.1
All farms	36	5,435	1,685	31.0
Non-FSA farmers (new area)				
1 crop year	12	4,874	954	19.6
2 crop years	12	7,289	899	12.3
3 or 4 crop years	9	7,705	724	9.4
5 or more crop years	11	9,404	1,130	12.0
All farms	44	7,244	936	12.9
Farmers in older districts				
All farms	29	12,981	1,887	14.5

Clients of the FSA increased their total assets by borrowing, but even so the total assets over which they had active control were smaller than the assets of those farmers who were not clients. As a consequence, the latter group are in a stronger financial position with a ratio of liabilities to assets of 13 to 100 compared with a ratio of 31 to 100 for the FSA clients. Although the FSA gave material assistance, their clients probably are still short of capital.

The financial position of farmers in the older irrigation districts is an indication of what may be expected in the new areas when they have reached full development. Non-FSA farmers settled for 5 or more years are approaching the older district farmers in the value of total assets. A part of the difference is caused by the method of valuing land. Land of new-area farms was valued on the basis of uniform appraisals in use by local project appraisal boards, whereas it was necessary to accept land values as given by the farmers themselves for the older district farms. A tendency of farmers to value land higher than appraisal schedules was apparent. An important portion of the liabilities of the older farms was composed of short-term loans for operating purposes, whereas much of the loans on the newer farms was for long-term investment in land, buildings, and equipment.

The group of farms settled 2 crop years averaged similar amounts of assets and liabilities as the group of farms settled 1 crop year (table 24). Farms settled longer periods had increasingly greater farm assets at the end of 1938, with the exception of the group settled 8 or more years. These latter farms were in an early unit which was relatively less favorable than latter developments. Value of livestock on this older group was over $2,000 in 1938, almost four times as great as 1-year farms and largest of all other groups. Cash and accounts receivable were also greater in the older groups of farms, and liabilities were less.

Financial Progress.- The difference in net worth at time of settlement and net worth at the end of 1938 offers a measure of the farmer's progress. Progress may be attained at the sacrifice of the accepted level of living, in which case the reward should be great enough to warrant the sacrifice. On the other hand, financial progress and a satisfactory living standard both may be obtained.

Most settlers on the new lands apparently have made definite progress in their financial position. Net worth increased as length of settlement increased (table 25), except on those farms in operation 8 or more years. This last group of farms was established before 1932 and operated during several years of extremely low agricultural prices. This may account for their smaller degree of progress. The number of cases in this older group was perhaps too small to present a true picture of such farms.

The 18 farms in operation 5 or more years averaged about $5,800 increase in net worth from time of settlement to December 31, 1938. This increase was at an average rate of approximately $900 per year. Some were above this average, but almost without exception these above-average farms had one or two grown sons working on the farm, or the operator had

outside work that returned a signficant off-farm income. Although the assets represented by the increase in net worth are not readily convertible into cash, they are an addition to the estate of the operator that compares favorably with savings made by most skilled laborers and small business men. Standards of living and sacrifices entailed in farm development should not be ignored in making such comparisons.

Table 24.- Average value of assets and liabilities of owners and part-owners in new project areas, by length of settlement, Vale-Owyhee Area, Malheur County, Oregon, December 31, 1938

Item	Length of settlement on present farm: 1 crop year	2 crop years	3-4 crop years	5-7 crop years	8 or more crop yrs.	Total
Number of farms	20	28	14	13	5	80
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
Assets:						
Land	2,041	1,876	2,286	2,621	1,814	2,106
Buildings and machinery	1,577	1,538	1,766	3,477	2,028	1,933
Livestock	576	671	1,160	1,525	2,005	955
Other farm property	183	289	584	500	611	369
Total farm property	4,377	4,374	5,796	8,123	6,458	5,363
Household goods	443	464	370	540	314	445
Cash and accts. rec.	105	83	290	269	785	199
Other assets	296	581	818	15	0	423
Total assets	5,221	5,502	7,274	8,947	7,557	6,430
Liabilities:						
Mortgages, notes, liens	1,207	1,203	1,049	1,063	669	1,121
Delinquent taxes, int. etc.	15	24	44	20	148	33
Accounts payable	65	72	165	189	295	119
Total liabilities	1,287	1,299	1,258	1,272	1,112	1,273

During the first year of settlement the main form of progress was in improvements to land through clearing, leveling, and preparation for planting of crops. Increases of assets by this operation are limited to the acreage of irrigable land on the farm. Because all irrigable land is not cleared immediately, there was some increase in value of land through clearing on all groups of farms in 1938. On farms in operation from 5 to 7 years the average value of improvements to land was only $39 during the year 1938, contrasted with a value of $622 on farms in operation the first crop year, and $381 on farms in operation 2 crop years.

Excluding the value of improvements to land, which may be made more or less independently of available farm income, increase in net worth was slight during the first 2 years of operation, but was significant on the farms in operation a longer period. Increase in net worth during 1938, excluding improvements to land, was more than $1,100 per farm for farms in operation 5 to 7 years. As the length of time in

Table 25.- Increase in net worth, from time of settlement to December 31, 1938 and from January 1 to December 31, 1938, and amount of increase attributable to improvements to land, owned farms on new project areas classified by number of crop years on present farm, Vale and Owyhee projects, Malheur County, Oregon

Number of crop years on present farm	Farms	Time of settlement to December 31, 1938			January 1, 1938 to December 31, 1938		
		Increase in net worth	Appraised value of land improvements	Increase excluding land improvements	Increase in net worth	Appraised value of land improvements	Increase excluding land improvements
	Number	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
1	20	1/1,371	1,017	354	1/ 558	622	2/ -64
2	28	1,410	1,142	268	485	381	104
3 to 4	14	3,200	1,435	1,765	683	255	428
5 to 7	13	6,338	1,507	4,831	1,168	39	1,129
8 or more	5	4,376	1,097	3,279	750	101	649
All farms	81	2,699	1,226	1,473	665	349	316

1/ Difference in net worth between time of settlement and January 1, 1938 for this group of farms was caused by the fact that most of these farms were settled several months before January 1, 1938 and some as early as April and May 1937, though no crop was produced in 1937. The farmers had several months in which to increase net worth through improvements and outside earnings.

2/ Decrease.

operation became smaller, the increase in net worth was also smaller, and for farms established 1 year only there was an actual decrease in net worth when land improvements are ignored. In other words, net assets other than land were smaller at the end of the year than at the beginning of the year because the farm produced less than enough to cover family living costs, small as they were in most cases.

Average changes in net worth for all farmers and for groups of farmers tend to obscure some of the variation in rate of financial progress. There was a very wide range in the annual increment of net worth among the farms studied (table 26). Six farms reported a loss in net worth since settlement, even when allowance is made for land improvement, although four of these reported small losses. Twenty-one farms reported losses in net worth if no allowance is made for land improvement, and about half of these were rather substantial. Losses in net worth were confined almost entirely to settlers who had been on their farms 2 years or less. Losses were generally due to slow progress in land clearing, to low current income, and to consumption of capital resources for current living expense.

Table 26.- Distribution of settlers in new-project areas by average annual increment in net worth from date of settlement to December 31, 1938, Vale-Owyhee area, Malheur County, Oregon

Average annual increase or decrease in net worth	Number of settlers with specified increments:	
	Including increments due to land improvements	Not including increments due to land improvements
-$1,000 and over	0	2
-$500 to -$999	2	6
-$250 to -$499	0	4
- $1 to -$249	4	9
0 to $200	2	9
$200 to $399	10	12
$400 to $599	11	10
$600 to $799	8	9
$800 to $999	11	5
$1,000 to $1,399	12	7
$1,400 to $1,799	11	3
$1,800 to $2,399	5	1
$2,400 and over	4	3
All farms	80	80

On the other hand, 32 farms reported increases of more than $1,000 annually, when allowance is made for land improvements; and 14 farms reported equally large increases when land improvements are disregarded. Large annual increases in net worth were obtained by settlers of all lengths of settlement, from the most recent to those who had been on their farms 5 to 8 years. Large annual increases in net worth were very generally associated with one or more grown sons, who were able to assist materially in improving the farm, and with large amounts of off-farm

employment, which gave the family cash for living and for farm improvement. Although every farmer cannot get substantial off-farm employment, there are numerous opportunities for such work in every community.

Once the land has been fully developed the only source available for increasing net worth from farming is through procuring a larger family farm income than that required for family living costs. The factors responsible for high family farm incomes, such as proper combination of crop and livestock enterprises, sufficient size of operation to consume efficiently most of the operator's time, high yields, and others, are therefore associated with large increases in net worth.

Problems of Farm and Area Adjustment

The preceding pages have presented a picture of the Vale and Owyhee projects in 1938. Some farms were at the beginning of the settlement process, while others were almost fully developed. The area as a whole has had problems of adjustment which are not yet solved. Many changes will be made in the area, as the newer farms follow a pattern of development similar to that of the older farms, and as both new and old farms become more satisfactorily adjusted to natural and economic conditions of the area. Although prediction is always hazardous, it seems worth while to estimate the kind and extent of the changes which should or which will take place.

In the sections that follow, consideration is given to adjustments in crops and livestock, adaptation of farm boundaries to natural conditions, modification of farm organization to topographic conditions, the credit needs of the settler during the settlement period, and the ability of farms to repay debts.

Crop and Livestock Adjustments

New farms of the area have undergone drastic changes in organization as they have been developed. These changes result from internal development of the individual farms and from rapid growth of the entire rural community. Perhaps the most striking has been the increased supplies of hay accompanied by a less than proportionate increase in the number of hay-consuming livestock, resulting in an acute problem of hay surplus. This situation is not confined to the new farms, as the older farms are affected as well. Other adjustment problems are concerned with market outlets for other crops and livestock adapted to the area.

Previous discussion has indicated a definite trend of the new farms toward an organization similar to that now existing on older farms of the area. If in a few years the farms on new lands will be similar to the older farms in crop organization, the following changes in crop acreages and livestock numbers per farm may be expected.

(1) A further moderate increase in the acreage of alfalfa hay.
(2) A decrease in the acreage of grain crops.

(3) An appreciable increase in the more intensive row crops, such as sugar beets, potatoes, onions and beans.
(4) An increase in the acreage of irrigated pasture.
(5) A marked increase in livestock numbers.

Data shown in columns A and B of table 27 give the present organization on new farms and on old farms with respect to crop acres, livestock numbers, and production and utilization of hay.

If farmers will increase their livestock numbers to the extent indicated in the farm survey, and assuming that feeding of hay will continue at the same rate as was practiced in 1938,13/ the average farm will be as shown in column C of table 27. Crop-acreage distribution presumably will remain the same as on the older farms, but livestock numbers and hay consumption will be increased materially. Hay inventories may increase for 1 or 2 years without serious losses, if they are decreased in the immediately following years.

But hay inventories cannot be continually increased without bringing serious losses. Hay not fed on the farm, therefore, must be disposed of through sales. Expected future livestock numbers will consume about 78 tons of hay per farm (at present feeding rates), leaving a surplus of about 41 tons to be sold, approximately the same tonnage as was sold on older district farms in 1938. However, this tonnage was about twice as much as was sold on new area farms in 1938. In order that old farms and new farms sell an average of 41 tons each, there would be needed an increase in sales outlets for the area as a whole of some 40 or 45 percent over 1938 quantities. As range livestock supply the principal outlet for hay outside the irrigated areas, and as any appreciable increase in this livestock is limited by available range, such an increase is practically impossible.

The alternatives therefore are two: (1) an increase in livestock numbers on the irrigated farms beyond the expected future numbers or (2) a decrease in the acreage of hay grown. In order to consume all hay grown on the farms, livestock numbers would have to be increased on all farms, both old and new, to approximately twice the number found on older farms in 1938 (table 27, column D). That would be the extreme shift, however, with practically no sales made off the farm. Actually the area can probably continue to have its outlet for hay sales, though even that market may be partially supplied in future years by production from the nearby Black Canyon reclamation project now under construction. An average per farm sale of 20 tons might logically be expected to be the maximum for which markets will be available. No more than 22.5 acres of alfalfa per farm would be needed to supply market outlets and all feeding needs of the future livestock numbers as predicted by these farmers in 1938. This acreage is about the same as that of all new farms in 1938, and 18 percent less than the average on older farms (table 27, columns E and F). Any acreages released by the reduction of hay on older farms

13/ See Note 3, Appendix, for a discussion of the method used in determining feeding rates through multiple correlation analysis.

Table 27.- Average farm organization and hay utilization on new and old farms at present and under different situations

Item	A	B	C	D	E	F
	New farms: 1938 1/	Old farms: 1938 1/	Same as Col. B, but with expected future livestock numbers	Same as Col. B, basis all hay fed on farm 2/	Crops reorganized, livestock same as Col. C, most hay fed on farm:	Percentage change Col. E from Col. B
	Acres	Acres	Acres	Acres	Acres	Percent
Crops						
Alfalfa	22.7	27.5	27.5	27.5	22.5	- 18
Clover	10.4	8.4	8.4	8.4	8.4	0
Grains	19.5	15.2	15.2	15.2	15.2	0
Other crops	6.3	11.6	11.6	11.6	13.5	+ 16
Irrigated pasture	5.8	7.3	7.3	7.3	3/ 10.4	+ 42
Total cropland used	4/59.8	70.0	70.0	70.0	70.0	0
Total irrigable acres	72.8	72.8	72.8	72.8	72.8	0
Livestock (Hay-consuming)	Number	Number	Number	Number	Number	Percent
Dairy cows	4.7	6.6	9.0	13.7	9.0	+ 36
Other cattle	9.7	24.8	30.0	45.8	30.0	+ 21
Horses	3.8	5.4	5.0	5.0	5.0	- 7
Sheep	2.9	23.7	26.0	39.7	26.0	+ 10
Hay-consuming animal units	13.8	27.8	32.7	47.3	32.7	+ 18
Hay production and disposition	Tons	Tons	Tons	Tons	Tons	Percent
Hay produced	78.9	119.6	119.6	119.6	98.4	- 18
Hay purchased	4.7	3.6	0	0	0	-100
Total supplies	83.6	123.2	119.6	119.6	98.4	- 20
Sales and landlord's share	21.0	40.8	41.2	1.6	20.0	- 51
Fed	35.6	5/ 52.8	77.7	117.3	77.7	6/+ 23
Inventory change	25.4	28.9	0	0	0	-100
Other use	1.6	0.7	0.7	0.7	0.7	0
Total disposition	83.6	123.2	119.6	119.6	98.4	- 20

1/ Disposition of hay as actually found on these two groups of farms. Quantity of hay fed in all other columns based on rates determined from regression equation derived from actual feeding on 93 farms in all parts of the area. See Note 3, Appendix for method of calculation.

2/ Based on increasing all livestock except horses the same percentage as excess quantities of hay bear to the quantity of hay fed.

3/ Basis 0.5 acres of pasture per dairy cow and 0.25 acres per animal unit of other hay-consuming animals (approximately the acreages prevailing on 26 farms having "adequate" pastures in 1938).

4/ Less than sum of individual crop acreages because of considerable double cropping on new land, such as grain planted as a nurse crop for alfalfa or clover.

5/ Actual quantity fed. On basis of average quantities fed on all farms, 63.2 tons would be fed. Difference accounted for by larger pastures and more sugar-beet tops and other fodder available on older farms.

6/ Percentage increase calculated on basis of 63.2 tons fed in Column B instead of actual 52.8.

or the increase in cropland through clearing expected on new land would thus of necessity go into some other use. In the hypothetical case used, irrigated pasture acreage was increased to provide an adequate supply of succulent pasture for the increased numbers of livestock and acres in row crops were increased.

In actual practice an increase in sugar beets and pasture probably would result in less hay being fed because of sugar-beet tops and increased succulent feeds. A further adjustment downward of alfalfa acreage or an upward adjustment of livestock numbers beyond that indicated would thus be necessary.

The data given and the extent of adjustments needed should be considered as illustrative only and not exact predictions as to future trends. It is not to be expected that any appreciable number of farms will be the hypothetical average farm presented in table 27, but the general conclusions and the directions of change expected seem to be sound under the conditions prevailing in the Vale-Ontario area. For the area as a whole, the conclusions with respect to direction of changes needed are inescapable. A thorough understanding by all farmers and administrative agencies concerned of the economy of the area and of the nature of adjustments demanded by local circumstances might bring about an adjustment of the local agricultural problem more rapidly than would occur in the absence of such knowledge.

Natural vs. Artificial Farm Boundaries

The historically accepted method of farm-boundary determination in this area has been to follow section lines or lines running north and south or east and west parallel to such lines.14/ So most farm boundaries have followed a rectangular pattern, cutting across topography in a straight line with no relationship to natural features of an area. Under many conditions of farming or where the land is level, there have been no serious consequences, and determination of boundaries by surveying and legal description of property is simplified. Under other conditions, the advantages of simplicity may easily be outweighed by disadvantages.

Irrigation, of necessity, conforms to the existing topography, subject to slight modification through leveling of land. If land is level or gently sloping, irrigation canals and ditches may be placed where most convenient, and the simple rectangular farm boundary is therefore superior. Under less favorable conditions of slope and topography where irrigable land may be interspersed with ridges, steep slopes, and natural drainageways, the rectangular pattern may introduce serious problems of farm lay-out. The shallowness of the topsoil on the Vale, Owyhee, and similar projects prevents any extensive leveling operations which might otherwise offset these problems of slope. Large-

---

14/ See fig. 5, page 43, for an illustration of rectangular farm boundaries in the area.

scale leveling would seriously damage the soil. Under such conditions the advantages of placing farm boundaries along natural lines rather than along section lines are several:

(1) Farm boundaries or fence rows are prevented from isolating small patches of land naturally irrigable from the larger contiguous body of irrigable land across the artificially created line.

(2) Land lying in one slope irrigated from a single high point may all be included in one farm rather than in several, as sometimes happens.

(3) More of the irrigable land can be irrigated, because fence rows, roads, and ditches can often be placed on non-irrigable land that has little value.

(4) Savings to the irrigation district can be made in lateral canal construction by eliminating the necessity of building laterals to each of two or more land owners on a piece of irrigable land which may all be naturally irrigated from one high point.

(5) Savings to the individual farmer can be made through elimination of unnecessary flumes, syphons, bridges, and movement of equipment from one isolated patch of land to another, for instance where a main canal or lateral goes along the top of a ridge through the middle of a farm.

(6) Contour farming can be more easily adopted, thus facilitating better soil conservation.

The need for farm-boundary lay-out along natural lines is well illustrated in a selected area embracing 4 square miles of the Owyhee project (fig. 8). Present farm boundaries, shown as dotted lines, isolate many small areas of irrigable land, subdivide tracts of irrigable land into portions of three or four farms that should be farmed as one unit, and needlessly occupy much valuable irrigable land.

The farm-boundary pattern reorganized along natural lines is shown by solid lines. The number of irrigable acres in each farm approximates the distribution before reorganization, so there is still a sufficiently wide variation in farm size to permit the selection of a size adaptable to each individual farmer. The irrigable land in each farm is a much more compact unit allowing shorter movements of stock and equipment, fences and farm roads are placed where feasible on non-irrigable land thus permitting the maximum use of available irrigable land, and isolated tracts of irrigable land are largely eliminated.

The time to establish boundaries along natural lines is before the settlement of an irrigation development, for once the pattern of

Fig.8 ILLUSTRATION OF FARM BOUNDARIES MODIFIED TO FIT NATURAL FEATURES

SELECTED AREA OF FOUR SECTIONS, OWYHEE PROJECT

MALHEUR COUNTY, OREGON

LEGEND

Present farm boundaries

Proposed farm boundaries

Nonirrigable land

Scale in miles

0 1/4 1/2

SEE FIGURE 5 FOR LOCATION OF AREA INCLUDED ABOVE

U. S. DEPARTMENT OF AGRICULTURE NEG. 38696 BUREAU OF AGRICULTURAL ECONOMICS

FIGURE 8

farm boundaries has become established any widespread reorganization is difficult. Farmers change the pattern by buying or selling odd pieces of property, but this process is extremely slow, and disadvantages occasioned by the original boundary lay-out generally are perpetuated.

Many savings may be effectuated (on projects now under construction such as the Black Canyon in Idaho or the Grand Coulee in the State of Washington and on future projects of the West) by attention to farm lay-out of boundaries along natural lines. Among other advantages, Government ownership of all land prior to settlement would permit intelligently planned location of farm boundaries. Main roads could be placed 2 to 4 miles apart on section lines thus providing straight main roads, but farm roads leading from these highways might well follow natural boundaries, providing both easy grades on steeper sloping lands and construction of roads on non-irrigable land.

Even without governmental ownership of land, much could be accomplished, as land ownership of proposed projects usually is in much larger units than that permitted by reclamation laws, necessitating subdivision of most properties before settlement. Such subdivision might well be done in consultation with farm-management specialists to insure the many advantages and savings possible through establishment of farm boundaries along natural lines.

Farm Organization Modified by Degree of Slope

Contrary to popular impression, not all irrigated land is level or gently sloping. Large areas of present projects and of proposed irrigation developments are rolling to steep in topography. Problems of irrigation are intensified by added costs of labor and other factors as well as by soil erosion from water run-off on the generally more shallow soil on the steeper slopes. These problems impose limitations on the use of such land that affect farm organization, practices, costs, and farm income.

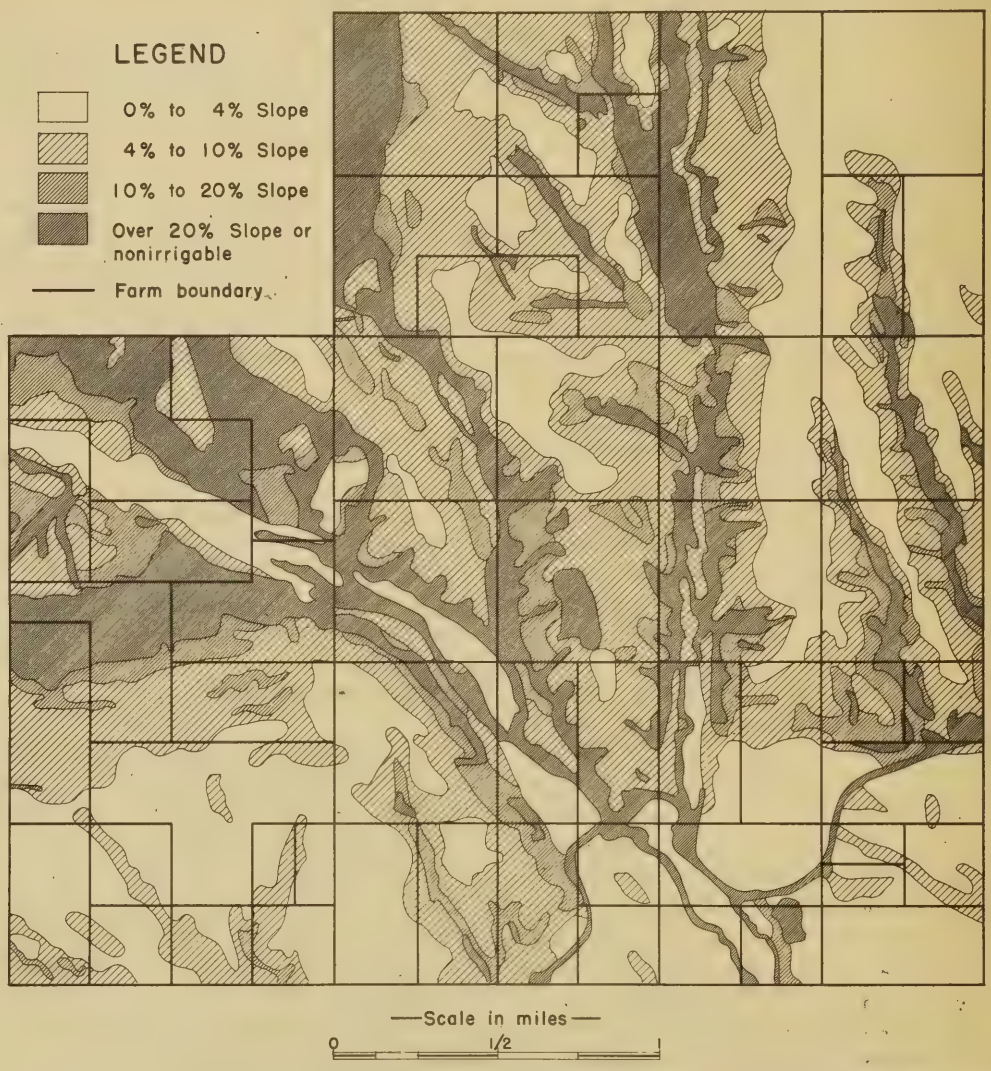
Relatively level or gently sloping land may be planted to any crop adapted to the particular area with no special problems of irrigation. Moderately sloping lands must be handled more carefully if clean-cultivated row crops are to be produced without soil washing. Steeply sloping land is limited to the production of permanent pasture or alfalfa. The degree of slope at which soil washing takes place varies with the type of soil, the kind of plant cover, and the care and skill of the operator in applying water. Slopes greater than 20 percent generally are considered too steep for irrigation. In general, slopes of 10 to 20 percent probably should be in a permanent cover, and those from 4 to 10 percent should have special care in the application of water for clean cultivated crops.

Slope groups of a typical area on the Vale and Owyhee projects are illustrated in figure 9. Farms vary widely in the percentage of irrigable land in each slope group--from those where all land is less than 4-percent slope to those with no gently sloping land and a high percentage of the irrigable land in the 10- to 20-percent slope group.

Fig. 9 SLOPE GROUPS AND OWNERSHIP BOUNDARIES

SAMPLE AREA OF EIGHT SECTIONS, OWYHEE PROJECT

MALHEUR COUNTY, OREGON



SEE FIGURE 5 FOR LOCATION OF AREA INCLUDED ABOVE

U. S. DEPARTMENT OF AGRICULTURE NEG. 38697 BUREAU OF AGRICULTURAL ECONOMICS

FIGURE 9

In the former case, the farmer has a wide range of crop selection and can carry out a uniform system of crop rotation over the entire farm. In the latter case, most of the farm must be placed in permanent cover to avoid serious soil washing and the farmer must exercise care in irrigating the less steep parts of his land. Choice of a farming system is narrowed and should revolve around the production of hay and pasture for livestock. Conformation of field lay-out to topography may be necessary, and different rotations adopted for each that will fit the particular physical features. As yields are lower, production costs are higher, and less intensive crops can be grown, a larger acreage of land must be operated in order to obtain incomes comparable to those obtained on more level land.

Considerations of slope of land should receive serious attention in determining the area of land to be included in a farm unit. In the sample area shown in figure 9, most small 40-acre farms are located on relatively level land, but several are composed almost entirely of steeper sloping lands. This situation alone will be a tremendous obstacle in the successful operation of such a unit because of the practical exclusion of intensive row crops from the farming system.

Steep slopes or irregular corners that cannot be cropped without soil losses or general inconvenience might well be planted to trees. The black locust grows well in this area and could be used as a base for a farm wood lot. Fence posts and fuel are but two of the wood-lot products which could result from such a practice. It seems probable that most farms could add $25 to $50 a year to farm income by the wood-lot use of land that would otherwise be idle.

Subdivision of land into farm units along natural boundaries and subdivision according to slope of irrigable land are two related problems which may have an important bearing upon successful farm operation in large areas included in irrigation projects.

Financial Budget During Developmental Period

Specific requirements for financing the development of a farm vary widely, depending upon many factors, among which are the size of farm, physical features of land selected, ability of the operator to do a wide variety of work, ability of the operator and family to postpone present desires, amount of usable farm assets on hand at time of settlement, and availability of outside work. Any budget constructed to show probable needs during the developmental period must necessarily make certain assumptions as to scale of living provided the farm family and rapidity of development.

One approach in dealing with this problem would be for public credit agencies to advance sufficient credit to permit rapid development of the farm and to provide adequate living facilities for the family during the development period as well as later. For an 80-acre farm this might require about a $6,000 investment distributed approximately as follows: $1,800 for a dwelling; $250 for a well and pump; $600 for outbuildings;

$800 for land; $750 for clearing, leveling, ditching, and fencing; and $1,800 for operating credit.

If an investment of this size were advanced as credit, it should be made as a part of a complete settlement plan that involves adequate supervisory assistance until farmers have become familiar with the area and with irrigation farming. Payment would have to be delayed during the early years of the settlement period, and a long-term, low-interest payment plan developed.

An alternative approach is a more gradual development of the farm plant, but one that involves more liberal use of credit than usually has been available to settlers in reclamation areas. This involves gradual clearing and leveling of land, substitution of family labor for hired labor in construction of buildings, and more modest but still acceptable housing conditions, particularly during the development period. On the other hand, this approach makes it possible for most settlers to assume the responsibilities of managing a full-time irrigated farm somewhat on an apprenticeship basis. If adequate supervision, and credit on a long-term, low-interest basis are not available, this approach will be the only alternative to the unsatisfactory progress resulting from lack of credit. Even under the delayed-development plan for a reasonably adequate farm set-up the settler must have at least $4,000 in cash or credit available for investment within the first 2 years of settlement. A smaller sum will severely handicap the settler.

An indication as to probable financial needs for development of an 80-acre general farm on the latter basis was furnished by experiences of settlers on the Vale and Owyhee projects (table 28).

It is assumed that the settler arrived with the average amount of usable farm assets, and that rate of development, costs, income, and investment were the average found on the Vale and Owyhee projects; also that credit was advanced from private sources. Obviously, a long-term, low-interest-rate loan would be much more desirable and would greatly facilitate development. By the sixth year the farm organization, farm income, and farm value approximate that of non-FSA farmers settled from 5 to 7 years, except that a more adequate farm dwelling is provided throughout the developmental period. The farm dwelling, if built in part by the operator, would provide by the sixth year a house of approximately $1,500 value -- about the same as farmers in older districts, but considerably better than most settlers on new lands have provided themselves, particularly during the early years of development.

With the assumptions made, total cash expenditures the first year of development are $3,520, and the second year are $1,663. From the third to the fifth year of operation there is an increase in expenditures, largely because of an increase in farm-operating expenses coincident with an increase in number of crop acres, number of livestock, and intensity of operations. An assumed irrigation construction charge is included the sixth year of operation. After the sixth year, development is not likely to cause any material change in the budget.

Table 28.- Probable financial needs during first 6 years of settlement on an 80-acre general farm as indicated by average situations prevailing on the Vale and Owyhee projects and providing for a reasonably adequate farm set-up

Item	Usable assets at time of settlement	Probable expenses by year of settlement 1/					
		First year	Second year	Third year	Fourth year	Fifth year	Sixth year
	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.
Dwelling 2/	0	500	0	0	250	250	0
Farm buildings	0	200	100	0	0	0	0
Fences	0	100	100	50	0	0	0
Machinery and equipment	325	325	100	100	50	50	50
Well and water system	0	250	0	0	0	0	0
Miscellaneous	25	50	25	25	25	25	25
Livestock 3/	550	130	0	0	0	0	0
Land 4/	0	250	125	125	125	125	0
Land clearing 5/	0	440	110	70	60	60	0
Irrigation construction charge 6/	0	0	0	0	0	0	300
Total annual investment	0	2,245	560	370	510	510	375
Cumulative investment	900	3,145	3,705	4,075	4,585	5,095	5,470
Farm operating expense 7/	0	725	653	700	1,000	1,525	1,525
Family living expenses	0	450	450	450	450	450	450
Household goods	300	100	0	0	50	50	50
Total annual expenditures		3,520	1,663	1,520	2,010	2,535	2,400

1/ Expenditures in addition to the assets at time of settlement that are shown in the first column.

2/ Assuming a moderate dwelling to which additions are made in the fourth and fifth year to provide a more satisfactory farm home.

3/ Assuming that after the first year the farmer will depend upon natural propagation to increase the size of his livestock enterprise.

4/ Assuming 75 acres of irrigable land purchased at $10 per acre raw land.

5/ Assuming cash costs of clearing and preparing for planting to be $10 per acre.

6/ Assuming a construction charge of $4 per irrigable acre beginning the sixth year after settlement. If the construction charge is smaller, more money would be available for other debt charges or for family living.

7/ Based on average expenses of Vale-Owyhee farms in 1938 for various lengths of settlement.

Total cash expenditures exceed farm receipts by $2,665 during the first year of settlement (table 29). By the third year, expenditures for all purposes are approximately the same as receipts, and by the sixth year farm receipts exceed expenditures by $480 -- more if construction charges are smaller than the assumed $300 annual charge for the farm.

Table 29.- Probable income, expense, and credit needs during first six years of settlement on an 80-acre general farm as indicated by average situations prevailing on the Vale and Owyhee projects

Item	Year of settlement: First	Second	Third	Fourth	Fifth	Sixth
	Dols.	Dols.	Dols.	Dols.	Dols.	Dols.
Total annual expenditures 1/	3,520	1,663	1,520	2,010	2,535	2,400
Gross farm receipts 2/	855	960	1,500	2,200	2,800	2,880
Annual excess or deficit	-2,665	-703	-20	+190	+265	+480
Cumulative deficit	-2,665	-3,368	-3,388	-3,198	-2,933	-2,453
Credit needs 3/						
New credit needed	1,665	1,003 4/	168 4/	0	0	0
Total amount of loan	1,665	2,468	2,848	2,636	2,636	2,386
Interest at 6 percent	100	148	158	158	158	143
Repayments of principal	0	0	0	0	0	250
Surplus available for increasing levels of living	0	0	0	32	107	87

1/ From table 28.
2/ Gross receipts of Vale-Owyhee project farmers in 1938 for various lengths of settlement. Interpolations have been made for some years.
3/ Assuming the settler has $1,000 cash at time of settlement and is unable to obtain off-the-farm employment.
4/ Includes interest on previous year's borrowings, which in following years is paid out of income.

If the settler has $1,000 cash at time of settlement and if he receives no off-the-farm income after settlement, his credit needs, assuming an interest rate of 6 percent, would be $1,665 the first year, about $800 the second year, and $170 the third year. No investment credit would be needed after the third year, and repayment of the loan could begin the sixth year -- sooner only if the scale of living is reduced or improvements to the dwelling are eliminated. With a payment of $250 on the loan principal and $300 for construction charges, the family would have available for family living slightly less than $600 per year, plus use of the farm dwelling and farm-produced products used in the home. The settler would need a repayment period of 11 years for liquida-

tion of the loan, or a total of 16 years' credit from the first year of setlement. As interest payments declined, expenditures for family living could be increased.

The above budget necessarily would be modified for differences in size of farm and living conditions. The amount of credit needed and rate of repayment would be altered materially if slack-season employment off the farm were available. Most settlers were forced to get along on less than the amounts indicated in the budgets because of lack of credit, although many were able to augment their incomes through outside employment. Ability and energy may partially make up for a lack of capital, but a minimum of capital must be available. 15/ Experience on the Vale and Owyhee projects demonstrates the possibility of some progress even under adverse circumstances, but it also emphasizes the need for more credit and capital than has generally been available, and especially the need for deferment of repayment during the early years.

Ability of Farms to Repay Debt

Debt repayment is dependent upon receipts from farm production in excess of essential farm and family living expenses. This excess in turn depends to a major degree upon a farm size that permits reasonably full utilization of operator and family labor. Farms smaller than one man can operate may have little or no debt-paying capacity. Other important modifiers of farm income include prices received, crop yields, and farm-operating expenses. Proper consideration of these factors will bring an increase in the amount of income available for debt repayment. Willingness to pay debts depends upon the farmer's attitudes toward debt and contracts and upon living standards which have become customary.

Ability to repay irrigation construction costs is related to the amount of mortgage or other debt contracted by the farmer. Although construction costs are legally a first lien or first mortgage against the land in an irrigation district, they may in actual practice be of lower standing than second mortgages. Other creditors may be more insistent upon repayment, and may be more on the alert to collect from the farmer when he has money. When farm income is high, construction charge payments can be kept current, and still leave considerable sums for servicing other debts. If high incomes encourage still heavier debt loads, then the first mortgage debt will be jeopardized when incomes become lower. Considerable delinquency may exist even when construction charges are entirely reasonable, if other types of land charges become excessive.

15/ Cf. "Reports on the Engineering, Agricultural, and Economic Feasibility of Kittitas Division, Yakima Project, Washington; Baker Project, Oregon; Vale Project, Oregon; Owyhee Project, Oregon-Idaho; Spanish Springs Project, Nevada; Great Salt Lake Basin Project, Utah; and Willwood Division, Shoshone Project, Wyoming," Bureau of Reclamation, Department of the Interior, 1925, pp. 116-127 and 162-171. Budgets of probable financial needs of settlers on the Vale and Owyhee projects were prepared and presented in this report a number of years before construction of the projects. The budgets indicate considerably greater capital needs than those presented above, and indicate a more rapid increase in income and rate of development.

Land charges can be kept down, at least to some degree, by credit policies of public agencies, by research into the probable future of income to agriculture, and by aggressive publicity on what constitutes reasonable land values and charges. The present anti-speculation policy of the Bureau of Reclamation should act as a powerful brake on inflated land values.

Debt-paying ability is more closely related to net income than gross income. For instance, two farms with $40 and $80 of gross value of production per acre may have operating expenses of $30 and $70 per acre respectively, so that each has a net income of $10 per acre. However, gross value of production may be useful as an indicator of the maximum debt-paying ability.

Under 1938 conditions on the Vale and Owyhee projects, farms in operation 5 years or more had a gross farm income of $38 per crop acre. Price conditions and yields in years to come may alter this figure somewhat, but under a general livestock and crop-farming system it seems probable that gross value of crops will be less than $45 per crop acre when farms are fully developed. The most recently developed plan for repayment of construction charges envisages a variable repayment of 5 percent of the gross value of the crops produced. Assuming $45 per acre gross value of crops produced, such a plan would require an annual construction payment of $2.25 per acre. Construction charges have not been assessed on either project, because construction costs have not been finally determined at present (1940), so no definite statements can be made as to probable construction assessments. 16/

But it appears that probable costs of irrigation construction if repaid on the 40-year repayment plan will consume closer to 10 percent of gross value of production than to 5 percent. Many farmers presumably could meet such a charge if other debt burdens were light, whereas others, less capable operators and more burdened with debt, would find the costs excessive.

Experience on the new lands has extended over too short a period to give conclusive evidence as to the debt-paying ability of farmers on the new lands after full development has been reached. Construction costs are only one of these charges levied against all farms, while other debt charges vary widely from farm to farm. Experience and energy of the individual operators will determine to a considerable degree the level of repayment. Equally important are the size and type of farm, the prevailing price level, and the standards of family living.

Social Conditions and Attitudes

Satisfaction with present living conditions depends upon the scale of living enjoyed currently, upon conditions of life during the immediately preceding years, upon prospects for improvement and enhancement of living standards. Satisfactions are obtained not only from an abundant supply

16/ Construction costs of the Owyhee project will approximate $189 per acre (Reclamation Era, May 1939, p. 96).

Table 30.- Cash expenditures and adequacy of family living in Vale-Owyhee areas, 1938

Cash expenditures in 1935 for family living	FSA clients in new project areas					Non-FSA farmers in new project areas				
	Number	Average size of family	Average spent per family	Adequate 1/	Percent adequate	Number	Average size of family	Average spent per family	Adequate 1/	Percent adequate
Dollars	Number	Number	Dollars	Dollars	Percent	Number	Number	Dollars	Dollars	Percent
150 - 199	4	4.5	187	450	42	2	2.5	162	250	65
200 - 299	12	4.5	259	450	58	6	2.7	236	270	87
300 - 449	9	4.2	368	420	88	17	4.4	369	440	84
450 - 599	8	4.9	513	490	105	8	5.4	498	540	92
600 and over	7	5.6	821	560	146	16	6.0	906	600	151
Total	40	4.7	430	470	92	49	4.8	541	480	113

1/ Based on FSA estimates of $100 per year per person.

of the physical necessities and comforts, but also from opportunities for social intercourse and participation in community development. Objective measurements of the amount of enjoyments and satisfactions available to members of a community are lacking, largely because each individual values satisfactions differently. However, housing conditions, home conveniences, and resources available for family living are important elements of satisfactory living that can be partly measured.

Family Living

Cash Expenditures.- Extremely small cash expenditures for family living were made on many farms in 1938, a not-unexpected situation in view of the pioneer nature of many settlement operations. Over 50 percent of FSA clients spent from $200 to $449 for family living (table 30). Non-FSA farmers in the new areas had more available resources and more of them were in the higher brackets of expenditures. About 75 percent of the farmers in older districts had cash expenditures for family living exceeding $600 in 1938, contrasted with 33 percent of non-FSA farmers in new areas, and only 17 percent of FSA clients. While many farm families had reasonably satisfactory cash resources available for family living, 62 percent of the FSA clients and 67 percent of the non-FSA farmers studied had less money available for family living than the Farm Security Administration considered adequate. In several cases, high expenditures for family living were caused by emergencies such as illness or death rather than by high levels of living.

The total amount of money available determines the percentage of the total that may be spent on any particular item of the family budget. Some needs, such as food and clothing, are more pressing than others and an irreducible minimum must be spent on such items before any allocations can safely be made for other expenditures. Such items as medical and dental care may be postponed for some time, though not without danger of high emergency costs. Families that spent less than $450 for family living in 1938 used about 50 percent of the total for purchases of food even though the farms produced appreciable quantities of food products for home consumption (table 31). Where expenditures of $800 or more were made, only 31 percent was spent for food. Medical, personal, and miscellaneous items were almost 40 percent of total expenditures for the $800 group, whereas none of the groups with smaller total expenditures used more than 23 percent of the total for these items.

Smallest expenditures for family living were made by those settlers who had been on their farms only 1 or 2 years (table 32). As the farmers were on their places longer, the amount of income increased and therefore the amount available for family living increased. Families settled for 5 or more years were approaching the farmers in the older irrigation districts in amount of cash expenditures for family living. Development of a farm under conditions of limited resources has meant that the farm family has been forced to reduce its expenditures to a minimum. In many cases the expectation of better things ahead has been almost the only satisfaction to be derived from the existing mode of life. Progress made by neighbors of the most recent settlers has apparently

Table 31.- Percentage of total cash expenditures in various items classified by size of total expenditure, Vale-Ontario farm families, Malheur County, Oregon, 1938

Cash expenditures for family living in 1938	Farm families	Average size of family	Expenditures in 1938		Percentage of total spent for:					
			Per family	Per person	Food	Clothing	Housing & household operations	Medical	Auto	Personal & miscellaneous
Dollars	Number	Persons	Dollars	Dollars	Percent	Percent	Percent	Percent	Percent	Percent
150 - 299	26	3.8	234	62	51.4	18.5	9.6	8.4	3.0	9.1
300 - 449	27	4.2	368	88	49.1	16.4	11.5	4.5	3.9	14.6
450 - 599	21	4.9	503	103	47.5	16.9	10.4	7.8	4.1	13.3
600 - 799	25	5.2	718	138	40.3	19.4	12.9	6.7	4.4	16.3
800 - More	23	5.0	1,101	220	31.0	15.2	9.3	13.9	5.2	25.4
All farms	122	4.6	572	124	40.2	17.0	10.7	9.3	4.5	18.3

Table 32.- Cash spent for family living and value of farm perquisites, farmers classified by settler type and length of time on farm, Vale-Ontario area, Malheur County, Oregon, 1938

Item	Farms	Cash spent for family living	Value of farm perquisites		Total value of farm family living
			Food production	Dwelling 1/	
	Number	Dollars	Dollars	Dollars	Dollars
FSA clients					
On farm 1 year	8	361	272	38	671
On farm 2 years	20	332	271	39	642
On farm 3-4 years	5	529	228	39	796
On farm 5 or more yrs.	7	693	310	87	1,090
All farms	40	426	273	48	747
Non-FSA farmers					
On farm 1 year	15	426	204	46	675
On farm 2 years	13	522	286	80	888
On farm 3-4 years	10	468	239	65	772
On farm 5 or more yrs.	11	784	403	129	1,316
All farms	49	541	278	80	899
Farmers in older districts					
All farms	33	798	304	165	1,267

1/ Calculated rental value of dwelling based on depreciation, repairs, and interest costs, which approximates 10 percent of the value of dwelling.

justified this expectation, as families settled for 5 or more years were able to spend about twice as much cash for family living as did the 1- and 2-year settlers.

Farm families in the older established irrigation districts averaged a distinctly higher scale of living than those in the newly developed areas. Items in the family budget that were distinctly higher were clothing, medical, housing, and miscellaneous (table 33). Expenditures for food were also higher though not proportionately so great as the items mentioned above. These higher expenditures per family were made even though the average family was smaller in the older districts, 4.2 persons per family compared with 4.7 in the new areas. On a per person basis the differences in expenditures are greater than indicated.

The level of family living could have been brought up to higher and more generally acceptable levels by extension of increased credit to settlers. Many settlers were pressed for cash, but increased their net worth considerably. The income due to increased net worth was usually in the form of permanent improvements, and could be used for current consumption only if it were possible to borrow additional money. An examination of the individual farm records indicates that on only 5 of the 80 new farms studied was the annual increment in net worth (including improvements to land) insufficient to raise the actual amount spent for family living up to the minimum satisfactory amount as estimated by FSA, had it been possible to borrow money to the extent of the increment in net worth. If improvements to land are excluded, 17 of the 80 new settlers had insufficient increments in net worth to bring their expenditures for family living to the same minimum level.

Considerable numbers of settlers spent less for family living than FSA estimated was essential for maintenance of health, and they also had increments in net worth more than sufficient to give them such a minimum satisfactory level of living. Some settlers probably would have preferred to borrow more money to increase their level of living, even though this meant slower financial progress. Lack of available credit prevented. But other families preferred to undergo hardships and accept a sub-standard level of living in order to hold indebtedness to a minimum.

Farm-Produced Commodities.- Value of farm-grown food products was an important addition to the family living (table 32). Fortunately, first-year settlers were able to produce about as much food for home consumption as did the older settlers. The quantity produced per family varied considerably and on some farms the chance was neglected. Home preserving and canning were used to augment the family living of many families, but here again many families failed to take full advantage of their opportunities (table 47, appendix). Conveniently located cold-storage-locker plants would do much to add to the amount of food produced that the farm could use for home consumption.

The average farm family consumed the following farm-produced food products during 1938: whole milk - 286 gallons; fresh cream - 46 gallons; butter - 96 pounds; eggs - 156 dozen; value of livestock slaughtered -

Table 33.- Scale of family living, FSA and Non-FSA farmers in new project areas and farmers in older districts, Vale-Ontario area, Malheur County, Oregon, 1938

Item	FSA clients in new-project areas	Non-FSA farmers in new-project areas	Farmers in older irrigation districts
Number of families	40	49	33
Number persons per family	4.7	4.8	4.2
	Dol.per family	Dol.per family	Dol.per family
Cash expenditures in 1938 for:			
Food	194	227	279
Clothing	67	105	122
Household operation	30	24	20
Personal	61	72	88
Medical	37	50	78
Housing	22	25	84
Auto	16	19	47
All other	9	19	80
Total family living	426	541	798
Life insurance premiums	17	11	49
Value of automobile 1/	142	200	327
Value of dwelling	398	686	1,640
	Number	Number	Number
Rooms in dwelling	2.6	3.4	5.1

1/ Includes "pick-up" truck where no automobile is owned.

44 dollars; and value of garden - 82 dollars. The quantities of each product consumed varied in general with the number of persons in the farm family (table 48, appendix).

Housing Conditions

Adequacy of family living is closely associated with the kind of housing available. Most settlers with limited resources have had to make a choice between spending most of their available cash at time of settlement on a farm dwelling or on other farm buildings, machinery, equipment, and livestock. Because future farm income depends greatly upon the early development of a productive farm plant, many settlers have refrained from building adequate dwellings. Some farmers with limited resources who have built an adequate, comfortable house in the beginning have later found they had no money for buying needed farm equipment and livestock, and have thus jeopardized their chances of success.

Relatively severe winter temperatures in the area require soundly built dwellings for comfort of the family. In numerous cases, flimsy shacks have brought unnecessary hardships on the family and expenses for medical attention, if not permanent injury to health. Some settlers have started out by constructing a concrete basement large enough to accommodate the future farm house; over this is placed a semi-permanent roof. In this basement dwelling the family lives until the farm is sufficiently productive to warrant a permanent home. Such a structure has obvious disadvantages and is not generally satisfactory, but it is warm and dry in most cases, and little loss is involved when the permanent dwelling is later built over the basement. It is probably the most commodious and best quality shelter obtainable if the settler has only $300 or less in cash to put into a dwelling.

The average value of dwellings of clients of the Farm Security Administration was about $400 in 1938 (table 33), compared with almost $700 for non-FSA farmers, and over $1,600 for farms in the older irrigation districts. On the assumption that this third group has adequate housing, there remains much to be accomplished on the farms of the new areas before comfortable living quarters are available. The inadequacy of housing is emphasized by the fact that FSA families with 4.7 persons per family lived in houses which averaged 2.6 rooms per dwelling. Some of these families had adequate housing, so the condition of many was worse than indicated by the averages.

Home Conveniences

The presence of conveniences like running water in house, mechanical refrigerator, electricity, indoor toilet, telephone, and radio was closely associated with income and financial progress, which in turn were associated with length of time on farm, size and type of farm, and other factors. (See tables 49 and 50, appendix.)

Most farmers had their own wells, although many were shallow and inadequate. Almost 20 percent of the farmers in new areas hauled water

from neighbors. Adequate supplies of wholesome water generally are obtained by drilling wells from 100 to 300 feet in depth. The cost of such wells supplied with pumping facilities varied from $100 to $600, depending upon depth and type of water system installed. One-half the settlers in the new areas had drilled wells. Relatively few had running water in the house, partly because of the temporary construction of the dwellings.

Electric power lines have been installed by the local public-utility company in many sections of the new areas that have been developed for several years. Compactness of settlement makes it possible to extend lines to all parts of the area with relatively small additional expense. The practice of charging a flat rate for service has doubtless discouraged the use of electricity for lighting and incidental uses only. Those farmers who have been able to install electric ranges for cooking, hot-water heaters, and electric-power machinery have obtained their electricity at low unit cost.

Social Services

Nearness of the newly irrigated areas to older established communities has obviated some of the acute problems regarding establishment of roads, schools, and other social services attendant upon the development of a new area. School facilities for settlers in the new areas generally have been provided by enlarging existing facilities in the older areas.

Local farm roads in some parts of the new areas have been woefully inadequate during the first few years of settlement, though most farms were located within a few miles of a hard-surfaced road from the beginning of settlement. The character of the soil requires that a gravel surface be applied if the roads are to be passable during certain seasons of the year. The county has proceeded with this work as rapidly as tax revenues have permitted, but there is necessarily a lag between settlement and final road improvement. Bad roads have resulted in increased expenses of automobile operation and relative isolation of the farms from community centers.

Many people have advocated development of roads by the Bureau of Reclamation or a similar governmental agency before the settlement of the farms, the cost to be added to the construction charge of the irrigation project. This method would doubtless be advantageous to settlers during the early years. It also would be attractive to the older communities that happened to be located in the same road-improvement district as the new lands. Lower taxes would be expected than if the road district had to pay the costs of improvement from current taxation levies.

Objection to the plan might center largely around the question of benefits. If a community as a whole gains by development of an adjacent area, logically some of the costs of development should be borne by the community, rather than expecting the new settlers to pay for all costs. Determination of benefits to be derived and costs that should be borne by each group concerned is a difficult problem. The proposed plan may have

considerable merit. It warrants further study for possible application to other new irrigation developments.

Attitudes of Settlers

Those interviewed were asked how well they liked irrigation farming and how the family liked living in the community. The settlers on the whole expressed satisfaction with irrigation farming and with the choices they had made in selecting their place of settlement.

Expressions of a high degree of satisfaction with irrigated farming were made by about 55 percent of the settlers on new lands. Another 30 percent were well satisfied, though less enthusiastic in their statements. Six percent of those interviewed liked irrigated farming, though they preferred farming in some other section of the country where irrigation was not practiced. An active dislike for irrigation farming was expressed by about 10 percent. The reasons given for dislike included too hard work, too high costs, and preference for another type of farming.

Only 7 percent stated that their families were dissatisfied with living in the area. Most of those interviewed were well pleased with the area, though many expressed dissatisfaction with certain features of their environment, such as lack of social life, dust, poor roads, climate, and homesickness. Some reasons given for dissatisfaction were exactly the reasons given by others for satisfaction.

Enthusiasm of many of the settlers with regard to future prospects was noted by the enumerators time after time. Many felt that they had the opportunity of a life-time and hopes were high for realizing their expectations. This attitude of enthusiasm and hope was in strong contrast to that reported in similar studies on recent settlement made in other farming areas of the Pacific Coast States. 17/ These enthusiasms may have been tinged with wishful thinking in some cases, but experiences of the longer-established settlers no doubt contributed to the hopes, and such experiences appeared to justify the expectations.

17/ Studies of recent migration and land settlement conducted by the Bureau of Agricultural Economics and cooperating agencies in northern Idaho, western Washington, and California; reports as yet unpublished.

APPENDIX

Note 1.- In addition to the usual data obtained on farm income and expense of operation, data were secured on farm family living expenses during the year, borrowings and loan payments, and cash positions at the beginning and end of the year, in addition to income received from all other sources. Total cash expenditures made by the farmer for all purposes during the year 1938 were balanced against total cash received from all sources, taking into account the change in cash position. Unless there was an approximate balance of the two it was called to the attention of the farmer. In many instances additional income or expense items were recalled that had been overlooked or forgotten by the farmer. Voluntary adjustments in original estimates sometimes were made by the farmer. Without the cash balance check the original estimates would never have been questioned.

In addition, these data provided the basis for calculating "cash" income as well as family farm income - a distinction particularly important in a developing community.

The enumerators felt this to be one of the most important checks made, and well worth the few minutes additional time required in making a rapid summation of income and expense items before leaving the farmer. Return calls were practically eliminated - a saving of some importance judging from the number of return calls made on the first few schedules where the check was made in the office rather than in the field.

Note 2.- A productive man work unit or PMWU is the average amount of work accomplished in a 10-hour day spent directly in production of crops, livestock, livestock products, or custom work off the farm. It does not include work spent in repair of farm machinery or buildings, in caring for work stock, or in general upkeep of the farm. As average rates of performance are used, the amount of time spent by any individual farmer may vary considerably from the number of work units calculated on the basis of average rates. A large number of PMWU per farm may be obtained by large numbers of livestock and acres of crops, more intensive crops, or by more efficient use of operator's labor.

In this study performance rates as determined in other studies made in the local area and in nearby irrigated areas in southern Idaho were used as the basis for calculating productive man work units. Only work usually performed by the operator was included. Work usually done by hired labor, such as thinning beets or operating the threshing machine, was excluded. Where a farmer is able to perform work that is usually hired, the amount of productive work would be more than is now indicated. For farmers with larger-than-average operations, the number of productive work units probably is less than indicated.

The following rates were used in calculating productive man work units:

Crops	Number of man hours
Alfalfa hay (3 cuttings)	27 per acre
Clover hay (1 cutting)	15 " "
Alfalfa and clover (new seeding)	13 " "
Red clover hay and seed 1/	21 " "
Wheat, oats, barley, or rye 1/	20 " "
Corn	28 " "
Potatoes 2/	40 " "
Sugar beets 3/	31 " "
Pasture	8 " "
Livestock	
Dairy cows (including care of calves)	130 per animal
Other cattle	20 " "
Sheep	20 " " unit
Hogs	30 " " "
Chickens (above 100 hens)	5 " hen

1/ Where farmer puts the grain or clover to thresher or huller.

2/ Where the farmer digs the potatoes but contracts the picking, hauling, and grading.

3/ Where the farmer lifts the beets but hires or contracts the blocking, thinning, hoeing, topping, loading, and hauling.

Source of data: Adapted from the following:

Eke, Paul A. and Hunter, Byron. "Farm Management Information for Twin Falls County, Idaho" (mimeographed) Agr. Exp. Sta., University of Idaho, 1930.

Eke, Paul A. and Johnson, Neil W. "Farm Management Information for the Idaho Falls Area" (mimeographed) Agr. Exp. Sta., University of Idaho, December 1931.

Selby, H. E., Burrier, A. S., and Brandt, P. M. "Cost and Efficiency in Dairy Farming in Oregon" Agr. Exp. Sta., Oregon State Agricultural College, Bulletin No. 318, September 1933.

Scudder, H. D., Burrier, A. S., Lunn, A. G., and Knowlton, F. L. "Cost and Efficiency in Commercial Egg Production in Oregon" Agr. Exp. Sta., Oregon State Agricultural College, Bulletin No. 287, June 1931.

Note 3.- Because of the importance of hay in the farm organization and the present surplus of production over available markets and feeding demands, estimates of feeding rates to the various kinds of livestock were needed in order to demonstrate the extent of surplus and needed adjustments in livestock numbers to balance supplies with consumption. No attempt was made to obtain feeding rates to various kinds of livestock directly from farmers, because most farmers have no such information available, though they know quite well the total quantity of hay fed during the year to all livestock.

The farm schedules furnished data on total hay fed on each farm together with numbers of each class of livestock. A multiple correlation regression equation was calculated to indicate average quantities of hay fed to each of three major hay-consuming livestock groups. Sheep were found on only a few farms and, where present, sometimes were fed only a fraction of the year so they were eliminated from consideration. The variables considered were as follows:

X_1 - tons of hay fed per farm during 1938.

X_2 - average number of dairy cows in 1938.

X_3 - average number of other cattle in 1938.

X_4 - average number of horses in 1938.

Data were available for 93 farms with comparable data. The regression equation was as follows:

$$X_1 = 6.072 + 2.911\ X_2 + 0.900\ X_3 + 1.381\ X_4$$

On these 93 farms therefore the following rates of feeding hay existed in addition to a small quantity not accounted for by the three variables:

Dairy cows - 2.9 tons per year

Other cattle - 0.9 tons per year

Horses - 1.4 tons per year

Theoretically the constant 6.07 should approach zero on the basis that if there are no livestock there will be no hay fed. The average quantity of hay fed was 38.3 tons per farm, so the constant is not a large percentage of the average amount fed. One explanation of the size of the constant may be that there is always some wastage of hay in feeding. Another explanation is that there may be a curvilinear relationship.

Because of the high correlation ($\overline{R}^2 = 0.752$) between the three groups of livestock and quantity of hay fed, the regression equation appeared to offer a reliable estimate of hay requirements of each class

of livestock. The proportion of variation not accounted for by the three independent variables probably is due largely to differences in feeding and management practices from farm to farm and to variations in amount of pasture and other feeds such as sugar-beet tops and fodder.

From the results obtained, this method appears to offer as reliable or perhaps more reliable results than could be obtained by having farmers estimate the quantities of hay fed to each class of livestock, which would be a mere guess on the part of most farmers. The results of the method depend upon a variation from farm to farm in the percentage of livestock in each group considered and upon the relative importance of hay to total roughages consumed. In an irrigated area most roughage is supplied in the form of hay.

Note 4.- Prices. Geographically, the Vale-Owyhee area is a part of the Snake River Basin, most of the agriculture of which is contained in southern Idaho. Because the Vale-Owyhee area, though in Oregon, is directly adjacent to the area that constitutes most of the agriculture of the State of Idaho, price data for the latter State (table 34) are of much more interest to the local area than are corresponding prices for Oregon. Comparisons of available local prices indicate a close relationship to Idaho prices.

Prices for grain were lower in 1938 than for any year since 1932, though this fact should not materially alter the conclusion drawn with respect to the profitability of grain production, as most other prices were somewhat lower in 1938 than in the immediately preceding years. Grain production probably will never assume major proportions, but will continue to be only an incidental part of a rotation based largely on row crops and alfalfa or clover. Without a major realignment of relative prices this area will continue to rely on livestock and livestock products as an important source of farm income.

The relationship of farm prices to economic progress during the period of farm development and after is more concerned with the level of prices than with increasing prices. If prices throughout the 5 or more years of development before 1938 were as high as in 1936 and 1937, progress would have been more rapid than that found in the present study of newly developed farms.

Note 5.- Historical Change on 20 Identical Farms. Farm organization data for 20 idential farms for the period 1934-38 indicate the nature and extent of some of the changes that occurred during the early years of development (table 35). These farms apparently came into operation for the first time in the 1934 crop year and were located on the East and West Bench Divisions of the Vale project, the first large area to be developed by the Bureau of Reclamation in the area studied.

Livestock numbers, particularly those of dairy cattle, increased during the first 4 years of the period. A rapid increase in the value of stock and equipment occurred, from less than $500 per farm in 1934 to over $1,400 in 1937 and 1938. A part of this increase was due to a higher value per animal unit. Grain crops declined only slightly in acreage, but declined greatly as a percentage of total land in crops, because crop acreage increased from 26 acres in 1934 to 57 acres in 1938. Hay and pasture acreage was small the first year, increased rapidly to 34 acres by the third year, and appeared stationary after the third year.

Table 34.- Average prices received by Idaho farmers, 1931-39

Year	Wheat per bushel	Barley per bushel	Corn per bushel	Alfalfa seed per bushel	Red clover seed per bushel	Alfalfa hay per ton
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
1931	.34	.33	.58	7.00	6.30	8.00
1932	.31	.24	.36	6.10	4.50	4.60
1933	.55	.35	.57	6.00	5.30	6.00
1934	.69	.51	.82	11.00	8.90	8.70
1935	.70	.40	.73	8.60	8.20	6.60
1936	.89	.62	1.04	13.10	13.90	6.90
1937	.71	.51	.68	16.70	17.10	7.90
1938	.45	.33	.53	12.40	7.70	6.80
1939 1/	.62	.42	.63	11.60	7.10	6.80

	Potatoes per bushel	Sugar beets per ton	Eggs per dozen	Butterfat per pound	Hogs per cwt.	Beef cattle per cwt.
1931	.28	6.03	.144	.21	5.80	4.60
1932	.22	5.10	.128	.17	3.45	3.40
1933	.52	5.16	.140	.17	3.70	3.00
1934	.48	4.69	.150	.22	4.10	3.15
1935	.48	5.26	.215	.29	8.30	4.95
1936	.92	6.06	.196	.34	9.40	5.10
1937	.26	5.19	.200	.34	9.30	6.00
1938	.33	4.43	.202	.26	7.80	5.50
1939 1/	.43	---	.179	.25	6.40	6.20

1/ Preliminary.

U. S. Dept. of Agriculture, Crops and Markets. Season average prices, except alfalfa hay, which is the December 15 price.

Table 35.- Changes in farm organization from 1934 to 1938, 20 identical farms on East and West Bench Divisions, Vale project, Malheur County, Oregon 1/

Item	1934	1935	1936	1937	1938
	Number	Number	Number	Number	Number
Livestock per farm:					
Horses and mules	2.2	3.2	2.9	3.2	3.7
Dairy cattle	3.8	4.0	8.3	11.3	9.4
Hogs	1.5	6.3	11.5	7.5	5.3
Productive animal units	3.9	4.9	9.1	10.7	9.5
A.U. per 100 crop acres	14.8	13.3	20.4	20.2	16.6
Value of stock and equipment:	Dollars	Dollars	Dollars	Dollars	Dollars
Per farm	468	885	1110	1482	1404
Per crop acre	17.73	24.11	24.90	27.91	24.57
Crops per farm:	Acres	Acres	Acres	Acres	Acres
Grains	12.5	11.1	10.8	9.7	11.2
Clover and alfalfa seed	-	1.6	2.0	6.2	8.7
All hay and pasture	9.1	27.5	33.6	35.8	33.8
All other crops	4.9	10.2	0.9	1.2	3.7
Total crop acreage 2/	25.9	36.7	43.8	51.2	57.1
Irrigable acreage	67.8	67.8	67.8	67.8	67.8
Percent crop acreage is of irrigable acreage	38.3	54.1	64.6	75.6	84.3
Total acres in farm	94.3	94.3	94.3	94.3	94.3

1/ Farms that appeared in the Bureau of Reclamation Census for the first time in 1934.

2/ The sum of individual crop acreages totals more than the cropped acreage because of some double-cropping.

Table 36.- Climatological data for three weather stations, Vale-Ontario area, Malheur County, Oregon

Station	Average annual precipitation	Average annual snowfall	Average date of last killing frost in spring	Average date of first killing frost in autumn	Average length of growing season
	Inches	Inches			Days
Harper	7.12	21.2	May 13	Sept. 17	127
Kingman	8.64	18.9	April 27	Oct. 13	169
Vale	8.40	20.9	May 17	Sept. 18	124

U. S. Weather Bureau. Precipitation data for all years records are available to and including 1937, other data for all years to and including 1930.

Table 37.- Average monthly temperatures at Vale, Oregon

Month	Average temperature	Average maximum temperature	Average minimum temperature
January	26.0	35.9	16.0
February	32.1	42.4	21.8
March	41.6	54.8	28.5
April	49.7	65.8	33.6
May	57.2	73.9	40.4
June	64.3	82.3	46.8
July	72.1	91.9	51.8
August	69.6	90.3	49.5
September	59.6	79.1	40.0
October	48.8	66.6	31.0
November	37.5	50.3	24.6
December	27.7	37.5	18.6
Annual	48.8	64.2	33.6

U. S. Weather Bureau. Records for the Vale station are for 35 years to and including 1930.

Table 38.- Number of farms, acreage of major crops, and total acreage irrigated, Vale project, 1930-1938 and Owyhee project, 1935-1938, Malheur County, Oregon

Project and year	Farms	Acreage of major crops				Total acreage irrigated
		Alfalfa hay	Clover seed	All grains	Sugar beets	
	Number	Acres	Acres	Acres	Acres	Acres
Vale project						
1930	33	38	-	821	-	1,412
1931	60	429	81	689	-	2,131
1932	97	848	250	1,430	-	4,915
1933	105	1,609	111	1,357	-	4,982
1934	156	2,411	158	1,286	-	6,413
1935	217	3,873	241	1,744	-	8,070
1936	273	5,053	245	3,490	4	11,404
1937	385	5,711	857	4,899	828	16,488
1938	414	7,000	1,553	5,524	4,532	20,791
Owyhee project 1/						
1935	71	973	23	1,349	20	3,500
1936	141	1,500	520	3,510	96	6,771
1937	380	2,072	2,084	8,548	495	18,161
1938	616	7,071	6,246	13,610	741	32,078

1/ Owyhee Irrigation District only. Does not include any lands in older irrigation districts, except Kingman Colony in 1938, nor any new lands in the Gem Irrigation District in Idaho. New lands (2,990 acres) in the Gem District were irrigated for the first time in 1938. The South Canal Division lying in Oregon south of Adrian is included as part of the Owyhee Irrigation District.

Bureau of Reclamation records.

Table 39.- State of origin of clients of the Farm Security Administration who moved into Malheur County, Oregon from 1930 to 1938 1/

State or region of origin	Number of cases	Percentage of total
Middle West 2/	11	2.9
Northern Great Plains 3/	82	21.7
Southern Great Plains 4/	72	19.0
Drouth Area (no state given)	23	6.1
South 5/	3	0.8
Idaho	103	27.3
Washington	36	9.5
Utah	27	7.1
Other Western States 6/	18	4.8
Canada	3	0.8
Total	378	100.0

1/ This tabulation does not include settlers who moved into the county from other parts of Oregon.
2/ Includes Minnesota, Iowa, Missouri, Illinois, and Michigan.
3/ Includes North Dakota, South Dakota, Nebraska, Montana, and Wyoming.
4/ Includes Kansas, Oklahoma, Texas, and Colorado.
5/ Includes Alabama and Arkansas.
6/ Includes Arizona, California, and Nevada.

Farm Security Administration files at Portland, Oregon.

Table 40.- Age composition: Number of persons and percentage of total in various age groups, by settler types, Vale-Ontario Area, Malheur County, Oregon, 1938

Age group	Number of persons in each group: FSA clients	Non-FSA farmers	Older district farmers	Percentage in each age group: FSA clients	Non-FSA farmers	Older district farmers
	Number	Number	Number	Percent	Percent	Percent
Less than 5 years	24	22	6	12.8	9.4	4.3
5 - 9 years	24	28	10	12.8	12.0	7.1
10 - 14 years	24	37	12	12.8	15.8	8.5
15 - 19 years	22	40	17	11.7	17.1	12.0
20 years and over:						
Males	50	61	54	26.5	26.0	38.3
Females	44	46	42	23.4	19.7	29.8
Total all ages	188	234	141	100.0	100.0	100.0
Number of families	40	49	33			
Av. no. per family	4.70	4.77	4.27			

Table 41.- Formal education of farm operators and wives by settler type, Vale-Ontario, Malheur County, Oregon, 1938

Number of years in school	FSA clients in new project areas: Operator	FSA clients in new project areas: Wife	Non-FSA farmers in new project areas: Operator	Non-FSA farmers in new project areas: Wife	Farmers in older irrig. districts: Operator	Farmers in older irrig. districts: Wife
	Number	Number	Number	Number	Number	Number
Less than 5	3	1	4	1	2	2
5 to 8	24	14	23	22	20	13
9 to 12	11	19	21	13	11	12
13 to 16	2	6	1	7	0	3
Total	40	40	49	43	33	30

Table 42.- Principal reason given for leaving former location, settlers who moved into Vale-Ontario area since 1929 classified by region of origin

Principal reason for leaving former location	Great Plains Region	Oregon & Idaho	Other Western States
Number of settlers	30	65	16
	Percent	Percent	Percent
Drought, climatic conditions	63.3	4.6	0.0
No work, went broke, depression conditions	10.0	9.2	25.0
Wanted to own farm, better opportunity, etc.	23.4	56.9	50.0
Couldn't make farm pay, poor land, no water, etc.	0.0	18.5	6.2
Land values or rent too high, lease expired.	0.0	6.2	18.8
Miscellaneous	3.3	4.6	0.0
Total	100.0	100.0	100.0

Table 43.- Principal reason given for locating in Vale-Ontario area, FSA clients and non-FSA farmers in new areas and farmers in older irrigation districts, Malheur County, Oregon, 1938 1/

Principal reason given	Percentage of total giving specified reason		
	FSA clients in new project areas	Non-FSA farmers in new project areas	Farmers in older irrigation districts
Number of settlers	40	49	22
	Percent	Percent	Percent
Low land values or capital requirements	32.5	42.8	27.3
Good opportunity to establish a home	30.0	8.2	0.0
Relatives and friends here	15.0	16.4	9.1
Liked country, climate, or irrigated farming	12.5	22.4	36.3
Only place available	5.0	0.0	0.0
Lived near locality prior to settlement on farm	5.0	10.2	27.3
Total	100.0	100.0	100.0

1/ Farmers who moved into their present farms before 1929 not included.

Table 44.- Acreage of crops in Vale project, Owyhee project, and older irrigation districts, Malheur County, Oregon, 1938

Crop	Acres of crops in: Vale project	Owyhee project 1/	Older irrigation districts 2/	Owyhee ditch company 3/	Total
Number of farms	414	616	484	209	4/ 1,723
	Acres	Acres	Acres	Acres	Acres
Barley	2,778	4,367	3,098	-	10,243
Corn	723	1,140	999	-	2,862
Oats	385	1,473	439	-	2,297
Wheat	1,631	6,463	3,004	-	11,098
Other cereals	17	167	222	-	406
Alfalfa seed	278	241	263	-	782
Clover seed	1,553	6,246	990	-	8,789
Alfalfa hay	7,000	7,071	4,735	-	18,806
Other hay	936	4,294	674	-	5,904
Tame seeded pasture	1,118	928	564	-	2,610
Other pasture	319	1,990	5/ 2,677	-	4,986
Potatoes	688	364	1,723	-	2,775
Sugar beets	4,532	741	2,721	-	7,994
Beans, onions, and lettuce	140	99	582	-	821
Fruits	0	43	404	-	447
Total irrigated acreage	20,791	32,078	23,032	11,740	4/ 87,641
Total irrigable acreage	30,000	55,000	30,139	12,000	4/ 127,139

1/ Includes the former Kingman Colony Irrigation District, but not any new or old lands in the Gem District in Idaho. Includes South Canal Division lands located in Oregon.

2/ All older irrigation districts, including Warmsprings, except Owyhee Ditch Company.

3/ No crop census taken in 1938. Total acres irrigated and number of farms only data available. Irrigable acreage estimated.

4/ Includes Owyhee Ditch Company data. These data therefore represent all acreage and all farms located west of the Snake River in Oregon.

5/ Includes some tame seeded pasture in the Warmsprings District which was not segregated in the crop census for that district.

Table 45.- Crop organization of farms classified by number of irrigable acres per farm, new project areas and older irrigation districts, Vale-Ontario area, Malheur County, Oregon, 1938

Farm size and kind of crop	Number of farms and average acreage per farm reporting specified crop: New project areas: Number of farms	Acres per farm	Older districts: Number of farms	Acres per farm	Percentage each crop is of total crop acreage in the size group: New project areas	Older districts
Less than 30 irrigable acres:						
Alfalfa	80	9.1	90	6.7	34.4	29.9
Clover	33	9.4	13	5.2	13.3	3.3
Pasture	41	4.3	62	4.8	8.4	14.8
Small grains	52	9.6	61	7.9	23.5	23.8
Corn	29	5.1	33	3.0	6.9	4.8
Sugar beets	13	10.2	18	9.2	6.2	8.2
Total crop acreage	128	16.6	166	12.2	100.0	100.0
30 to 59 irrigable acres:						
Alfalfa	246	15.6	114	14.7	30.3	31.0
Clover	132	10.6	21	8.2	11.0	3.2
Pasture	161	5.3	84	9.3	6.7	14.5
Small grain	269	16.0	104	12.9	34.0	24.9
Corn	98	7.3	46	5.8	5.7	4.9
Sugar beets	47	13.4	44	12.8	5.0	10.5
Total crop acreage	361	35.0	148	36.5	100.0	100.0
60 to 99 irrigable acres:						
Alfalfa	246	20.7	97	25.8	27.5	31.7
Clover	163	19.8	34	13.1	17.4	5.6
Pasture	181	6.6	77	10.9	6.5	10.7
Small grains	258	24.9	97	20.6	34.6	25.3
Corn	86	9.6	42	7.1	4.4	3.8
Sugar beets	54	15.6	38	17.0	4.6	8.2
Total crop acreage	336	55.1	117	67.5	100.0	100.0
100 to 139 irrigable acres:						
Alfalfa	52	35.0	34	38.2	28.6	35.9
Clover	36	31.5	7	15.4	17.8	3.0
Pasture	29	13.4	21	15.6	6.1	9.1
Small grains	48	41.6	30	33.4	31.3	27.8
Corn	24	14.6	4	16.3	5.5	1.8
Sugar beets	10	25.0	13	21.3	3.9	7.7
Total crop acreage	66	96.6	37	97.6	100.0	100.0

Continued

Table 45.- Crop organization of farms classified by number of irrigable acres per farm, new project areas and older irrigation districts, Vale-Ontario area, Malheur County, Oregon, 1938 - Continued

Farm size and kind of crop	Number of farms and average acreage per farm reporting specified crops: New project areas: Number of farms	New project areas: Acres per farm	Older districts: Number of farms	Older districts: Acres per farm	Percentage each crop is of total crop acreage in the size group: New project areas	Older districts
140 to 179 irrigable acres:						
Alfalfa	31	45.6	25	53.3	24.3	36.4
Clover	27	43.0	4	27.5	20.0	3.0
Pasture	21	12.0	18	12.2	4.3	6.0
Small grains	44	58.5	23	48.4	44.3	30.4
Corn	7	11.8	7	8.9	14.2	1.7
Sugar beets	6	26.7	12	30.6	2.8	10.0
Total crop acreage	47	123.5	26	140.8	100.0	100.0

Bureau of Reclamation records at Vale and Ontario, Oregon, and Warmsprings Irrigation District records at Vale, Oregon. New project areas include all divisions of the Vale project and all lands of the Owyhee project lying north and west of Adrian. Older districts include the Warmsprings, Ontario-Nyssa, Kingman Colony, Advancement, Crystal, Payette-Oregon Slope, Bench, and Slide Irrigation Districts.

Table 46.- Variations by districts in percentage of farms growing specified crops, Vale-Ontario area, Malheur County, Oregon, 1938

District	Farms	Percentage of farms growing specified crops: Alfalfa	Clover	Pasture	Small grains	Corn	Sugar beets
	Number	Percent	Percent	Percent	Percent	Percent	Percent
Owyhee project	552	59.2	46.0	44.5	75.9	27.4	6.7
Vale project	405	82.2	36.5	48.4	65.7	24.9	25.0
Warmsprings Irrig.Dist.	228	76.4	23.3	55.2	65.8	21.0	23.2
Other older districts 1/	284	71.8	20.1	52.0	64.0	25.0	28.9
Owyhee project: 2/							
Farms started in 1935	132	67.4	56.0	45.4	68.9	25.0	15.9
" " " 1936	197	71.1	55.3	47.2	76.2	24.4	1.5
" " " 1937	69	37.3	43.4	52.1	74.0	27.5	3.0
" " " 1938	154	53.2	26.6	37.7	82.5	33.1	7.2
Vale project: 3/							
Harper-Little Valley Div.	71	85.9	24.0	61.9	35.1	8.4	40.8
West Bench Division	70	87.2	27.1	51.4	58.6	31.4	40.0
East Bench Division	110	95.4	54.5	50.0	75.5	16.3	21.8
Willow Creek Div.	154	68.8	33.8	39.6	76.0	35.1	12.3

1/ All other older districts in the area other than the Warmsprings Irrigation District and the Owyhee Ditch Company. No data were available for the latter district.

2/ Farms segregated by year water was first turned on the land in the particular division of the project. Farms included in 1935, 1936, and 1937 are in the Mitchell Butte Division of the project and farms included in 1938 are in the Dead Ox Flat Division.

3/ The approximate years in which water was first turned onto each division of the Vale project was as follows: Harper-Little Valley, 1930 and 1931; West Bench, 1931 and 1932; East Bench, 1932 and 1933; Willow Creek, 1937 and 1938.

Ibid. table 10.

Table 47.- Distribution of farms by number of quarts of home canned fruits and vegetables grown on the farm, Vale-Ontario area, Malheur County, Oregon, 1938

Number of quarts canned in 1938	Farmers in new project areas		Farmers in older irrigation districts	
	Number	Percent	Number	Percent
None	18	20.2	10	30.3
1-24	11	12.4	1	3.0
25-49	12	13.5	2	6.0
50-99	14	15.7	5	15.2
100-199	19	21.3	6	18.2
200-299	11	12.4	4	12.1
300 and over	4	4.5	5	15.2
Total	89	100.0	33	100.0

Table 48.- Farm produce used per family classified by size of family, Vale-Ontario area, Malheur County, Oregon, 1938

Number persons per family	Average number per family	Quantity or value of farm produce used per family						
		Whole milk	Fresh cream	Butter	Eggs	Skim milk	Value livestock slaughtered	Value garden
		Gallons	Gallons	Pounds	Dozen	Gallons	Dollars	Dollars
1 and 2	1.8	268	25	50	88	18	18	64
3 and 4	3.7	199	47	86	179	71	40	90
5 and 6	5.4	322	49	107	190	52	57	77
7 & over	7.8	410	58	146	135	87	56	95
All families	4.6	286	46	96	156	59	44	82

Table 49.- Percentage of farms having specified conveniences and facilities, farms on Vale and Owyhee projects, classified by number of years on present farm, Malheur County, Oregon, 1938

Item	Number of years on present farm			
	1 year	2 years	3-4 years	5 or more years
Number of farms	23	33	15	18
	Percent	Percent	Percent	Percent
Radio	48	55	80	78
Mechanical refrigerator	9	12	7	39
Ice box	0	12	7	0
Running water in house	13	0	0	28
Indoor toilet	0	3	0	11
Telephone	0	0	7	0
Furnace	0	0	0	11
Automobile and/or truck	87	85	93	89
Tractor	30	12	20	33

Table 50.- Percentage of farms having specified conveniences and facilities, FSA clients and non-FSA farmers on new project areas and farmers in older irrigation districts, Vale-Ontario area, Malheur County, Oregon, 1938

Item	FSA clients	Non-FSA farmers	Older district farmers
Number of farms	40	49	33
	Percent	Percent	Percent
Radio	57	65	91
Mechanical refrigerator	18	14	58
Ice box	8	4	9
Running water in house	10	8	39
Indoor toilet	2	4	24
Telephone	2	0	12
Furnace	0	4	9
Automobile and/or truck	80	94	97
Tractor	20	24	24

Table 51.- Crop yields: Older irrigation districts, Owyhee project and Vale project for 1938 and Vale project for 1935-1938, 4-year average, Malheur County, Oregon

Crop	Unit	1938 yields			1935-1938 4 yr.ave. yields
		Older irrig. districts 1/	Owyhee project	Vale project	Vale project
Alfalfa hay	tons	4.4	3.5	3.4	3.4
Other hay 2/	tons	1.3	1.4	1.7	1.5
Barley	bushels	41.8	29.3	28.8	28.8
Corn	do	46.6	25.4	25.3	25.1
Oats	do	57.3	33.1	35.8	32.0
Wheat	do	36.5	22.6	25.6	21.5
Alfalfa seed	do	2.2	1.6	2.8	2.6
Clover seed	do	4.5	2.7	4.0	3.4
Onions	do	606.0	523.0	977.0	522.2
Potatoes	do	235.0	77.0	209.0	203.9
Sugar beets	tons	17.0	14.4	13.4	3/ 13.4

1/ Included are the following: Ontario-Nyssa Irrigation District, Advancement Irrigation District, Bench Irrigation District, Crystal Irrigation District, and Payette-Oregon Slope Irrigation District. No data on yields available for Warmsprings Irrigation District and Owyhee Ditch Company.
2/ Largely clover hay.
3/ 1937 and 1938 average. No sugar beets were grown before 1937.

Bureau of Reclamation, Vale and Ontario, Oregon.