UNITED NATIONS
ECONOMIC
AND
SOCIAL COUNCIL

GENERAL
E/CN.12/306
8 April 1953
ENGLISH
ORIGINAL: SPANISH

ECONOMIC COMMISSION FOR LATIN AMERICA

Fifth Session
Rio de Janeiro, Brazil
9 April 1953

# ANALYSIS OF SOME FACTORS WHICH ACT AS AN OBSTACLE TO THE INCREASE OF AGRICULTURAL PRODUCTION

## A SPECIFIC INVESTIGATION BASED ON SAMPLING TECHNIQUE

Prepared jointly by the Economic Commission
for Latin America and the United Nations
Food and Agriculture Organization

SUMMARY OF

# ANALYSIS OF SOME FACTORS WHICH ACT AS AN OBSTACLE TO THE INCREASE OF AGRICULTURAL PRODUCTION

## A SPECIFIC INVESTIGATION BASED ON SAMPLING TECHNIQUE

1. The present Study covers an agricultural area where irrigation plays an essential role. While only 16 per cent of the total farm land is irrigated, such areas produce 85 per cent of the gross value of production.
2. Land labour and capital, now available to farmers, are not being used to full capacity:
   a) More than one fifth of the irrigated land is maintained in natural pasture or in fallow. However, much of this land is suitable for more intensive use, to produce wheat and other crops which are scarce in Chile;
   b) Manpower output is generally low, although considerable differences exist between the different productive sectors. On small farms there is a high input of manpower per hectare with an accompanying low output per individual. As the size of the farm increases, so there is a greater output for each individual in the labour force;
   c) The tendency of the movement of capital in agriculture is away from this activity. The capital accruing from small properties is insufficient for use in other activities, but in the larger farm group, representing 10 per cent of the total and accounting for two thirds of the aggregate production, a large part of the profits are not re-invested in agriculture. In addition, in 14 per cent of the large farms recent investment do not appear to meet even the requirements of depreciation and already some deterioration in permanent improvements is evident.
3. There are certain elements which contribute to the failure to take full advantage of the cultivated areas:
   a) One factor is concerned with the type of administration. Where

the owner directly manages his properties only a quarter of the irrigated land is left in natural pasture. On properties where the administration is in charge of a salaried manager, subject to the owner's supervision, nearly one third is left in natural pasture. But on farms where an employee of an absentee landlord exercises complete authority more than forty per cent of the irrigated land is left in natural pasture.

b) In the opinion of those carrying out the research work, the attitude of the landlord was found to be an important element in production. They reported that 8 per cent of the irrigated area was left uncultivated, exclusively, as far as they could determine, because of lack of interest on the part of the owner. The majority of such cases occurred on large properties. On the other hand, a considerable part of the lack of interest was shown by smallholders with properties either with a reduced area or containing poor soils.

c) The advantage which was taken of the land was found to be in inverse proportion to the size of the property. Smallholders tend to use their land to its maximum capacity.

4. The majority of agricultural labour force lives on farms and receives a relatively small cash income.

a) Agricultural manpower was made up as follows: nearly three fifths, resident farm labourers and their families; one fifth, seasonal and day workers living off the farm; one fifth, owners, agents and their families; in addition there was a small percentage of share croppers and specialized farm hands.

b) Agricultural wages are low because:

i) They are generally associated with a low output per individual. On small farms, labour, whether it is the smallholder himself or a day worker, is not furnished with the efficient machinery and adequate power which would allow for an output justifying higher wages. Naturally, the use of agricultural machinery, even if it were available, in small fields would tend to be uneconomic. 10 per cent of the farms have no source

/of power

of power except manual labour. Only 20 per cent of the farmers use tractors.

ii) Labour is plentiful. Except in the case of specialized workers, there are few indications that any shortage exists or that manpower constitutes any problem.

iii) The lack of training limits the labourer's ability to be of greater value to the employer, and wages thus tend to be in line with ability.

iv) The system of remuneration for agricultural labour consists of providing a home, certain foodstuffs or a parcel of land on which to produce it and a small daily cash wage.

c) The results of low wages are:

i) a lack of incentive to encourage the worker to put forward his best effort;

ii) standards of living, which, in many cases, adversely affect efficiency;

iii) the inability of farm families to contribute to any great extent to the economy of the urban areas, through purchases of services or consumer goods.

5. The availability of land is the principal limiting factor for production on many farms.

Two thirds of the farm units vary in size from 1 to 20 hectares and together represent less than 2 per cent of the total area. Due to their restricted size, up-to-date machinery and equipment cannot be utilized. The draft power available on such farms (almost entirely horses and oxen) is often only partially used. After foodstuffs are supplied to the comparatively large population per hectare of productive land, very little remains to be marketed.

/INDEX

# ANALYSIS OF SOME FACTORS WHICH ACT AS AN OBSTACLE TO THE INCREASE OF AGRICULTURAL PRODUCTION

## A SPECIFIC INVESTIGATION BASED ON SAMPLING TECHNIQUE

## INDEX



/ANALYSIS

# ANALYSIS OF SOME FACTORS WHICH ACT AS AN OBSTACLE TO THE INCREASE OF AGRICULTURAL PRODUCTION: A SPECIFIC INVESTIGATION BASED ON SAMPLING TECHNIQUE

Prepared jointly by the ECLA and FAO Secretariats

## Introduction

This is a study of the farm and live-stock business of two provinces in Central Chile, Santiago and Valparaiso. It covers their main economic problems and short-term incentives to produce. The area is about 160 kilometres long from north to south and extends from the Pacific Ocean to the foothills of the Andes. 1/ It therefore comprises practically every type of climate and soil found in the Central Zone of Chile, since it embraces: the great mixed properties - irrigated and dry farming lands - in the Central Valley extending towards the mountains; the entirely irrigated farms in the valley itself; and the large and small dry farming properties along the Coast. The zone is important because it is adjacent to Chile's two largest cities, Santiago and Valparaiso, and supplies them with most of their perishable products.

The total farmed area in the two provinces comprises a little more than two million hectares, of which around 325,000 hectares are producing crops and pasture with irrigation, and some 120 thousand are producing crops without irrigation. Also the area contains some 765,000 hectares of dry natural pastures considered cultivable by farmers. Of the first, or irrigated area, 250,000 hectares are under cultivation, while about 75,000 are either lying fallow or used as natural pastures. 2/ Although there is much more dry farming than irrigated land, farming in this region may be said to be mainly producing crops under irrigation, as over 85 per cent of production comes from land under irrigation.

In the agricultural year 1951-52 the crops grown were: wheat, 95,000 hectares; 3/ cultivated pastures, mainly alfalfa and clover, 4/ 99,000

1/ The mountain zone was excluded as no maps were available.

2/ The last census (1936) gave the figure of 1,213 thousand hectares for Chile's entire irrigated land.

3/ About 1/8 of the total estimated for Chile

4/ In addition, 1,500 hectares of pastures without irrigation were grown.

/ hectares; row

hectares; row crops, 77 thousand hectares, of which over 20,000 hectares were used for vegetables; barley and miscellaneous field crops, 42,000 hectares; row crops, 77 thousand hectares, of which over 20,000 hectares were used for vegetables; barley and miscellaneous field crops, 42,000 hectares; fruit trees, 25,000 hectares; vineyards, 15,000 hectares. Also on the farms of these two provinces were found in April 1952 about 370 thousand cattle, of which one fourth were dairy cows; 500,000 sheep and more than 50,000 goats.

In these two provinces there are somewhat more than 8,000 farm operating units of one hectare or more in size, employing the equivalent of 86,000 full-time workers. Actually the number of persons employed is greater, because some work only part-time at farming, while others work only part of the year on the farms of the area. Moreover, the farms in this region provide permanent residence for some 240,000 people, including the operators [1] and their families, the administrators and administrative staff with their families, the tenants, share-croppers, labourers, specialized workers and their families. Also included in the group are domestic servants, small tradesmen etc. who tend to make up the communities on the large estates.

Land distribution according to size is very uneven. On the one hand, the estates exceeding one thousand hectares, which only form 6 per cent of the total farms, control 80 per cent of the land area, whereas on the other, the properties having less than 20 hectares (but excluding those of less than one hectare) only possess 1.6 per cent of the total area. This uneven distribution becomes even more marked in view of the fact that 27 per cent of the farms between 1 and 5 hectares have no irrigated land.

The estimated gross value of the crops produced in both provinces amounted to around 8,700 million pesos [2] at prices of April 1952. This includes farming and live-stock production obtained by the operators and by the resident farm labourers on the land allotted to them as "rations".

The farm power in the area consists of slightly less than 2,700 tractors, about 37,000 draft horses and 12,000 yoke of oxen.

---

1/ This refers to owners, those who rent farms, co-partners and in general persons who are responsible for agricultural production in an executive capacity.

2/ Including 643 million pesos produced by the resident farm labourers on their land "rations"

/The foregoing

The foregoing gives a general idea of the area studied and its farming. The figures were based on findings of a farm by farm analysis of 401 farm operating units selected by a mechanical sampling device from the entire farm area of the two provinces, excluding the Cordillera de los Andes. The area of the units analysed amounted to 101 thousand hectares.

The sample method was chosen very carefully with a view to obtaining adequate representation of all sectors of production and of the diverse regions in both provinces. The selected farm operating units were studied by skilled professional men who were acquainted with the zone.[1/]

CHAPTER I The property and its size

In studying farming and means of production in the provinces of Santiago and Valparaiso, the irregular distribution of property in relation to its area is particularly noticeable.

In a zone where the types of farming range from sheep-grazing and natural pasture and extensive growing of cereals without irrigation, to intensive crops from irrigated fruit-orchards and vegetable gardens, the size and distribution of property become very important in evaluating the means of production as a basis for any development plan.

Of the 401 properties studied, 5 per cent (19 farms), exceeding one thousand hectares each, owned slightly under 80 per cent (79,983 hectares) of the total area. By contrast, at the other extreme, 64 per cent of the total properties (259 farms having an area of from 1 to 20 hectares, make up only 1.6 per cent (1,589 hectares) of the area being studied. Properties covering from 20 to 100 hectares constitute in turn 17 per cent of the total number of farms, but only comprise slightly under 3 per cent of the area of the region (see Table 1). Classified in relation to irrigation, 20 farms (5 per cent of the total) comprise a little over 63 per cent of the irrigated area.

This unequal distribution of property becomes more important since, in the group of smaller properties up to 20 hectares, 27 per cent of the area is unirrigated, and so produces much less than the irrigated area. Moreover, there are few possibilities of diversification.

---

1/ More details of the sampling device used are given in the Annex.

The farm area, by itself, is insufficient to give an adequate idea of the size of the operating unit, since the extreme differences noted in the distribution of property by area are partially offset by the fact that 46 per cent of the land on the large farms cannot be cultivated. Most of this land, (about 85 per cent) belongs to the group of properties exceeding one thousand hectares.

For a better understanding of both the distribution of arable land and the average productive capacity of the 401 farms studied, it being impossible to obtain any reliable information from the owners, a certain figure was assigned to each property representing the gross value of production obtained from average yields of each province. 1/ It should be stressed that such values represent only a theoretical average production. Their

---

1/ It was impossible to assign the real value of production to each property since the information obtained from the farmers showed discrepancies, above all in relation to the gross income and individual unit yields.

To overcome this difficulty, it was necessary to assign to the crops and live-stock for each area, the average yields per province as supplied by the Ministry of Agriculture, taking different coefficients for irrigated or unirrigated lands, and assigning a production value to natural pastures according to this utilization and capacity per zone. This method provided figures which gave adequate importance to the different types of farming and stock-raising according to whether the region was irrigated or not. These figures in turn represented the value of normal production.

The use of the system of average returns can partly offset the different factors which influence production and which vary so much from one farm to another, as, for example, the influence of the climate, the quality of the soil, the administrative capacity of the owner and what he does towards ensuring more efficient production.

The production thus obtained, multiplied by the average prices received by the farmer in some cases, and when these did not exist, taking the wholesale prices in the city of Santiago for March 1952, gave what might be termed "the average capacity of production expressed in cash currency".

Such values, at the same time, give an idea of the average gross value of production from agricultural properties.

immediate aim is to establish the size of the property; in no case do they indicate the real gross value of their production. It is possible, however, that the estimated values of total production for both provinces is not very different from the actual value.

Table 1 Distribution of property and arable area compared with the size of farms

(in percentages of the total)

| Area in hectares | Properties | Total | Arable | | Cultivated | | Natural Pasture | | Fallow | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | (1) | (2) | (1) | (2) | (1) | (2) | (1) | (2) |
| 1 - 4 | 31 | .3 | 1.2 | 0.1 | 1.6 | 0.6 | 0.2 | 0.05 | - | 0.2 |
| 5 - 19 | 33 | 1.3 | 4.3 | 1.0 | 5.2 | 2.3 | 1.6 | 0.8 | - | 1.7 |
| 20 - 49 | 12 | 1.4 | 4.2 | 1.2 | 4.3 | 2.2 | 3.7 | 1.0 | 1.3 | 2.7 |
| 50 - 99 | 5 | 1.5 | 3.0 | 1.5 | 3.3 | 3.8 | 2.1 | 1.1 | - | 5.2 |
| 100 - 199 | 8 | 4.2 | 15.7 | 1.4 | 17.0 | 5.4 | 12.2 | 0.6 | 3.3 | 7.2 |
| 200 - 499 | 4 | 5.4 | 21.7 | 2.1 | 21.6 | 1.1 | 21.6 | 2.3 | 21.5 | 1.7 |
| 500 - 999 | 2 | 6.8 | 19.6 | 1.7 | 16.6 | 1.4 | 29.1 | 1.8 | 36.7 | 1.4 |
| 1000 and above | 5 | 79.1 | 30.3 | 91.0 | 30.3 | 83.2 | 29.5 | 92.3 | 37.2 | 79.9 |
| Total | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

(1) Irrigated

(2) Not irrigated

Using the method described, it was calculated that the productive capacity of the 401 properties was rather less than 403 million pesos,[1] and that of this total, approximately 47 per cent (188 million) was produced by 17 farms.[2] They constitute only 4 per cent of the total number. At the other end of the scale were 247 properties with a gross annual value of production of less than 250 thousand pesos, forming 62 per cent of the total. These farms were collectively responsible for only 5.4 per cent of the value of production. Such an unequal distribution of property can be seen much more clearly in Table 2 and Plates 1 and 2.

Within the sector where the gross value of production is below 250 thousand pesos (Group 1-5) it was found that 1 per cent of all properties from the sample (4 farms) could not be considered as agricultural farms, since in spite of comprising up to 30 hectares, they produced nothing, owing to their rugged topography and their poor soils. There was also

1/ Excluding production of resident farm labourers.

2/ The average gross production of these properties reached more than 10 million pesos per farm.

a sector of 39 small properties (Group No. 2) up to 27 hectares, where the gross annual value of production did not reach 25 thousand pesos; these farms mainly consisted of unirrigated areas with poor soil and steep slopes. These, however, were classified by their proprietors as being suitable for cultivation. The greater part of this land was left as natural pasture to feed a few animals, largely sheep and goats; this was the main reason for the low income from these properties. Some farms planted small areas with wheat and pulse crops.

Table 2 Distribution of property by the estimated gross value of production

| Group | Size of the property according to gross value of production | Number of properties | Percentage of total | Value of production (in thousands of pesos) | Average productive value by property | Percentage of the whole |
|---|---|---|---|---|---|---|
| 1 | 0 | 4 | 1 | 0 | | - |
| 2 | 1 - 25,000 | 39 | 10 | 471 | 12 | 0.1 |
| 3 | 25,001 - 50,000 | 45 | 11 | 1,641 | 36 | 0.4 |
| 4 | 50,001 - 100,000 | 70 | 18 | 5,106 | 73 | 1.3 |
| 5 | 100,001 - 250,000 | 87 | 22 | 14,348 | 165 | 3.6 |
| 6 | 250,001 - 500,000 | 46 | 11 | 16,207 | 352 | 4.0 |
| 7 | 500,001 -1,000,000 | 28 | 7 | 20,470 | 731 | 5.1 |
| 8 | 1,000,001 -2500,000 | 36 | 9 | 58,237 | 1,618 | 14.4 |
| 9 | 2500,001 -5,000,000 | 27 | 7 | 98,246 | 3,639 | 24.4 |
| 10 | Over 5,000,000 | 17 | 4 | 188,110 | 11,065 | 46.7 |
| TOTALS | | 401 | 100 | 402,836 | 1,005 | 100.0 |

Most of the small irrigated farms with a maximum of 11 hectares of crops (32 per cent of all farms) are found in the three groups immediately above groups 3, 4 and 5, where the gross value of production does not exceed 250 thousand pesos. They are followed by other unirrigated farms (18 per cent of all farms) with a higher productive capacity, cultivating a maximum of 21 hectares. Finally, there are a few properties (1 per cent of all farms), ranging from 200 to 2,500 hectares, and consisting almost entirely of steeply sloping ground which cannot be cultivated.

/All the farms

All the farms in the second group and a large part of the third are found in zones which could be classified as submarginal; the poor soil, steep topography and the impossibility of introducing irrigation systems, together with the unsuitable size of the properties, result in their owners being able to obtain from them an extremely low standard of living. Subsistence farming is generally carried on with a great waste of labour since the primitive methods of cultivation employed and the poor yields cause low productivity. Had it been possible to obtain reliable data concerning production from these farms the gross value of their production would have proved to be far below the average of the 21 thousand pesos assigned to the 88 properties with incomes of less than 50 thousand pesos. Furthermore, this type of operating unit is responsible for a large part of the under-employment in Chilean farming districts, since the small area cultivated keeps the owners and their families occupied for relatively few days during the year.

In the larger units within this group, particularly those with irrigated land, the situation of the operator improves considerably since, together with obtaining a higher gross value of production, greater use can be made of all available manpower, which does not imply that an efficient or even complete use is made of it. Other advantages are the greater possibilities for improving the farming through greater diversification and a much broader crop rotation. Similarly, smallholders in areas of intensive farming are offered the opportunity to seek work in neighbouring properties.

In the groups with a gross value of production above 250 thousand pesos, the land area of the properties bears no relationship to such value, because these groups include farms ranging from the small irrigated property intensively exploited and cultivated to the fullest extent, to the large estate.

It should be noted, however, that in the two larger groups of operating units, Groups 9 and 10 in Table 2, where the value of production per farm exceeds 2.5 million pesos, all the properties, except those engaged in large-scale chicken-farming, have cultivated areas exceeding a hundred hectares and an average of rather more than 3000 hectares.

/Later on,

Later on, in the chapter dealing with land utilization the way in which the arable land is used, in the different sectors of properties distributed according to size, will be described in greater detail.

It is sufficient here to say that there is no close relationship between the area of available productive soil and the production resulting from it. Owing to the differing degrees of the intensity of cultivation, a small property with certain garden vegetables, fruit trees and vineyards, or dedicated to chicken-farming, can produce a much greater gross income than another larger property exploited extensively.

Land titles

All the analyses and conclusions of the present study were based on agricultural undertakings, that is, farms or small properties which could be identified as such by the research workers who visited the area. It is true that the number of properties recognized as such apparently differs greatly from the number of title-deeds registered at the Income Tax Office. In the registers corresponding to the rural and semi-urban zones of the provinces of Santiago and Valparaiso, 17,058 titles are registered relating to property of over one hectare in area, which is more than double the number of farms calculated on the basis of the sample studied.

Such a great difference between these figures is because many properties, particularly in the unirrigated zones, are not considered as being agricultural owing to their small size and poor soil. Agricultural enterprises may be made up of various title-deeds. In many cases the owners have gone on incorporating other possessions or plots to their original farms, so as to form a larger operating unit. Each addition has a separate title-deed and continues to figure separately in the registers. In addition, many small farms have no houses or offices and were not therefore identified as properties by the research workers engaged on this study.

Many properties of over one hectare are in the semi-urban zones and were not taken into account in the survey.

Although for the purposes of this study only properties of more than one hectare were considered, it should be recalled that besides these, there are in both provinces 24,876 title-deeds for rural and semi-urban

properties having over one thousand square metres, which contribute in some way to the support of their owners. These properties cover an area of 7,040 hectares, that is, 3 per cent of the total area of both provinces.

Land division for other analyses

In order to facilitate the analyses in the following chapters, a new distribution was established by which the land, instead of being arranged in accordance with the gross value of production, was divided into 10 equal groups (tenths), containing 41 properties each. The last group contained only 37 properties since there were four farms which were being used exclusively for dwelling purposes. As such they had no arable ground, were classified as non-agricultural and were placed in a separate group. This smaller number is also due to readjustments made in the sample to avoid an excessive representation of large properties.[1/] Land distribution in the rest of this study will be made in terms of tenths, as in Table 3.

## CHAPTER II. Manpower

The manpower question is very important in any study on agriculture. In order to analyse the part it plays both as a production factor and as a consumption element, the following divisions should be established: first, the group of persons who direct or administer farming operations; secondly, the group of men, women and children who perform manual labour; and thirdly, the numerous population who live in the rural districts - including the two previous groups - and who depend on it as their residence and as the principal source of their food and income. However, it becomes difficult, if not impossible, to establish a precise division between the person or groups of persons who administer a property and those who do the manual work, since in the majority of small properties the owner is at the same time the administrator and labourer. Consequently administrators, stewards and overseers have all been classified as workers as well as those persons who only do physical work.

---

1/ This division has been adopted for two principal reasons: first for groups with about the same number of properties, there will be no danger of making comparisons between sectors chosen arbitrarily which may contain an inadequate number of observations; and secondly, because this method is easy as a means for a more systematic presentation.

Table 3 Land Distribution in Groups of 10 (tenths) According to the Size of the Unit, Measured by the Gross Estimated Value of Production

| Number of the group (Tenths) | Gross value of production in pesos | Number of properties | Approximate percentage of the number of properties in each group |
|---|---|---|---|
| 0 | 0 | 4 (non agricultural) | 1 |
| 1 | 1 - 26,000 | 41 | 10 |
| 2 | 26,001 - 48,000 | 41 | 10 |
| 3 | 48,001 - 70,000 | 41 | 10 |
| 4 | 70,001 - 104,000 | 41 | 10 |
| 5 | 104,001 - 165,000 | 41 | 10 |
| 6 | 165,001 - 260,000 | 41 | 10 |
| 7 | 260,001 - 480,000 | 41 | 10 |
| 8 | 480,001 - 1,260,000 | 41 | 10 |
| 9 | 1,260,001 - 3,500,000 | 37 | 9 |
| 10 | 3,500,001 - 27,752,000 | 32 | 8 |

Table 4 Days Worked by Different Classes of Workers (owners, administrators, resident farm labourers, outside workers share-croppers, specialized workers, etc.) and their Equivalent in Worker-years

| Class of worker | Days worked | Percentage of the whole | Average days worked per year | Equivalent in worker-years |
|---|---|---|---|---|
| Owner and his family | 54,223 | 5 | 320 | 169 |
| Administration | 119,601 | 12 | 340 | 352 |
| Resident farm labourers and their families | 571,050 | 57 | 240 | 2,379 |
| Outside workers | 187,245 | 19 | 180 | 1,040 |
| Share-croppers | 54,858 | 5 | 180 | 305 |
| Specialized workers | 23,307 | 2 | 240 | 97 |
| TOTALS | 1,010,284 | 100 | | 4,342 |

In the agricultural year 1951-52, the 401 farm units studied in both provinces employed a total of over a million work-days to obtain a theoretical gross value of production estimated at slightly under 403 million pesos.

/Taking into

Taking into account the average number of work-days for each class of worker (administrators, resident farm labourers, outside workers, share-croppers, etc.) on the properties studied in the survey (see Table 4), it is estimated that the equivalent of rather more than 4,300 workers were employed annually. In fact, the number of persons actively engaged in agriculture in the zone is somewhat higher, since there are many migrant workers who only work on the farms during the periods of greatest activity. Furthermore, some owners and their families try to supplement their incomes by seeking work away from the land during periods of little farming activity.

Taking the number of work-days employed in the different distribution groups, each property in the first two tenths had an average annual input of 222 working days, that is, the equivalent of 7 tenths of a full-time operator-worker. (See Table 5). In groups 5 and 6, the two middle tenths, the number of work-days per unit reached an average of about 700 days, that is, three permanent workers. In tenths 9 and 10, the average labour input per farm reached 11,385 work-days or 47 full-time workers.

Table 5 Average Input of Work-days per Property at Different Levels of Gross Value of Production

| Tenth Number | Value of production | Total input of work-days | Average annual input of work-days per property |
|---|---|---|---|
| 1 | 1 - 26,000 | 6,177 | 150 |
| 2 | 26,001 - 48,000 | 12,033 | 293 |
| 3 | 48,001 - 70,000 | 16,915 | 412 |
| 4 | 70,001 - 104,000 | 21,876 | 533 |
| 5 | 104,001 - 165,000 | 29,553 | 121 |
| 6 | 165,001 - 260,000 | 26,255 | 655 |
| 7 | 260,001 - 480,000 | 34,203 | 834 |
| 8 | 480,001 - 1,260,000 | 77,087 | 1,880 |
| 9 | 1,260,001 - 3,500,000 | 173,248 | 4,682 |
| 10 | 3,500,001 - 27,752,000 | 612,337 | 19,135 |

Productivity of the farm worker

On dividing the value of production mentioned in Chapter I, by the number of work-days - including owners, administrators, specialized workers and farm-labourers in general - it may be seen that each one, on an average, yielded a gross product of about 400 pesos. The equivalent of a full-time

/worker would

worker 1/ would thus produce 111 thousand pesos per year. Again, it should be stressed that these values represent the gross production from which operating expenses have not been deducted. Such expenses include wages, seed, fertilizers, machinery and fuel, disinfectants, feed etc. Moreover, there has been no deduction for interest, amortization on invested capital, the land rent or taxes paid.

Large disparities in the productivity of agricultural workers are in evidence throughout the various sectors of agriculture, the most notable, however, being observed in the different sizes of the units and in the differing types of farming.

Accounting exclusively for the size of the unit, measured by the gross value of production, the least productivity is found in smaller sized units, and among those which are not irrigated. In the two groups of small units the average gross production per work-day only amounts to 111 pesos (32.7 thousand pesos per worker-year). In the intermediate tenths (fifth and sixth) production rises to 250 pesos per work-day (62 thousand pesos yearly) and in the two upper groups, (ninth and tenth), the value rises to 422 pesos per work-day and 102 thousand pesos per worker - year. (See Table 6 and Plate 3).

Comparing the groups separately, the superiority of No. 8, becomes apparent with a return of 439 pesos per work-day. This group is mainly made up of medium-sized units, which with two exceptions (having 1,500 hectares between them), have an average area of 33 hectares, 20 of which are under cultivation. 85 per cent of the cultivated area is irrigated land, and more than two-thirds consists of fruit-trees, vegetable plots, and vineyards.

Group 7 is next in importance, with more or less the same characteristics. Group 10 is largely given over to dairy farming where much of the work is mechanized.

---

1/ To calculate the equivalent of a full-time worker, an average is taken of the actual work-days contributed, weighted by each type of worker in the 410 properties studied.

/The values

The values noted in Table 6 may give an erroneous estimate of production or net income, since in the small properties, investments and operating expenses are very small, being limited in many cases - especially on unirrigated land - to the purchase of seed, the hiring of animals and working implements and to the assignment of a nominal value to the work of the owner and his relations. In the large properties, on the other hand, overhead expenses, the amortization of the machinery used, fuel, improved seeds, concentrated feed for the animals, interest on invested capital, etc., account for a considerable percentage of the gross income. Such great differences in the gross productivity of labour are thus seen to be partly offset when the net productivity is calculated.

Efficiency of the farm worker

A simple observation of the number of work-days per unit indicates that there is generally a considerable waste of farm labour in both provinces.

Table 6 Gross Production - expressed in Currency at Prices for March 1952 - per work-day and per Equivalent of worker-year in the 397 properties studied

| Tenth number | Production in thousands of pesos | Work-days | Gross product per work-day | Equivalent of work-days in man-years (weighted average) | Average days worked per man | Gross productivity per permanent man-year (in '000 pesos) |
|---|---|---|---|---|---|---|
| 1 | 523 | 6,177 | 84 | 20 | 313 | 26 |
| 2 | 1,507 | 12,033 | 125 | 42 | 284 | 36 |
| 3 | 2,461 | 16,915 | 142 | 64 | 264 | 37 |
| 4 | 3,557 | 21,876 | 162 | 84 | 261 | 42 |
| 5 | 5,591 | 29,553 | 189 | 113 | 261 | 49 |
| 6 | 8,502 | 26,855 | 316 | 114 | 236 | 74 |
| 7 | 14,608 | 34,203 | 427 | 114 | 236 | 101 |
| 8 | 33,855 | 77,087 | 439 | 345 | 223 | 98 |
| 9 | 68,494 | 173,248 | 395 | 719 | 241 | 95 |
| 10 | 263,738 | 612,337 | 431 | 2,551 | 240 | 103 |

The Economic Commission for Latin America has already noted this fact in its Economic Survey of Latin America 1949, indicating that "as a consequence of the systems of work and the forms of cultivation, the number of work-days per man in a determined activity is appreciably high",

/and makes

and makes comparisons between the average number of work-days required to cultivate a hectare of different products in Chile and in other countries. Taking into account only some crops with a similar return per hectare, it is seen that while in Chile for a hectare of maize 407 man-hours are necessary, in the United States a somewhat higher yield is produced for an average of only 68 man-hours. For wheat, an average of 212 hours is required in Chile, against 22 in the United States.[1/]

Farming in the provinces of Santiago and Valparaiso, is undoubtedly among the most efficient in the whole country; but even if the labour input were reduced by 50 per cent, it would still be very high compared with efficient and well-mechanized farming.

In order to establish a more effective measure of the agricultural worker's productivity in the different sectors of the present study, a basis of comparison had to be found which, in this case, could be the "normal" labour input required for different crops under "normal" conditions for soil and topography. Based on studies of production costs carried out by the Department of Rural Economy of the Ministry of Agriculture, on the authoritative judgment of a number of Chilean technicians and the experience of farmers, information is available on this subject. A calculation was made of the number of work-days necessary for the complete cultivation of a hectare of the zone's various products under normal conditions, both without mechanization or with only partial mechanization, that is, the use of mechanical traction only for soil preparation and of a reaper and a stationary threshing machine for wheat harvesting.

Once the corresponding work-days for each crop had been obtained with those required for the breeding and care of stud and draft animals, 15 per cent was added for general work and administration. At first sight this percentage may seem low, but it should be recalled that the small holdings, in nearly every case, do not put in days for administration and that in the unirrigated units there is very little general work. Both these facts help to offset the rather higher proportion of this type of work on the larger properties.

Comparing the figures of the "normal" work input with the real ones for the agricultural year 1951-52, it is evident that there is an enormous waste of labour in the smaller properties (those having a gross value of

1/ Document E/CN.12/164. Rev.1, Development of Agricultural Production in Chile, pages 318-342.

/production below

production below 48,000 pesos). In these, the average work input per unit was about 220 work-days per year. Under efficient "normal" conditions (without mechanization) approximately 90 days would have been sufficient. (See Table 7 and Plate 4). Therefore, had there been "normal" workers and draft animals, together with "normal" soil characteristics, up to 60 per cent of the labour employed in this sector could have been saved. In the groups immediately above, the position is not very different, as there could have been about 55 per cent labour saving. Such an excessive work input is partly justified, however, by the fact that most of these units are very small, with unsuitable topography where any work done requires additional effort. Moreover, these units have only the most rudimentary working implements, such as wooden ploughs, home-made harrows, etc. and for draft purposes oxen or horses are employed, the harvest is reaped by hand, while the thrashing of seed is done by animals.

Table 7 Average Work Input per Property in Work-days per year Compared with the "normal" (estimated) Input Without Mecharization and with Partial Mechanization

| Number of the tenth | Real work-days annually A | "Normal" work-days B | Percentage work-days at present wasted $[100 - (\frac{B}{A} \times 100)]$ C | "Normal" work-days D a/ | Percentage work-days at present wasted $[100 - (\frac{D}{A} \times 100)]$ E a/ |
|---|---|---|---|---|---|
| 1 | 150 | 51 | 66 | - | - |
| 2 | 293 | 123 | 58 | - | - |
| 3 | 412 | 179 | 57 | - | - |
| 4 | 533 | 246 | 54 | 214 | 560 |
| 5 | 721 | 411 | 43 | 349 | 52 |
| 6 | 655 | 600 | 8 | 501 | 24 |
| 7 | 834 | 817 | 2 | 689 | 18 |
| 8 | 1,880 | 2,050 | - | 1,886 | - |
| 9 | 4,682 | 5,099 | - | 4,369 | 7 |
| 10 | 19,129 | 21,589 | - | 19,324 | - |

a/ No comparison was made between the real work input and the "normal" input with partial mechanization in groups 1, 2 and 3, since it was considered that in practically all of them the use of machinery is uneconomic, owing to the small size of the fields to be cultivated or to the excessive angle of the ground.

/The principal

The principal source of the great waste of labour is found, however, in the under-employment of this type of operator, since an appreciable part of his time is not taken up in productive activities.

As the size of the unit increases, passing from the subsistence to the fully commercial level, the productivity of the worker is seen to improve by the use of machinery, while greater efficiency is observed in the utilization of work. Thus in the groups containing units with a production of more than half a million pesos (groups 8, 9 and 10), the average of work-days are less than the calculated "normal" average.

Such advantages should by no means lead to the conclusion that these units have risen to the highest grade of efficiency in the utilization of the agricultural worker through better organization and administration. By comparing the real working days with those estimated under "normal" conditions with partial mechanization, it was already found that where there is no wastage, the figures are similar in either case; in actual fact, for an appreciable percentage of the units in these groups, mechanization has already passed beyond the most simple stage. Many units use machines for sowing, combined harvesters for grain, advanced models of mowing machines, milking equipment, etc. Their utilization should have helped to reduce the average input of working days. Moreover, it should be recalled that the figures used as a basis for these comparisons were calculated by taking into account the "normal" conditions of Chilean agronomy and not the "technically ideal" ones.

Worker efficiency under different systems of land tenure and administration

In order to verify whether the different types of land tenure have any bearing upon the efficiency and productivity of the rural worker, the real work input in units operated by owners, tenants and share-croppers was compared with the "normal" requirements for the crops grown by them. There were no significant differences, since, in general terms, the "wastage" of work is more or less the same under all three types of tenancy.

Fairly similar results were obtained on comparing the work input under the various types of administration, that is: 1) landlords who operate their own farms and live on them; 2) landlords who do not operate the property directly, and who visit it only occasionally to

/settle working

settle working problems, and 3) landlords who leave the management of the farm directly to agents or stewards. The fact that the results of these comparisons may not be systematic, with no clear tendency, demonstrates the mixed composition of the landlords and administrators who direct the agricultural work of both provinces.

Table 8 Types of Administrator on the 397 Agricultural Units studied in the Provinces of Santiago and Valparaiso

| | Profes-sional | With practical experience | Country-men | Pro-fes-sional | With practical expe-rience | Country men | In-dus-trial |
|---|---|---|---|---|---|---|---|
| Owners | 22 | 80 | 132 | 13 | 19 | 20 | 4 |
| Tenants | 4 | 31 | 29 | 3 | 3 | 2 | - |
| Share-croppers | 1 | 2 | 23 | 1 | 4 | 4 | - |
| TOTAL | 27 | 113 | 184 | 17 | 26 | 26 | 4 |

In fact, as may be seen from Table 8, the administrators of agricultural properties differ greatly as to capacity and training. Naturally they show differing degrees of efficiency, and, as such, exercise a decisive influence on the way in which the agricultural labourer is employed. Among the units studied there were several, generally operated by professionals, where labour efficiency reached levels very much higher than the "normal" one, even without the intensive use of farm machinery and under the ordinary wage conditions prevailing in the zone.

Classes of workers: their share in production

Farm-labourers in the provinces of Santiago and Valparaiso do not appear to differ much in their make-up from those of the rest of the central zone (although they are nearer the great urban centres of the country and have a relatively better system of communications at their disposal). An exception is that for the most part they are generally better paid.

Of the active farming population the most important group, and that which makes the greatest contribution to production, is the resident farm labourer group. During the agricultural year 1951-52, this group of worker and his family between them were responsible for 55 to 60 per cent of the total labour input; of this total, about 70 per cent corresponds

/to resident

to resident farm labourers themselves, that is to the heads of families, while the remaining 30 per cent corresponds to their relations who, by living in the house belonging to the head of the family, contract an obligation to work on the farm.[1/]

The wages of the resident farm labourer vary considerably from area to area, but, in general, it may be said that cash wages range from 15 to 50 pesos per day. In addition to this wage and also according to the area, the resident farm labourer receives a "raw" food ration, a dwelling place, and a piece of land. This land may vary from a little fenced yard surrounding his dwelling, to four or five hectares of unirrigated land. Normally, however, the plot of irrigated land is about a quarter of a city block (0.4 hectares) and that of the unirrigated land about the size of a city block (1.56 hectares). Where the resident farm labourer does not receive land, he usually has a right to share the crops in the irrigated land of the farm. Finally, the resident farm labourer has the right to pasture a given number of animals in the fields belonging to the farm.

The obligations of the resident farm labourer consist of supplying one, two and sometimes up to three permanent workers at least when the work of the farm so requires.

Next in importance are those known as "outside" workers, who between them provide from 15 to 20 per cent of the total work input. The day wages of this class of worker vary from 40 to 80 pesos, plus a ration of food or a "galleta",[2/] or both. This body of workers is for the most part made up of smallholders whose aim is to eke out their incomes by working as hired farm-hands. In addition there is a numerous floating population which seeks employment in farm labour during harvest-time, to work later in other activities, such as road-making, building and so on.

The tasks of administration absorbed between 10 and 15 per cent of the total number of working days. Among them are included those contributed by administrators, stewards, foremen, stable heads, keepers of keys, and so on, but not the work of owners or managers whether they act only as administrators or as members of the labour force as well. The remuneration of the administrative staff takes the form of a monthly wage, which may vary considerably according to the kind of work done and the ability of the employee. This wage is generally supplemented by

1/ On many farms these workers are known as "obligatory workers" and must work on a permanent basis.

2/ Loaf weighing between 250 and 500 grams.

/allotments of

allotments of land and grazing rights, and usually includes the occupation of a dwelling-house and rations of raw foodstuffs.

Operators and share-croppers each contribute between 3 and 7 per cent of the sum total of labour. The first-named form a fairly numerous group, since among them are reckoned the majority of the smallholders classified in groups 1,2,3 and 4 of our distribution. Share-croppers may be, in some cases landlords who take a whole property to work it partially or entirely, and in others, tenants, who as part of their perquisites agree to share a given area equally. There are various methods of share cropping, but, as a general rule, the landowner's contribution is the land itself, and all or half the seed, the fertilizers and the disinfectants; the share-cropper provides the labour, farm implements and beasts of burden. The crop is shared equally.

Finally, the skilled workers - tractor-drivers, mechanics, carpenters, stonemasons, electricians, etc., contribute between 1 and 5 per cent of the total number of working-days completed. These are the relatively better-paid agricultural workers.

Causes Contributing to the Deficient Yield of the Farm-Labourer

The small amount of work achieved by the farm-labourer is not due to any specific cause, but rather to a large number of factors which are closely inter-related, and which, in many cases, constitute a vicious circle. To avoid too prolonged a consideration of this subject, it is convenient to enumerate only the most important of these causes:

1) It was found in the course of the enquiry that on only 2 per cent of the properties was land left untilled for want of labour, and that on an additional 13 per cent this shortage affected an increase in production. It was thus obvious that the problem of a labour shortage does not exist in any marked degree. On the contrary labour is, if not plentiful, at any rate adequate for agricultural needs at its present technical stage. The fact that the level of farm-workers' wages has not risen at the same pace as wages in other branches of the domestic economy, and even less than the cost of living, [1] is a clear indication that the manpower supply in rural areas has been more than satisfactory, since landlords have not had to compete to attract labourers by better wages and working conditions.

1/ Report of the IBRD-FAO Mission to Chile, Chapter II, page 21.

/This in

This in itself has helped to detract from the labourers' efficiency and to cause only a low rate of productivity. It is true that there were quite a number of farmers (19 per cent of the total number interviewed) who indicated the need for more efficient labour if they were to increase their production. These are, however, local and seasonal characteristics, generally due to the poor terms of payment offered by the farmers concerned.

2) The low level of farm-workers' wages obliges the labourer to conform to a very low standard of living, which has its repercussions upon his health and upon his initiative to improve his rate of output. In reality, the small income turns the labourer into a partly isolated element of the domestic economy, since he finds it impossible to obtain any but the most indispensable consumer goods with which to feed and clothe himself; the comforts and conveniences of modern life are entirely forbidden to him.

It is worth while to emphasize the pernicious influence exercised by this low level of wages on the country's economy. An enormous potential market is practically closed to the products of domestic industries, owing to the shortage of purchasing-power among the rural population.

3) The system of payment which holds good for the chief group of agricultural workers, the resident farm labourers, based as it is on a small nominal wage in actual cash and the allocation of plots of land and grazing rights, presupposes, even if the resident farm labourer himself does not recognize the fact, a decided disadvantage to his finances, as the latter part of his earnings depends upon his own efforts and is subject to the contingencies inherent in agriculture.

4) The lack of education of the rural labourer is also an important factor in his low level of efficiency. His semi-illiteracy, and his ignorance of better means of improving his standard of living, compel him to follow the only work of which he is capable, and even prevent him from adapting himself to more technical or mechanized farming methods.

5) In spite of the farm-worker's low standard of productivity, it is indubitable that from an economic and social viewpoint he ought to be paid much higher wages. It must be borne in mind, moreover, that the efficiency of the farm-hand cannot be improved without the investment of capital in agricultural enterprise, and without the collaboration of the executive farm authority in the better organization of the work. The capable

administration of an estate, even without heavy additional outlay, can appreciably increase the productivity of the rural labourer.

6) The small investments in agriculture places within the worker's reach very few means of improving his productivity. Eighty per cent of the estates studied possess no motorized draft power, and more than fifty per cent are unacquainted with any other instrument of labour than the ordinary plough for animal traction. It is difficult to imagine how a labourer can become more efficient in such precarious conditions.

Resident Population

Without counting the outside workmen, who live only temporarily on the properties, the permanent rural population of the 401 estates studied amounts to something more than 12 thousand persons. This number includes about 172 operators, between 2.8 and 3 thousand resident farm workers, about 400 administrative employees, share-croppers, who amount to approximately 350, and the skilled workers whose number should reach a little over 110. In this figure are included all the members of their families, their dependents and other inmates of their households, domestic servants and a certain number of persons, who may, or may not, do agricultural work.

By far the greater part of this population is dependent on agricultural labour as its chief - generally its only - source of income, and on farm produce for most of its food supply. The primary preoccupation of more than half the properties in the zone must be the satisfaction of their own food requirements before anything can be sent to market. The area and production which has to be allocated to filling the requirements of the rural population, is therefore appreciable.

## CHAPTER III. Draft power and mechanization

Among the factors which contribute to a greater degree of productivity of farm labour, and to making better use of the land, is the amount and kind of draft power available. The importance of these factors is greater in the provinces of Santiago and Valparaiso, where the wages level for farm workers is relatively higher than in the rest of the country.

The agricultural properties studied in these provinces had at their disposition, in April 1952, 133 tractors, 1,832 draft horses and 604 yoke of oxen to deal with their requirements in the way of heavy draft (mainly

/ploughing

ploughing implements, and, on a smaller scale, transport). This availability covered 17 thousand cultivated hectares, 2 thousand hectares lying fallow, and an area of 35 thousand hectares of land capable of cultivation which was found to be under natural grasses. This draft power would be equivalent to that of 96 draft horses, 32 yoke of oxen and 7 tractors for every thousand hectares of cultivated and fallow land. 1/

Table 9 Type of Draft Power Available on 397 Properties in the Provinces of Santiago and Valparaiso, Distributed in Groups According to their Production Value

(percentages of the total number in each group or tenth)

| No. of tenth | Properties possessing or hiring tractors a/ | Properties depending exclusively on draft animals b/ | Properties neither using nor possessing draft power |
|---|---|---|---|
| 1 | 0 | 63 | 37 |
| 2 | 0 | 80 | 20 |
| 3 | 0 | 83 | 17 |
| 4 | 0 | 90 | 10 |
| 5 | 10 | 88 | 2 |
| 6 | 22 | 93 | 5 |
| 7 | 5 | 90 | 5 |
| 8 | 34 | 64 | 2 |
| 9 | 76 | 24 | 0 |
| 10 | 91 | 9 | 0 |
| Total number of properties | 20 | 70 | 10 |

a/ 7 of the 78 properties forming this group work with hired tractors.

b/ 33 of the 279 properties depending solely on draft animals, obtained them on hire.

Ten per cent of the properties studied did not possess or use any kind of draft power. 2/ (See Table 9 and Plate 5.) In Plate 5 these properties

1/ In the provinces of Santiago and Valparaiso there should be, therefore, rather more than 2,600 tractors, about 37,000 draught horses and 12,000 yoke of oxen, to deal with 340,000 hectares under cultivation, 40,000 hectares lying fallow and about 700,000 hectares of cultivable land under grass.

2/ Of these 40 estates, which in the past agricultural year had no draft power at their disposal, 65 per cent were either under cultivation of some sort - principally tree plantations - or had cultivable areas under natural grass. These were exclusively row-crops. Only the remaining 35 per cent had no need of mechanical or animal draft since they had no economically arable areas.

/are represented

are represented by the shaded area on the bottom left-hand side, and, as may be seen, most of them belong to the groups in which the gross value of production is low.

In contrast to the group named, a larger sector of properties is to be found, which possesses or hires one or more tractors, and which constitutes about 20 per cent of the total number of farms. They are represented in Plate 5 by the shaded area in the top right-hand side.

A more detailed examination of Plate 5 underlines the fact that not one of the properties listed in the four groups of lower production values possesses tractors, and that, on the contrary, 94 per cent [1] of the properties with the greatest production value did possess one or more of these machines.

The intermediate zone in Plate 5 shows the proportion of properties which depend exclusively on animal draft to carry out the cultivating processes of their lands. It can thus be observed that this is the type of draft mainly used in the zone, since 70 per cent of the farms are only worked with oxen and horses.[2]

The relationship between the total number of properties and the type of draft power which they have at their disposal, may give an erroneous impression of the importance of each of these types with respect to the total area under cultivation. An examination of the number of tractors, draft horses and oxen existing on the properties studied, and of the working capacity of each of them, reveals the possibility that it may be the tractors which deal with the largest areas. Indeed, if to each of the 133 existing tractors is assigned an average working capacity of 95 hectares annually, to each pair of horses 9 hectares, and to each yoke of oxen 7 hectares, [3] the result would be that the former could deal with the cultivation of rather less than 13 thousand hectares, and the two latter together with a more or less similar area. In actual fact, both tractors and animals work smaller areas, since most landowners prefer to have an emergency

---

1/ In this percentage are included two properties that hired tractors.

2/ Averages obtained in the course of an enquiry into the use of agricultural machinery made by ECLA in 1950.

3/ Averages obtained in the course of an enquiry into the use of agricultural machinery made by the Economic Commission for Latin America in 1950.

surplus of draft power. Table 10 shows in some detail the number of properties in each group which used some form of draft power, and the total area worked. Similarly it shows the type and quantity of draft power available, and the total number of hectares which could have been cultivated with these means if the capacity of each team were "rationally" exploited.

Table 10 Cultivated Area, Area Lying Fallow, and their Ratio to the Quantity, Type and "Normal" Working Capacity of the Draft Power Available to Each Group

| No. of tenth | No. of properties in Groups, which possess areas capable of cultivation | Area tilled (hectares) | Area lying fallow (hectares) | Total area worked (hectares) | Pair of horses | Yoke of oxen | Tractors | Normal working capacity (hectares) | Percentage use of draft power available per property |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 26 | 17 | 7 | 24 | 8 | 21 | - | 219 | 11 |
| 2 | 34 | 75 | 33 | 108 | 16 | 17 | - | 263 | 41 |
| 3 | 35 | 79 | 7 | 86 | 14 | 10 | - | 196 | 44 |
| 4 | 37 | 115 | 19 | 134 | 27 | 7 | - | 292 | 46 |
| 5 | 40 | 239 | 58 | 297 | 26 | 16 | 3 | 631 | 47 |
| 6 | 40 | 252 | 56 | 308 | 34 | 10 | 1 | 471 | 65 |
| 7 | 39 | 408 | 86 | 494 | 47 | 14 | 3 | 806 | 61 |
| 8 | 41 | 861 | 37 | 898 | 120 | 17 | 11 | 2,244 | 40 |
| 9 | 37 | 3,066 | 308 | 3,374 | 190 | 124 | 45 | 6,853 | 49 |
| 10 | 32 | 11,907 | 1,344 | 13,251 | 434 | 362 | 70a | 6,282 | 81 |
| Totals | | 17,019 | 1,955 | 18,974 | 916 | 604 | 133 | 28,257 | 67 |

a/ In this group the working capacity per tractor was calculated at 140 hectares, since the average among the larger properties is that of four-bladed ploughs.

These figures show that draft power on the small properties with a modest gross production value is turned to comparatively poor account, and that draft power is increasingly used in proportion to the size of the farm. This difference is explained by the fact that, as a general rule, the smallholder, who has at his disposal only very limited areas of cultivable land, finds himself compelled to maintain a much greater draft power than he really needs. In many cases the area under cultivation would not, from a strictly economical viewpoint, justify even the possession of a yoke of oxen.1/

1/ Such inadequate use of draft power for strictly agricultural purposes is partly balanced by the use of these animals for transport or their hiring to other farmers.

/From the

From the figures in Table 10 it can also be seen that, in the smallest group, the owners prefer the ox to the horse, and that in the biggest, up to group 9, the proportion is reversed, in favour of horse teams, which are quicker. The facilities for cattle-breeding and the use of cattle for meat, on the properties where production value is greatest, reduce to a minimum the advantage of draft horse power over that of oxen. It should be borne in mind, however, that in this type of enterprise animal draft has gradually sunk to a secondary position, and is used only to supplement mechanical traction, which has become a factor of fundamental importance to the tilling of the soil.

Cultivable Area and Draft Power

Up to now, only the areas under cultivation and lying fallow have been considered in relation to draft power, and no account has been taken of that enormous cultivable area, whether irrigated or not, where no crops are grown and which is used only as grassland.

In the sample area studied, there exist 35,000 hectares of land considered by farmers to be capable of cultivation (nearly 9 per cent of it is irrigated), which in the agricultural year 1951-52 were not tilled for a variety of reasons. Of this figure about 24,000 hectares - of which 850 were irrigated and the remainder not - should be considered uneconomical for cultivation purposes. This is either because the soil is not fertile enough or they have steep slopes, because they have suffered heavily from erosion, or they lack sufficient natural or artificial moisture, because they need artificial drainage, or have no available means of communication to send their produce to market. There would remain, therefore, somewhat more than 11 thousand hectares capable of cultivation under varying conditions. 1/ In

1/ From a strictly technical viewpoint, the area indicated by landowners as cultivable is exaggerated, since, according to the estimate of the research workers, at least 40 per cent of it has differences of elevation so great as to make them unfit for cultivation, without the introduction of measures for soil preservation, owing to the danger of erosion.

accordance with calculations,[1] the draft power available in the region (taking into account that the tractors, draft horses and oxen of each property only work in their particular spheres) would be enough to cultivate that area without any difficulty. (See Table 11). If it had been desired to make an immediate increase in the area under cultivation without altering the familiar systems of work, it would have been possible to use about 9 thousand hectares without making any further expense under this heading. Later, in the chapter on the use of the land, a detailed analysis will be made of the additional reasons which have prevented the bringing of this area under cultivation.

It should be indicated here that the survey showed that only less than one per cent of the properties failed to cultivate their natural grassland for lack of draft power. In terms of area of the land, somewhat more than 3 per cent of the cultivable unirrigated area was not sown for this reason. No farmer indicated lack of draft power as a reason for leaving irrigated grassland uncultivated.

Mechanization of Agricultural Tasks

The mechanization of agricultural work in the provinces of Santiago and Valparaiso is very far from reaching levels comparable with those of countries where agriculture is more fully developed.

For a number of reasons, - the modest size of the property, lack of capital, cheap labour, the high price of machinery and spare parts, ignorance of how to handle it and of its advantages, and so on - agricultural machinery even in its simplest forms has not yet managed to find its way

1/ To make this calculation, the following "normal" working capacities were assumed for the different draft means, in accordance with official estimates and the results of an enquiry made by the Economic Commission for Latin America into the use of agricultural machinery; tractors for six, four, three, two, and one-bladed ploughs, 160, 140, 105, 70 and 35 hectares respectively per working year; a pair of horses, 9 hectares; a yoke of oxen, 7 hectares. Multiplying the corresponding factors by each of the elements available on the property, the area which could be comfortably worked under normal conditions was obtained. When this figure was higher than the cultivable area of the property it was omitted. Such theoretical areas were considered as virtually wasted, since the practice of hiring out draft animals is not widespread. Only 1.3 per cent of the areas cultivated and lying fallow were worked with hired draft power. When the figure was lower, the difference was noted as "area for which draft power is not available".

/Table 11

Table 11 Area for which Draft Power is not Available Compared with the unused Cultivable Area in the Provinces of Santiago and Valparaiso

| No. of tenth | Area without draft power a/ (hectares) | Area considered as cultivable by farmers and which was left in natural pasture in 1951-52 b/ | | | Percentage of cultivated land lacking draft power for cultivation |
|---|---|---|---|---|---|
| | | Irrigated | Unirrigated | Total | |
| | A | B | C | D | $\frac{A}{D} \times 100$ |
| 1 | 225 | 12 | 299 | 311 | 72 |
| 2 | 100 | 3 | 120 | 123 | 81 |
| 3 | 78 | 4 | 113 | 117 | 67 |
| 4 | 18 | 1 | 70 | 71 | 25 |
| 5 | 221 | 56 | 224 | 280 | 79 |
| 6 | 207 | 19 | 236 | 255 | 81 |
| 7 | 498 | 262 | 252 | 514 | 97 |
| 8 | 153 | 97 | 157 | 254 | 60 |
| 9 | 2,991 | 1,869 | 2,399 | 4,268 | 70 |
| 10 | 18,516 | 816 | 28,343 | 29,159 | 63 |
| | 23,007 | 3,139 | 32,213 | 35,352 | 65 |

a/ This column represents the surplus of total cultivable area on the estimated capacity of draft power available in each property.

b/ Only represents a part of the cultivable area - in accordance with the opinion of the farmers themselves - which for different reasons was left under natural pasture during the agricultural year mentioned.

into the smaller properties. Thus, in farms with gross productive values lower than 104 thousand pesos, which together form a little more than 40 per cent of the total number of properties, it was found that the only elements used, other than those strictly confined to manual labour, were the plough, the wooden harrow and some type of grinder worked by hand. As the size of the property increases, some progressive farmers are found who have introduced small types of equipment and use it with good results. Already in Group No. 5 there are three landlords who possess small tractors for the cultivation of fruit orchards and vegetable areas. Other farmers in this same Group, a total of 5, have either grass cutters, ploughs of animal draft or grain harvesters. One of them possesses a stationary thrasher for his own use and to be rented to other farmers. Groups 6 and 7 are mechanized more or less to the same extent, and only landlords with a gross productive value above 480 thousand pesos have made larger investments in agricultural machinery of different types.

/Separating some

Separating some of the work, it is considered 1/ that, in Group 8, between 45 and 50 per cent of the work of preparing the soil is carried out by tractor. In the two higher Groups this proportion rises to a little over 60 per cent.

Harvesting and thrashing of cereals is entirely mechanized on the majority of the farms which grow these crops to any extent. Only in isolated cases are a few farms found where reaping is still carried out by hand. 35 per cent of the properties which possess or hire harvest machines for cereals work with automotive power or combined harvesters. On the other hand, 78 per cent of the properties belong to the Groups 9 and 10, which cultivate grain crops, possess their own machinery, and only 22 per cent hire it either from the Corporación de Fomento or from neighbouring properties. Of the other kinds of agricultural work, only those relating to the sowing of grain crops, sheep-rearing, storing in silos and disinfecting of tree plantations are worthy of mention as mechanized. Apart from these, only isolated estates are to be found where machinery is used to a fuller degree. It was found that only on less than 1 per cent of the properties belonging to these two groups (7 farms) was the work of farming — sowing, tilling, fertilizing, fumigation, harvesting and selection - carried on entirely by machinery. Milking-machines are used in comparatively few dairies; modern cutting and stacking-machinery for haymaking is less common, and machinery for filling and emptying barns has not yet made its appearance in the zone.

## CHAPTER IV. Use of the Land

According to information obtained from the Dirección General de Impuestos Internos, the agricultural properties of more than one hectare in extent in the provinces of Santiago and Valparaiso, would cover an area of somewhat more than 2,040 thousand hectares. The sample studied on a basis of 5 per cent of the total area, included 401 properties of various sizes above one hectare, which in all covered 101,056 hectares, that is, almost exactly 5 per cent of the figure corresponding to the area occupied by farming estates in both provinces.

Of the sample area, only 54 per cent (54,326 hectares) is considered by the landowners to be arable land capable of cultivation. The remaining 46

1/ On the basis of the "optima" coefficients of capacity assigned to the draft power in the estimates of the preceding section.

per cent is taken up by natural and artificially planted woods, barren soil, mountains, water surface, roads, buildings, etc. (See Table 12 and plate 6).

The area fit for cultivation was not fully utilized in the agricultural year 1951-52, for sown crops and plantations, since 65 per cent of it (35,352 hectares) was left under natural pasture; an additional 4 per cent (1,955 hectares) was left to lie fallow in preparation for sowing in the year 1952-53, and only the remaining 31 per cent (17,019 hectares) was cultivated with cereals, row crops, dry pulse crops, orchards and vineyards, artificially planted fodder crops, and so on.[1/]

On analysing in more detail the area fit for cultivation, it is to be observed that 30 per cent of it is irrigated by systems which for the most part originate in the numerous rivers which cut through the region from east to west, next in reservoirs for storing rainwater, [2/] and, on a very small scale — as an experiment in fact — in deep wells worked with pumps. Of the remaining area fit for cultivation, 70 per cent corresponds exclusively to soil which has no immediate possibility of being irrigated, and where dry soil agriculture is practised on a comparatively small scale. This ground is chiefly left under natural pasture. To make this type of land fit for irrigated agriculture would necessitate considerable capital outlay, which normally is not within the means of the owner of a large property, and still less within that of the smallholder.

On a more thorough examination of Table 12, it is noticeable that, on an average, the properties belonging to the four groups with the lowest gross production value have a total area which can be used, slightly larger than the four groups of the highest gross production values. Thus, while the former have 61 per cent of their total area catalogued as fit for cultivation, the latter have only 55 per cent. The two middle groups - 5 and 6 - present a very erratic picture owing to the presence of two properties of more than 1,400 hectares of hilly country, with only small areas fit for cultivation. In these two groups full use can be made of only an average of 21 per cent of their total area.

1/ According to the most recent data -- Agrarian Plan 1942-43 — the land surface of Chile amounts to 74 million hectares, of which 19 million 26 per cent) are agricultural land, 12 million (17 per cent) are planted with forests and 42 million (57 per cent) are barren. Of the agricultural area, 17 per cent is under cultivation, 15 per cent is natural pasture and 68 per cent consists of thickets or clearings where regrowth is beginning, etc. There is no information on the cultivable area, and it only appears that 6 per cent of the agricultural area of the country is under any system of irrigation.

2/ Almost all these reservoirs have been built due to private efforts.

/Table 12

Table 12 Use of the Land on 401 Properties Situated in the Provinces of Santiago and Valparaiso

(Distribution according to the estimated gross value of production)

| | Total area of 401 properties | Cultivable Area[a] | | Area cultivated | | Cultivable area | | Area lying Fallow | | Afforested area |
|---|---|---|---|---|---|---|---|---|---|---|
| | | b/ | c/ | b/ | c/ | b/ | c/ | b/ | c/ | |
| 0 | 107 | - | - | - | - | - | - | - | - | - |
| 1 | 468 | 16 | 319 | 4 | 13 | 12 | 299 | - | 7 | 13 |
| 2 | 532 | 19 | 212 | 16 | 59 | 3 | 120 | - | 33 | 23 |
| 3 | 303 | 46 | 157 | 42 | 37 | 4 | 113 | - | 7 | 25 |
| 4 | 292 | 78 | 127 | 77 | 38 | 1 | 70 | - | 19 | 36 |
| 5 | 1,986 | 186 | 391 | 128 | 111 | 56 | 224 | 2 | 56 | - |
| 6 | 3,407 | 203 | 360 | 184 | 68 | 19 | 236 | - | 56 | 459 |
| 7 | 1,496 | 555 | 453 | 293 | 115 | 262 | 252 | - | 86 | 381 |
| 8 | 2,790 | 802 | 350 | 699 | 162 | 97 | 157 | 6 | 31 | 762 |
| 9 | 16,245 | 4,015 | 3,627 | 2,126 | 940 | 1,869 | 2,399 | 74 | 288 | 1,504 |
| 10 | 73,430 | 10,190 | 32,220 | 8,955 | 2,952 | 816 | 28,343 | 365 | 925 | 78 |
| Totals | 101,056 | 16,110 | 38,216 | 12,524 | 4,495 | 3,139 | 32,213 | 447 | 1,508 | 3,281 |

a/ According to estimates of the farm operators.

b/ Irrigated

c/ Unirrigated

A very different situation appears on comparing the total area fit for cultivation with that fit for irrigated cultivation within each group, as in this case it is the properties of which the standard of production is low that have the smaller proportion of their cultivable area under irrigation, while those which give a bigger yield, especially Groups 6 and 7, are irrigated on a much larger scale. Indeed, while Groups 1 and 2 only have, on an average, 6 per cent of their cultivable area under irrigation, Groups 9 and 10 have 28 per cent. On the other hand, the intermediate Groups are those in the best position, since 5 and 6 have 34 per cent of their cultivable area under systems of irrigation, and 7 and 8 have as much as 63 per cent.

Irrigated Soil

The provinces of Santiago and Valparaiso are in a privileged position in comparison with the rest of the country, as far as their proximity to the principal markets for consumption is concerned. Moreover, they have at their disposal a road network, which, while far from complete or of the best standard,

/is nevertheless

is nevertheless one of the best in the country. If to this availability and the accessibility of markets is added the fact that Chilean agricultural production shows a deficit, owing, among other causes, to the shortage of irrigated land suitable for cultivation, it is logical to expect that the maximum use be made of the existing irrigated area.

The results of the enquiry showed the existence of a different situation, as only 78 per cent of the irrigated area fit for cultivation was used for crops in the year 1951-52, and the remaining 22 per cent was not properly worked. On one hand, 3,139 hectares (19 per cent of the irrigated area fit for cultivation) were left under natural pasture and, on the other, 447 hectares (3 per cent of the total amount) were ploughed and left to lie fallow. Such a waste of land is due to numerous reasons, which it will be attempted to establish with some degree of accuracy.

It was verified that 72 per cent of the properties, which had some irrigated land at their disposal, cultivated all of it, though in very varying degrees of intensity. Only the remaining 28 per cent(80 holdings), left land not properly utilized. Some of these properties were to be found on the very outskirts of Santiago.

Irrigated Soil under Natural Pasture and Lying Fallow

Returning to the Groups based on the estimated gross value of production, it is to be noticed that on the small farms the irrigated area is almost entirely exploited, (see Table 13), since in the first four groups, 80 per cent of the holdings with irrigated soil used the whole of it for crops. The remaining 17 per cent (7 farms) left only small areas under natural pasture. In this sector only one property was abandoned.

In the intermediate groups, 5 and 6, the proportion of holdings with irrigated natural pasture and fallow land increased to 26 per cent (17 farms).

As the size of the farms increased, it was found that the proportion of holdings where full use was not made of the irrigated land grew larger as well. Thus, in the two groups of properties with the greatest gross production value, more than half of them, in 1951-52, left irrigated areas under natural pasture or lying fallow.

/Table 13

Table 13. Number of Properties and Area of Cultivable Irrigated Land Kept Under Natural Pasture or Lying Fallow

| Number of the group | Number of properties in each group | Number of properties with irrigated land | Number of holdings under natural pasture or lying fallow | B/A x100 Percentage | Cultivable Irrigated area (Hects.) | Irrigated area under natural pasture and lying fallow (Hects.) | E/D x100 Percentage |
|---|---|---|---|---|---|---|---|
| | | A | B | C | D | E | F |
| 1 | 41 | 5 | 1 | 20 | 16 | 12 | 75 |
| 2 | 41 | 15 | 2 | 13 | 19 | 3 | 16 |
| 3 | 41 | 28 | 3 | 11 | 46 | 4 | 9 |
| 4 | 41 | 36 | 1 | 3 | 78 | 1 | 1 |
| 5 | 41 | 29 | 8 | 27 | 186 | 58 | 31 |
| 6 | 41 | 35 | 9 | 26 | 203 | 19 | 9 |
| 7 | 41 | 34 | 8 | 24 | 555 | 262 | 47 |
| 8 | 41 | 39 | 12 | 31 | 802 | 103 | 13 |
| 9 | 37 | 33 | 19 | 58 | 4,015 | 1,889 | 47 |
| 10 | 32 | 32 | 17 | 52 | 10,190 | 1,235 | 12 |
| TOTALS | | 286 | 80 | 28 | 16,110 | 3,586 | 22 |

/There is

There is a striking increase, in absolute numbers, in the area which is not properly exploited by these Groups (9 and 10), since the two of them together account for 87 per cent of the total amount of land left in these conditions in the agricultural year with which we are concerned.

On analysing the causes of this situation, it was found that several of them were fully justifiable, since the cultivation of some types of land, -- infertile (173 hectares), eroded or saline (78 hectares), lacking in water for irrigation (424 hectares), [1] subject to flooding (158 hectares) or on properties which had no adequate means of communication for the transport of their products to the market, (16 hectares), would have proved uneconomical. Nevertheless, only 849 hectares (24 per cent of the total irrigated area under natural pasture and lying fallow) were left uncultivated for these reasons.

A variety of causes, for some of which landlords and managers were exclusively responsible, hindered a better working of the remaining 2,737 hectares of irrigated soil.

It is undoubtedly of prime importance to the agricultural economy of the zone and of the country in general that 1,275 hectares, that is, 36 per cent of the total area under natural pasture or lying fallow, and 8 per cent of the total irrigated area fit for cultivation, should be found to have been left uncultivated solely through neglect or lack of interest on the part of owners. [1] It is also important to state that the greater part

---

1/ Both in the case of lack of water and in that of eroded soil, only half the uncultivated area can be taken as justifiable for these reasons, as they may be overcome by using satisfactory technical methods.

2/ This conclusion was reached by a process of elimination of factors. In those of the holdings surveyed where the existence of irrigated land under natural pasture was confirmed, the operator was asked what were the reasons that had prevented him from cultivating that area. When various factors of production which he had within his reach, to his administrative capacity and to the general state of the property, the quality of the kinds of soil and the availability of water for irrigation. When, at the end of the process of elimination, doubts still existed, the cause was given as "no apparent reason", but in the majority of cases it was possible to come to precise conclusions as to the owner's lack of interest in exploiting the whole of his irrigated soil.

of this area (87 per cent of the total) is to be found on very large properties, which, as a general rule, reach high levels of production without the need to cultivate the whole area at their disposal. (See Table 14).

The lack of water for irrigation in the months of greatest need prevented the cultivation of 24 per cent (848 hectares) of the area mentioned, but, as in the preceding case, this deficiency could have been overcome by technical methods, or failing that, by growing winter crops. It is a matter of universal knowledge that, in general, unsatisfactory use is made of the water available for irrigation. This being so, it can be stated that, for normal soil conditions, if a rational use were made of the existing water resources, a larger area could be irrigated. The mere practice of nocturnal irrigation, or failing that, of storing reserves, at present wasted during the night, would solve part of the water shortage problem.

Next in importance among the causes of deficient exploitation of the irrigated soil, came the lack of operating capital. There followed the ignorance of agricultural techniques displayed by some farm operators or administrators, since 7 per cent of the area (263 hectares) under natural pasture and lying fallow was left in that condition owing to ignorance and erroneous beliefs on the part of those responsible for the working of this land. Some of this area remained under natural pasture because it was considered that these provided a better yield than cultivated crops throughout the winter months, and therefore supplied larger quantities of animal fodder. Other areas - normally fertile soils - was left fallow through ignorance of the advantages of crop rotation and the belief that soil must "rest" if it is to maintain its fertility. Such farm operators were also ignorant of the advantages of soil analysis and the use of fertilizers.

It is somewhat strange that lack of capital should have prevented the cultivation of only 12 per cent of the area (424 hectares), since normally this is held to be the main reason for agricultural deficiencies. Nevertheless, only six farmers specifically indicated lack of capital as the cause which prevented them from making better use of their land. This factor attains greater importance in the case of unirrigated soils and will be mentioned later.

/Table 14

Table 14 Cultivable Irrigated Area Kept Under Natural Pasture or Lying Fallow, and Reasons Which Hindered its Better Exploitation

| Reason | Number of properties | Number of hectares | Percentage of total number of hectares under natural pasture or lying fallow |
|---|---|---|---|
| Owners' lack of interest | 28 | 1,275 | 35.5 |
| Lack of water for irrigation | 15 | 848 | 23.7 |
| Lack of operating capital | 8 | 424 | 11.8 |
| Ignorance of agricultural techniques | 12 | 263 | 7.3 |
| Very poor or saline soils | 4 | 172 | 4.8 |
| Lack of drainage | 2 | 156 | 4.4 |
| Erosion | 2 | 155 | 4.3 |
| No apparent reason | 4 | 139 | 4.0 |
| Shortage of draught power | 1 | 111 | 3.1 |
| Shortage of labour | 3 | 24 | 0.7 |
| Shortage of transport | 1 | 16 | 0.4 |
| Totals | 80 | 3,586 | 100.0 |

/Scarcity of

Scarcity of labour (24 hectares) and lack of draft power (111 hectares) prevented the cultivation of 135 hectares distributed among 4 properties.

It was not possible to establish accurately the reasons for which 139 hectares remained under natural pasture, since the replies obtained in this connexion, when forthcoming, were not clear.

Land Tenure and Type of Administration, and their Influence on the Utilization of Irrigated Soil

With the aim of determining which are the sectors that make best use of the irrigated soil at their disposal, an analysis was made of the available information in this connexion according to the type of land tenure and the type of administration, to which were subject the holdings that possessed natural pasture and fallow land in irrigated areas.

It was found that it was in the sector where the farms are operated by their owners, either directly or through managers, that the worst use was made of their irrigated arable area, since 28 per cent of it was maintained without crops.[1/] The holdings occupied by rent-paying tenants made the most complete use of their arable irrigated soil. The need of operators of this class to make the maximum use of the properties they rent, to obtain in this way a reasonable profit on the rent they have to pay and on their investment, compelled them to keep 83 per cent of their irrigated area planted and sown. Consequently, only 17 per cent of this area remained under natural pasture. Finally, farms operated entirely by share croppers were those which made the best use of the cultivable soil at their disposal, since they left only 2 per cent of it unsown. The nature of these share-cropper contracts was certainly what prevented land from being left to the fallow, under this system of land tenure.[2/]

The influence which the type of administration has on the degree of intensity of agricultural exploitation was also established. 61 per cent of the irrigated arable area corresponds to holdings personally and permanently administrated by the operator and an additional 37 per cent to properties managed by agents or stewards who are more or less closely supervised by the operator on his occasional visits. Finally, the

1/ Owners operate 83 per cent of the total irrigated area suitable for cultivation.

2/ The holdings operated by share croppers had under their administration only 3 per cent of the total arable and irrigated area.

/remaining 2

remaining 2 per cent belong to estates owned by absentee landlords - excluding farms and large properties operated by limited liability companies, included in the first sector - who have delegated their management to third parties over whom they exercise only a very superficial control.

While on properties managed directly by the farm operator, only 24 per cent of the total area was not used for crops. In those managed jointly by the steward and owner this percentage rose to 30 per cent, and in those of absentee landlords reached as much as 43 per cent.

The figures recorded cannot be more eloquent. Even where there may be attenuating circumstances, it is clearly evident that the direct attention of the operator, whether he be owner, rent-paying tenant or share-cropper, influences the more complete utilization of the irrigated soil. In contrast properties allocated to the management of a baliff or steward - not always responsibly carried out - have a high proportion of wasted arable land.

Irrigated Area Under Cultivation

The limitations of the present survey, as far as its scope and aims were concerned, did not permit a detailed examination to establish the existing types of operation and the exact area which they occupy in both provinces. However, it was possible to determine, firstly, the area covered by the principal groups of crops, and, secondly, to classify the properties according to their chief source of income. This was done to acquire a more precise knowledge of the influence exercised by each crop, or group of crops, on the agricultural economy of the zone.

It has already been printed out, at the beginning of this chapter, that 78 per cent (12,524 hectares) of the irrigated arable area was taken up by crops during the agricultural year 1951-52.

The crops which occupied the largest area of irrigated land were lucern and clover, the former predominating. Given the proximity of these artificial meadows to the big urban centres of the country, their main purpose is that of supplying fodder to the milk stock which constitutes one of the most important branches of agricultural activity in the zone. (See Table 15.) This area with the partial assistance of the unirrigated natural pasture, also has to supply fodder for the large herds of fat stock

/Table 15

Table 15 Distribution of Crops in Irrigated Land on 397 Properties in the Provinces of Santiago and Valparaiso

| Crops | Area in hectares | Percentage of the total irrigated area under cultivation in hectares |
|---|---|---|
| Grass crops | 3,952 | 32 |
| Row crops | 2,940 | 23 |
| Green vegetables | 1,153 | - |
| Maize | 812 | - |
| Beans | 382 | - |
| Potatoes | 378 | - |
| Sunflower | 215 | - |
| Wheat | 1,862 | 15 |
| Fruit | 1,122 | 9 |
| Vines | 691 | 6 |
| Barley | 783 | 6 |
| Other products | 247 | 2 |
| Resident farm labourers allotments | 922 | 7 |
| Totals | 12,524 | 100 |

/and yoke

and yoke cattle which are bred in the region. Lastly, although on a smaller scale, such crops are used for making hay. An important part of the hay leaves the properties, either for consumption in the city of Santiago or for dispatch to the northern and southern zones of the country. In all, 3,952 hectares of irrigated land [1] were used, forming 32 per cent of the irrigated area under cultivation.

The second place was occupied by row crops-vegetables and sunflowers-with 2,940 hectares (23 per cnet). [2] Within this class of crops came green vegetables (1,153 hectares), which were the most important, followed at some distance by maize (812 hectares). Beans, potatoes and sunflower each occupied much smaller areas - 382,378 and 215 hectares respectively. Wheat from irrigated land was sown over 1,862 hectares, that is, in 15 per cent of the irrigated area under cultivation.

Fruit-trees covered 1,122 hectares (9 per cent of the irrigated area under cultivation), vineyards 691 hectares (6 per cent) and barley 788 hectares (6 per cent). A further 247 hectares were planted with various other crops, such as, in order to importance, hemp, oats for grain, and, on a very small scale, rice. Finally, the remaining 922 hectares (7 per cent) were handed over to tenants and employees as allotments of land for their exclusive use. The whole of this last area was under crops which it was not possible to identify, since the farm operators, as a general rule, do not know to what use their tenants put the land which they receive as allotments.

From an economic viewpoint, and on the basis of an estimated gross production value, it was the milk-producing stock which, consuming grassed grain and other fodder, rose above all the other live-stock, producing more than 73 millions pesos. (See Table 16.) Of the farms(with this source of wealth) surveyed, 35 per cent (140 holdings) kept 4,880 milch cows for commercial purposes, that is, for the sale of milk for public consumption. [3] The value of row crops, as a whole, reached a higher level

1/ In this area are included oats grown for fodder and maize for storing in silos.

2/ If to the irrigated area is added the unirrigated area under cultivation, wheat would take second place, in accordance with the area cultivated.

3/ This number does not include the cows which tenants and landowners keep to provide milk for their own consumption.

Table 16 Irrigated Properties and Details of Crops, with Production Value of Each

| Class of produce | Number of properties on which each class of produce is cultivated a/ | Percentage of total number of holdings | Value of produce in millions of pesos |
|---|---|---|---|
| Dairy produce | 140 | 35 | 73 |
| Vineyards | 50 | 12 | 48 |
| Fruit trees | 160 | 40 | 44 |
| Row crops | | | |
| Fresh vegetables | 110 | 28 | 43 |
| Maize, beans, sunflower | 121 | 31 | 28 |
| Potatoes | 80 | 30 | 15 |
| Wheat | 76 | 26 | 28 |
| Beef cattle | 143 | 36 | 15 |
| Poultry-rearing | 7 | 2 | 15 |
| Barley | 29 | 7 | 10 |
| Other crops | 8 | 2 | 3 |

a/ Includes the number of properties on which such crops are cultivated under each head, counting them separately. All the irrigated farms operate two or more types of crop or produce.

than the foregoing - 86 million pesos - but considered individually the value of each species was lower. For instance the production of green vegetables reached a value of 43 million pesos, that of maize, beans and sunflower reached 28 million and that of potatoes about 15 million pesos. 26 per cent (102 farms) of the holdings surveyed cultivated one or more hectares - 1,409 altogether - of maize, beans or sunflower; 15 per cent (61 farms) devoted 378 hectares to growing potatoes, and 26 per cent (103 holdings), 1,153 hectares to frech vegetables of various types, mainly tomatoes and onions.[1/]

Vineyards and orchards, although occupying a comparatively small area, recorded a production which altogether amounted to 92 million pesos - 48 million from the vineyards and 44 million from the fruit-trees. These last two crops have an importance almost as great as the row crops, since 38 per cent of the properties surveyed had one or more hectares planted with fruit-trees. Irrigated vineyards, on the contrary, were found only in 6 per cent of the total number of properties (25 farms).

Next in order of importance follow beef cattle, with a value of over 15 million pesos. Production was considerably higher than that for sheep (10 million pesos), since beef cattle included animals for breeding, slaughtering and for the yoke; the latter after a reasonable period of service, are butchered for consumption. Of the total number of properties, 36 per cent (143 farms) kept 13,740 head of breeding and fat stock and 1,208 head of yoke animals. It must be noted, however, that a considerable proportion of this cattle grazes exclusively on unirrigated land, and that in reality it should be dealt with elsewhere. But in view of the impossibility of making a complete separation, especially in the case of those large properties where the cattle graze on both irrigated and unirrigated pastures, the whole of the live-stock has been included in this section.

Commercial poultry-breeding is also of considerable importance, since, within the sample area, 7 properties were found of which the gross value of production exceed 15 million pesos.

1/ For purposes of this estimate an independent census was taken of the holdings on which each kind of produce was to be found; therefore, many of the farms appear on repeated occasions, since they produced crops belonging to all three groups.

Irrigated agriculture in the provinces of Santiago and Valparaiso is characterized by a fairly wide degree of variety, except for certain produce - fruit-growing and vineyards - or in specific areas - such as the tomato and garlic-growing zones of Limache and La Calera respectively. It is carried on within the limits of strictly commercial lines, and is subjected to a programme of acrop rotation determined, for the most part, experimentally.

In the irrigated agriculture of the region there is a widespread custom of producing two or more crops together - cereals with lucern or clover, maize with beans, fresh vegetables or grass crops sown between the rows of trees in orchards, and so on, - with the aim, according to present opinions, of obtaining bigger yields and making better use of the arable area. In the agricultural year 1951-52, 585 hectares were cultivated in this manner, that is, almost 5 per cent of the irrigated area under cultivation.

In some very fertile soils, and where climatic conditions are favourable, -- principally in the area of the Aconcagua Valley - it is customary to sow two and three crops annually on the same ground. Fresh vegetable crops, particularly those of rapid growth, are those which lend themselves best to this practice. Altogether this system was followed in 247 hectares of land.

Unirrigated Land

Very different from that of the irrigated land, is the picture presented by the arable unirrigated areas. The former are, for the most part, flat or only slightly sloping; their high value causes the owners to acquaint themselves with them in detail and with comparative accuracy. The unirrigated areas are much more extensive, varied in their topography and used for cultivation on a limited scale. For this reason their owners are less familiar with them. Moreover, the landowners display a very elastic standard of judgment in their estimates of such areas and their possibilities for cultivation, since it is, in general, purely experimental in character. 1/

1/ From a strictly technical viewpoint, a considerable proportion of the area indicated by the results of the enquiry as arable and cultivated, ought to be considered as "unfit for cultivation", owing either to its excessive slopes, to its state of "exhaustion" or to the degree to which it is eroded. However, for the purposes of the present analysis, the information was used in the form in which it was submitted by individual farmers.

The arable unirrigated area in the 401 properties studied, comprises 38,216 hectares, that is 70 per cent of the total area suitable for cultivation.

The adverse rainfall conditions, and the smaller and more hazardous production which its cultivation can offer, apart from many other reasons, are an inducement to use a high proportion of such areas for natural pasture. In fact, 84 per cent (32,213 hectares) of the arable unirrigated area was not ploughed in the year to which the present survey refers.

12 per cent, that is, an area of 4,495 hectares, was sown chiefly with wheat, barly, lentils and chickpeas. Cultivated dry-soil fodder was found only in a more or less experimental form, since on not more than two holdings were crops of this type cultivated fairly successfully over 73 hectares. The three varieties forming these cultivated grasslands were: lucern, tuberous Phallaris and Burnet. Finally, 1,508 hectares (4 per cent) were left lying fallow in the months of April and May of 1952.

Unirrigated Land under Natural Pasture

In contrast with what was observed in the case of the irrigated properties, it is among those of the lowest production values, that is the holdings corresponding to Groups 1 to 3, among which the highest proportion of farms with unirrigated land is found. The use made on them of the arable area does not substantially differ from that in the other groups. Taking into account all the holdings which have unirrigated areas suitable for cultivation, it was seen that 77 per cent of them (122 farms) had part or the whole of their area under natural pasture during the agricultural year 1951-52. (See Table 17.) Only the remaining 23 per cent had the whole of their land either under crops or lying fallow.[1/]

Nor can much be said as to the influence of the size of the enterprise upon the degree to which the arable unirrigated land is operated, since a comparison between the area suitable for cultivation and that left under natural pasture, according to the size of the property, reveals no definite tendency from which to draw conclusions. 94 per cent of the unirrigated area suitable for cultivation is to be found in the two groups which record the highest gross production values (Groups 9 and 10).

1/ In contrast to the treatment given to the arable irrigated area, the fallow land have been separated here from those under natural pasture, since from a technical point of view, it is considered that the former are indispensable for dry soil, as they not only replace the necessity for rotation of crops, but also constitute the only way of saving some of the winter moisture. This is a badly-applied principle of "dry farming".

/Table 17

Table 17. Number of Properties with Arable Unirrigated Areas in Relation to Those which Keep a Part of such Areas under Natural Pasture

| Number of group | Number of properties with arable unirrigated areas | Number of properties with unirrigated natural pasture | $\frac{B}{A} \times 100$ Percentage of properties with arable unirrigated areas with natural pasture | Arable Unirrigated area | Area of unirrigated natural pasture | $\frac{E}{D} \times 100$ Percentage of unirrigated arable area to natural pasture |
|---|---|---|---|---|---|---|
| | A | B | C | D | E | F |
| 1 | 34 | 29 | 85 | 319 | 299 | 94 |
| 2 | 36 | 23 | 64 | 212 | 120 | 57 |
| 3 | 15 | 13 | 87 | 157 | 113 | 72 |
| 4 | 10 | 7 | 70 | 127 | 70 | 55 |
| 5 | 14 | 12 | 86 | 391 | 224 | 57 |
| 6 | 7 | 5 | 71 | 360 | 236 | 66 |
| 7 | 9 | 7 | 78 | 453 | 252 | 56 |
| 8 | 6 | 3 | 50 | 350 | 157 | 45 |
| 9 | 11 | 8 | 73 | 3,627 | 2,399 | 66 |
| 10 | 16 | 15 | 94 | 32,220 | 28,343 | 88 |
| TOTALS | 158 | 122 | 77 | 38,216 | 32,213 | 84 |

/Table 18

Table 16 Arable Unirrigated Area under Natural Pasture, and Reasons which Prevented its Cultivation.

| Justifiable Reason | Number of properties | | Number of hectares | Percentage of total number of hectares und natural pasture |
|---|---|---|---|---|
| Lack of irrigation | 31 | | 18,017 | 55.9 |
| Poverty of soil | 19 | | 3,183 | 9.9 |
| In rotation under natural pasture | 4 | | 398 | 1.2 |
| Erosion | 21 | | 814 | 2.5 |
| Lack of transport | 5 | | 157 | 0.5 |
| Lack of drainage | 2 | | 121 | 0.4 |
| | | 82 | 22,690 | 70.4 |
| Unjustifiable Reasons | | | | |
| Owner's lack of interest | 13 | | 6,762 | 21 |
| Lack of capital | 14 | | 1,564 | 418 |
| Shortage of draft power | 3 | | 565 | 1.8 |
| Shortage of labour | 3 | | 459 | 1.4 |
| Ignorance of techniques | | | 126 | 0.4 |
| No apparent reason | 1 | | 47 | 0.1 |
| | | 40 | 9,523 | 29.5 |
| Totals | | 122 | 32,213 | 99.9 |

/It is also

It is also worthy of note that in the case of the irrigated area, it is the properties belonging to those two groups which together contain 95 per cent of the arable area which was kept under natural pasture in the agricultural year 1951-52.

On the other hand, on analysing the causes for these lands being left uncultivated, it is seen that 22,690 hectares, that is, 70 per cent of their total, remained in that state for fully justifiable reasons. (See Table 18.) In fact, 18,017 hectares (56 per cent of the area under unirrigated natural pasture), were not ploughed because it was considered that their cultivation, without irrigation, and with the technical knowledge of most of the operators in its present condition, would have been uneconomical; 3,581 hectares (11 per cent) were poor or totally infertile soil, and an additional 1,092 hectares could not be exploited, owing either to erosion (2 per cent) to the lack of means of communication for carrying the produce to market (0.5 per cent), or to their need for drainage (0.4 per cent). Nevertheless, an appreciable proportion of these soils could be made well utilized for unirrigated fodder crops, which are giving such good results on properties where experiments with them have been carried out.

Only 9,523 hectares, that is, 30 per cent of the unirrigated area under natural pasture, were left uncultivated for causes for which a short-term solution could have been found. Most of this area was left uncultivated owing to lack of interest on the landlord's part. For this reason 6,762 hectares were left uncultivated (21 per cent of the whole). 1/ Next in importance came a lack of operating capital and the shortage of draft power, reasons which prevented the cultivation of 1,564 and 565 hectares (5 and 2 per cent) respectively. Finally, owing to a shortage of labour, 459 hectares were not cultivated (1.4 per cent), and 126 hectares through ignorance of agricultural techniques.

The fact that so few hectares were left under natural pasture due to ignorance of agricultural techniques is not surprising, since this factor was taken into consideration only for areas where cultivation was technically practicable.

1/ In cataloguing the reasons for not cultivating such land, the same system was used as in the case of the irrigated area under natural pasture.

Land Tenure and Type of Administration, and their Influence on the use of the Arable Unirrigated Areas

The farms operated by their owners covered 94 per cent of the total unirrigated area suitable for cultivation and those operated by rent-paying tenants and share-croppers only 4 and 2 per cent respectively.

The influence of land tenure on the utilization of unirrigated land is not so notable as in the irrigated areas, but differences do exist which confirm the conclusion reached earlier that it is the rent-paying tenant and share croppers who make the fullest use of the arable area at their disposal. Indeed, while the farms operated by their owners kept 85 per cent of their arable area under natural pasture, the rent-paying tenants and share-croppers tilled a larger proportion of their land, leaving only 69 and 61 per cent, respectively, unploughed.

Similar results were obtained with respect to the influence exercised by the type of administration on the fullest use of the arable area. On properties managed directly by their owners, only 71 per cent of the arable unirrigated area was left under natural pasture, while on those managed by agents and stewards, but under the owner's strict supervision, this proportion rose to 89 per cent. The farms handed over to the exclusive responsibility of agents (those belonging to entirely absentee landlords) were those which left the biggest proportion of their arable area unworked. In these cases natural pasture covered as much as 92 per cent of the arable area.

Dry Soils under Cultivation

The scarcity and the irregular distribution of the rainfall, more than any other factor, limits unirrigated agriculture to the cultivation of only a few types of produce, so that the farmer, as a general rule, is not able to vary his produce from unirrigated areas and still less to establish programmes of crop rotation which could allow him to maintain the fertility of his soil.

The most usual form of cultivation consists in sowing a cereal at intervals of one, two and at times three years — according to the yields — and then to leave those parts of his land under natural pasture for a time which may vary between 2 to 5 years. To begin a new cycle, the land is ploughed and left fallow for a period of less than a year.

1/ This proportion is certainly lower than in actual fact, as it does not take into account the area of wheat grown by the resident farm labourer.

/In some

In some regions where the climate is milder and conditions of moisture permit - the coastal zone and the region to the south of the River Rapel - the crop rotation is begun by sowing chick-peas or lentils. Row crops are planted on a very small scale, and only in places where the natural humidity of the soil allows it.

The most important produce of the unirrigated areas was that of wheat since it accounted for 44 per cent (1,990 hectares) of the cultivated area.[1/] Rather more than half the properties possessing arable unirrigated land utilized one or more hectares for wheat crops. Next in importance followed barley, which occupied only 10 per cent (456 hectares) of the area sown. Chickpeas and lentils were grown on 35 properties, and covered an area of 307 hectares (7 per cent). Among row crops, a certain importance was given to the sunflower, which was sown on two farms and occupied 137 hectares.

The growing of fresh vegetables appeared only on a small scale, in limited areas with natural moisture, or where some possibility exists of watering with the help of hillside springs or of private reservoirs.

Vineyards covered a small area - somewhat more than 1 per cent - but are of importance since they offer the largest yields among all those grown on unirrigated soil. As in the case of the vegetable allotments, they are cultivated only in sheltered situations and where the soil has some natural humidity.

Cultivated grass crops on unirrigated soil, as previously noted, were found on two properties in a comparatively experimental form, and covering only 73 hectares. The sowing of lucern, tuberous Phallaris and Burnet may constitute one of the more immediate possibilities for improving rotation and increasing the productivity of the unirrigated areas.

Fonally, 23 per cent of the cultivated area (1,043 hectares) was handed over to the resident farm labourers as their allotments of land. Almost the whole of this area was cultivated under the various crops already mentioned. This area, however, was not included in the foregoing figures because the landlords were ignorant of the details of the crops sown on it.

---

1/ This proportion is certainly lower than in actual fact, as it does not take into account the area of wheat grown by the resident farm labourer.

Closely linked with agricultural activities on unirrigated land is sheep-rearing, which attains relative importance in the Provinces studied, and constitutes one of the principal activities in the Department of San Antonio, especially in the zone situated between the Rivers Rapel and Maipu. Only ten properties received their main source of income from sheep-rearing, but altogether 29 per cent of the properties containing unirrigated land (61 farms) bred this branch of stock commercially or for consumption.

The breeding of cattle and goats is an interesting element in dry-soil agriculture; the former as productive of animals for human consumption and the yoke, and the latter as an additional source of income from the natural pasture where the ground is steep and precipitous.

Finally, the existence of about 3,300 hectares of artificially-planted woodland must be taken into account. An important part of these trees were planted on ground which, according to generally prevailing standards, ought to be classified as fit for cultivation, but which, from a technical viewpoint, were only suitable for this purpose, as they were not fertile or ran the risk of being totally wasted, owing to erosion.

Natural Pasture and its Significance to the Economy of the Region

While it is true that the arable area left under natural pasture is used to advantage for the feeding of stock, the yield obtained from it is very limited, and signifies a loss both for the farmer who owns the land and for society. It has been calculated that an irrigated hectare under natural pasture can maintain, though not in satisfactory conditions, up to one head of cattle per hectare annually. That same hectare, sown with a fodder crop, can supply enough forage to feed satisfactorily between three and four heads. On unirrigated land, the difference is even greater, since a hectare under natural pasture can feed between 0.1 and 0.3 head of cattle, that is, can produce a gross value fluctuating between two hundred and six hundred pesos. That same hectare, artificially cultivated with unirrigated fodder crops or cereals, would yield approximately 5,000 and 8,000 pesos respectively.

This information and the size of the unirrigated areas in this zone, and in Chile as a whole, are a clear indication that research to discover fodder cropps or cereals which can grow freely on such areas, offers very

substantial possibilities for increasing production. The study of such fodder crops has already given practical results, but it is necessary to intensify such programmes, to provide the required seed and to acquaint farmers with the economic advantages of this type of crop in dry-soil areas.

Of the 3,586 irrigated hectares left under natural pasture or lying fallow, and of the 32,213 hectares of dry soil under natural pasture, 849 irrigated hectares and 22,690 unirrigated hectares were left uncultivated for fully justifiable reasons (within the limits of the present technical level of the operators). These included the poverty of the soil, insufficient water supply, absence of means of communication, lack of drainage or the presence of erosion. The remainder -- 2,737 irrigated hectares and 9,523 unirrigated land - was not cultivated through lack of interest on the owner's part or on account of difficulties which might have been overcome, either by private initiative or with the assistance of the State.

The arable area, which, during the agricultural year 1951-52 was not put to proper use, is found scattered throughout the various sectors of the zone, possessing soil characteristics similar to those of the cultivated area. To establish the value of the production which might have been obtained from this land, it may be assumed that it was cultibated with the same proportion of produce as was sown or planted in the rest of the area. If, moreover, to these crops are assigned the estimated mean values used originally to determine the total amount of the agricultural and stock-breeding production of the properties surveyed, and from them is substracted the value of the natural pasture production, the result will represent the gross production value which society and the farmers failed to collect in the agricultural year 1951-52.

In accordance with the figures in Table 19, it may be observed that without big capital outlay, within the present level of techniques and using only that part of the available area suitable for cultivation of which the problems were capable of solution, the properties under survey could have increased their gross takings by rather more than 98 million pesos. As a result of a posible production, estimated at 403 million pesos, about one-fourth can be assumed to have been lost, through causes which might easily have been overcome.

/This value

Table 19 Gross Value of Yields which could have been produced by the Cultivation of the Area left under Natural Pasture in the Agricultural Year 1951-52

| Crops | Percentage of Total Cultivated with Each Type of Produce a/ | | Area which could be cultivated (in Hectares) | | Estimated Mean Value of Production per Hectares (in pesos) | | Total Value of Present Production in Millions of Pesos | | |
|---|---|---|---|---|---|---|---|---|---|
| | c/ | d/ | c/ | d/ | c/ | d/ | c/ | d/ | Total |
| Wheat | 16 | 58 | 437 | 5,524 | 15,000 | 9,000 | 6.6 | 5.0 | 11.6 |
| Extension Row Crops | 12 | 15 | 328 | 1,429 | 19,000 | 11,000 | 6.2 | 15.7 | 21.9 |
| Potatoes | 3 | - b/ | 82 | - | 40,000 | - | 3.3 | - | 3.3 |
| Vegetables | 10 | - b/ | 274 | - | 40,000 | - | 11.0 | - | 11.0 |
| Barley | 7 | 13 | 192 | 1,238 | 13,000 | 8,000 | 2.5 | 9.9 | 12,4 |
| Other annual Crops | 2 | 9 | 55 | 857 | 14,000 | 10,000 | 0.8 | 8.6 | 9.4 |
| Fruit | 10 | - b/ | 274 | - | 40,000 | - | 11.0 | - | 11.0 |
| Vineyards | 6 | 2 | 164 | 190 | 70,000 | 30,000 | 11.5 | 5.7 | 17.2 |
| Grass Crops | 34 | 3 | 931 | 285 | 8,000 | 1,500 | 7.4 | 0.4 | 7.8 |
| Totals | 100 | 99 | 2,737 | 9,523 | - | - | 60.3 | 45.3 | 105.6 |

Gross value which could be produced by cultivating the area left under natural pasture: 105.6 millions

Less value actually produced 7.1 "

Gross value by which society failed to profit: 98.5 millions

a/ Crops cultivated only by the farm operator

b/ Less than 1 per cent.

c/ Irrigated land.

d/ Unirrigated land.

/This value

This value is more or less equivalent to 8 per cent of the total value of imports, in 1951, of those foodstuffs which could be produced in the country (meat, wheat, oil-producing crops, rice, sheep, etc.)[1/]

## CHAPTER V. Lack of Interest in Agricultural Operations and its Possible Causes

In every branch of economic activity, enterprises of great efficiency exist alongside others of proven inefficiency. The former commonly make rapid progress, or, at least, remain static. The second, on the other hand, tend to decline, and, if radical changes are not made in their organization and methods of work, find themselves obliged to close down on realising their utter incapacity to cope with the manifold economic and material exigencies of any organization within a sphere of free enterprise.

In agriculture, and especially in a type of agriculture presenting its own particular features, like that of Chile, these principles are not always valid. Given the comparative abundance of land, the prevailing labour customs, according to which half of its cost is paid on a basis of "allotments" of land and "perquisites" of varying nature, the low cost of draft power, and, finally, the limited rate of capital outlay which is normally customary, holdings are frequently encountered which maintain an extremely low level of efficiency without its expressing itself in terms of losses which involve the abandonment of agricultural activity. Moreover, the natural fertility of the soil, the wide system of production, the low level of wages and the possibility of producing a large part of the necessary elements of production - draft power, seeds, foodstuffs and blood stock - allow many holdings to yield profits almost on their own, without much outlay or effort on the part of the farm operator. In other cases, the operator limits himself to producing the necessary means of existence, and only on rare occasions - when the factor represented by the soil has become impoverished or been rendered useless by abuse and erosion - does he abandon his farm.

To summarize, it can be stated that in Chile, as in other countries where agriculture is not at a highly-developed stage and where the labourer's

---

1/ In value, these imports amounted to some 1,200 million pesos.

standard of living is low, the farmer, unlike the industrialist or the owner of a commercial enterprise, sees no threat to his economic stability in the fact that his plant or property and his staff of executives are not working at full capacity. On the contrary, many farmers consider that the greater the intensification of work and the larger the investment, the greater are the risks.[1/]

The results of the enquiry into incentives to production prove at least the first part of these assertions. In fact, of the 397 properties studied, it was found that only 69 (17 per cent of the total) were, in the opinion of the research workers, working at what could be called "full capacity", within the levels of technique reached in Chilean farming.[2/] Properties in this class were found in all the Groups of our distribution, and principally in groups 7 and 8 — with gross production values varying between 260,000 and 1,260,000 pesos — where 32 per cent of them were classified as well operated farms. On the other hand, the groups which had the smallest proportion of enterprises working at full capacity, were those of the smallest properties - 1 and 2 - in which only 4 per cent could be classified in that category, and those of the biggest properties - Groups 9 and 10 - where only 16 per cent was recorded.

Among the remaining 328 properties were some for which differing reasons prevented a full and efficient utilization of the productive factors which the owner had at his disposal. For others the full productive capacity was not achieved owing to a lack of some of these factors.

It is a striking fact that in 37 per cent of the properties surveyed (147 farms), one of the principal factors which prevented full production was

---

1/ An opinion definitely expressed by several farm operators.

2/ It was considered that a property was working at full capacity when its arable irrigated area was entirely taken up with crops, and its arable unirrigated area was worked with a "normal" rotation of crops, following the types of exploitation most commonly used in each zone, and with methods of cultivation slightly superior to those considered advisable in routine agriculture.

the apathy of the farm operator.[1] Moreover, it can be determined that in 8 per cent of the total number of the units (34 farms), practically the only barrier, which obstructed a better use being made of the resources which the landlord had within his reach, was his own lack of interest.

As in the case of the arable irrigated area not used for crops or plantations, the operation of farms at sub-normal levels represents a serious loss to the economy of the country and to society. Its importance in a country where the production of foodstuffs shows a deficit is such that it is worth while analysing the problem more thoroughly in order to learn its details and the possible solutions.

The 147 enterprises, where the landlord showed apathy in farm operations, covered 22 per cent of the total area,[2] and only 15 and 16 per cent respectively of the irrigated and the unirrigated cultivated areas. On the other hand, they contain 68 per cent of the total irrigated area under natural pasture and 32 per cent of the similar unirrigated area. It is therefore clear that the lack of interest on the part of the farm operator results in a lower proportion of crops and a higher one of land of which no proper use has been made. While such farm operators left 57 per cent (2,123 hectares) of their arable irrigated area uncultivated, the remaining properties (250 farms) only left 11 per cent. In the case of the arable unirrigated areas these proportions, without including fallow land, were 89 and 82 per cent respectively.

---

1/ A farm operator was held to be apathetic in his operations when two or more of the following points were in evidence: 1) Lack of interest in defining and solving the problems affecting his production; 2) Maintenance of arable areas under natural pasture without there being any acceptable reason for his failure to till them; 3) Total absenteeism from the property; 4. Carelessness and neglect both as to crops and as to the general appearance of the property; 5. Contracting of unsuitable personnel for the administration of the property; 6) Lack of interest in investing in his property; 7) Having all the factors of production within his reach and being unwilling to make full use of them.

2/ From this group are excluded the four properties which were considered as non-agricultural and which served only for dwelling purposes.

The Origin of the Lack of Interest in Small Properties

Some of the principal causes which give rise to a lack of interest on the part of the landlord, in the case of small properties, are, without any doubt: their limited size, the poor quality of their soil and the lack of irrigation, factors which combine to reduce to a minimum the farmer's income. It was, in fact, found that in the four groups of small holdings [1/] with an estimated gross value of production of less than 104,000 pesos — 45 per cent of the operators (on 74 farms) showed little or no interest in improving or intensifying their production.[2/]

On calculating the average gross production value for these estates, it was seen to reach only 44,000 pesos each, while that same average for the other 90 properties included in the four groups rose to more than 54,000 pesos per property. If the actual gross production were known, it would be sure to involve even greater differences than this estimate, as it was verified that in every case in which there was apathy on the part of the operator, the yields were less than those of better-worked holdings, since, as a general rule, if superior methods of cultivation were not employed on these latter, at least some effort was made to improve production. Moreover, the area cultivated by the former reached an average of 0.7 hectares of irrigated and one hectare of dry soil, whereas the second cultivated rather more than a hectare of irrigated and 0.8 of dry soil. It must similarly be taken into account that more than half the soil of the first-named farms was of poor fertility and broken topography. Moreover, three-quarters of their total area was affected by either moderate or severe erosion.[3/]

---

1/ From this group are excluded the 4 properties which were considered as non-agricultural and which served only for dwelling-purposes.

2/ Within these 4 groups, in that of the smallest property, with a gross value of production up to 26,000 pesos, 61 per cent of the farm operators came within this category.

3/ Of the 773 hectares corresponding to the 74 properties in this category, 495 were affected by a moderate degree of erosion; 71 by severe erosion, and 15 were considered as entirely useless.

/Factors of an

Factors of an economic and educational nature also had much to do with this situation. In reality, of the 66 operators who worked their farms personally, 61 were countrymen with little education, many of whom, barely knew how to read and write; the other five were also countrymen, but were better educated and had a clearer notion of agricultural production and its ends. These latter, unlike the former, also had additional sources of income, either from other farms which they owned or rented or from their personal work on properties owned by other persons.

Of the 8 holdings which completed this group, six were managed and worked by persons contracted by the landlords. As in the foregoing case, all these farm operators were poorly educated, and the low wages payable on the level of income could not of course permit the contracting of more efficient labour.

The precarious physical, economic and social conditions in which the work of the farmers classified in this group has to be carried on, justifies, up to a point, their lack of interest in increasing their production. While on the one hand their want of initiative and of technical knowledge prevents them from making due use of the limited resources within their reach, on the other hand the poor fertility of the soil, the inferior yields, the reduced size of the arable area they possess and their lack of economic means with which to operate, constitute an almost impassable barrier to any attempt to intensify their production.

It is interesting to note that from a strictly technical angle, the agricultural engineers who surveyed these properties considered that in 20 of them - out of the 74 holdings of which the owners showed no interest in improving conditions of exploitation - the principal factor which limited any increase in production was the poverty and exhaustion of the soil. On 12 farms the chief factor was ignorance of agricultural practices for the crops and soils handled, and on 12 others, the limited size of the arable area they possessed and the scanty economic resources at their disposal.

While it is true that the operators of all the properties to which we have been referring (74 holdings) showed apathy with respect to the exploitation of their farms, only in 10 cases (14 per cent) was this considered to be the chief, if not the only, factor which stood in the

/way of the

way of the exploitation of these farms at full capacity. In 7 out of the 20 remaining farms this factor was held to be the lack of irrigation; and in the other 13, the institutional impossibility of obtaining credit, etc.

In estimating the second most important cause which prevented the exploitation of these farms at full capacity, it was considered that lack of interest on the operators' part affected 25 other holdings.

The Origin of the Lack of Interest in Medium-Sized Properties

The situation varies considerably in the groups of medium-sized holdings -with gross production values between 104,000 and 480,000 pesos - as the properties present widely-differing features, and the reasons which explain the operator's apathy towards the exploitation of his farm may also, therefore, differ widely.

In these 3 groups only 40 per cent (49 of the 123 properties) of the farm operators displayed apathy towards the progress of their enterprises.

Out of the 49 farms which fell into this category, 78 per cent (38 properties) had more than two-thirds of their arable area under some system of irrigation. The operators' lack of interest in increasing the production of these farms appears to reveal itself in the high percentage of land left under natural pasture. While these 49 farm operators kept a high proportion of 53 per cent of their total area in this state, the other 74 farm operators in these three groups left only 9 per cent of their irrigated arable area under natural pasture. 1/

On analysing the causes which determined this situation in the 49 properties mentioned, it became evident that out of the 304 irrigated hectares which were left under natural pasture, in 265 hectares, (corresponding to 11 properties), that is, in 87 per cent, it was exclusively due to lack of interest on the landlords' part. It must be clarified, however, that of the 11 properties on which irrigated land was left uncultivated, in 10 cases the areas affected were of less than 5 hectares, while only one - a property of 320 hectares - kept 240 hectares under natural pasture for the purpose of hiring out the pasturage.

1/ The opposite occurs in the case of the arable unirrigated area, as the very operators who do show interest in improving their exploitation are those who made the worst use of this type of land. This is due, however, to the fact that an important part of this area (243 hectares, that is, 49 per cent of the area under natural pasture) is severely affected by erosion.

/The 39 hectares

The 39 hectares remaining were not cultivated because their soil was very poor (in the case of 15 hectares), or through lack of drainage, shortage of water for irrigation and ignorance of agricultural techniques on the part of the farm operators.

Nor can it be said, in this case, that the poor quality of the soil has been the cause of the owners' apathy towards increasing their production, since 26 per cent of these farms had fertile soils, 43 per cent had soils of a medium degree of fertility, and only on the remaining 31 per cent was most of the soil deficient. Moreover, this group of properties (the 49 indicated earlier) contained more than half (59 per cent) of level land existing in the 123 medium-sized holdings (comprised in Groups 5,6 and 7.)

From the foregoing it can be clearly observed that within these groups of properties it is not exactly the physical deficiencies of the soil which discourage the landowner from increasing or intensifying his production. From the following analysis it emerges that the origin of this situation is rather to be sought in economic causes.

About half (26) of the properties classified within the three groups of medium exploitation capacity, is made up of irrigated land situated near the supply zone of the two big urban centres of these provinces, the cities of Santiago and Valparaiso. Their capacity is less than 10 hectares each, but, on an average, only amounts to 6 hectares. Overcome by the "easy payments" system and by exaggerated advertisements of the virtues of small-scale agriculture and economic independence, many people, most of them having nothing to do with rural life, invested their savings and contracted debts in order to purchase these small parcels of land where the soil, for the most part, is of only moderate or poor fertility. The many requirements of intensive agriculture with respect to technical knowledge, administrative ability and capital outlay, together with the poor yields and worse profits they obtained by their efforts, resulted in utter disillusionment and consequent apathy. As a general rule these lots, due to their limited area and the unsatisfactory type of agriculture for which they were used, yielded only small profits and an income so reduced that it was not sufficient for the owners to maintain a standard of living comparable to the city. This situation gradually expressed itself in terms either of the sale of the property or of the delegation

of its operation to rent-paying tenants, share-croppers or labourer-administrators of little education, while the landlords returned to the city in search of other sources of income. The owners of such holdings who managed to exploit them successfully were those who could provide sufficient capital to plant orchards or vegerable crops, or to establish poultry-rearing facilities. In only one case was there an owner who carried on extensive agriculture with comparative success. This was due to his having rented several lots, to sow them with lucern and to use them for a combination of pasturage and hay-making.

These statements are proven by the fact that 9 (35 per cent), of the 26 lots classified in this group, were either rented or cultivated by share-croppers, and another 9 were in charge of labourer-administrators. The 8 remaining lots were used principally as dwelling-sites rather than for the productive value of their land. These events are further reinforced by the fact that it was possible to ascertain by direct questioning that 6 of the 18 landlords retained their holdings chiefly as a long-term investment.

The other 23 properties classified in this group presented differing features with regard to size and organization. It is logical to expect, therefore, that the apathy shown by the operators should have its origin in differing causes.

It is immediately obvious that the research workers who made the survey should have considered that in 8 of these 23 holdings, one of the principal reasons for a lack of interest in making proper use of them was the physical incapacity of the operator — chronic disease, old age, etc. In the case of 5 other holdings, two of them with an area of over 100 hectares each, the poor quality of the soil and their irregular topography prevented their operators — farmers of small education and no technical training — from making efforts to improve their production.

Economic difficulties, chiefly those resulting from the impossibility of obtaining adequate credit for purposes of capital outlay, severely limited the activities of five farms, and it was obvious that this factor contributed, in the course of time, to diminish their owners' interest in improving the exploitation of their land.[1/]

1/ In the case of 4 other properties it was considered that this factor was secondary in importance as a cause of the owner's indifference.

/Finally, of the

Finally, of the 5 remaining properties, it was estimated that in two the main cause was ignorance of agricultural techniques, and in three the sole reason was the indifference of the owners, as they had at their disposal all the factors necessary to make a considerable improvement in the exploitation of their land. It is worth while underlining that in these three cases the owners proved to be almost entirely absentee landlords who left their properties in the charge of farmers with little or no technical knowledge.

The Origin of Lack of Interest in Large Estates

Among the properties of which the gross production value can be rated as large — those corresponding to groups 8,9 and 10, with an income above 480,000 pesos — a smaller proportion of the farm operators showing apathy towards the progress or increase of the production of their enterprises is noticeable. Only 21 per cent of them (representing 23 of the 110 holdings) showed unmistakable signs of acting in this way. Nevertheless, in absolute numbers these properties represent a larger area and a bigger volume of production than the total of all the rest of the properties where production could be increased.

In this group of landlords who are apathetic towards the progress or increase of the productivity of their farms, there appear those operating properties from the medium-sized irrigated farm planted with fruit-trees and vineyards, left partly or wholly abandoned, to the large property laid-out from extensive agriculture, their characteristics being, if not better than, at least the same as, those of the other properties of the three groups with respect to size, quality of soil, topography and arable area.[1/]

1/ In actual fact, these 23 properties, which form 21 per cent of the total number of properties in the three groups of highest production values, possessed 18 per cent of the total area, 23 per cent of the irrigated arable area and 31 per cent of the unirrigated area fit for cultivation. Nevertheless, between them they accounted for 60 per cent of the irrigated area under natural pasture existing in the 110 properties of the three groups, and 34 per cent of the unirrigated area under natural pasture. On the other hand, they also had 27 per cent of the level area existing in the 110 properties. In hilly and mountainous zones, nevertheless, erosion affected them in a greater proportion than the usual average, as 31 per cent of their area was affected by moderate erosion and 25 per cent by severe erosion.

/The owners'

The owners' indifference begins to appear in the very low proportion, in relation to the total areas, of land under cultivation. Thus, while in the entire number of properties (110 properties) 78 per cent (11,780 hectares) of their arable area under irrigation was sown or planted, in the group classified as "uninterested" (23 farms), only 47 per cent (1,609 hectares) was under cultivation. In consequence, while the former kept only 22 per cent under natural pasture and lying fallow, the latter had 53 per cent of its total area in this condition. This situation appears in a more or less similar form in the unirrigated areas, since there the proportion cultivated in properties belonging to this class is 11 and 3 per cent respectively.

According to estimates of the research workers, 8 of the 23 properties of the group in question were operated with manifest negligence owing to the indifference or apathy of the farm operators. Three of them were maintained by their landlords more as long-term investments of capital, or as holiday residences, than as income-producing properties. The persons in charge of their administration had little or no education and the landlords visited the properties only occasionally. For none of them was the lack of capital a factor that limited their agricultural activities. When questioned on this point they stated that they had no difficulties either of an economic or of any other nature to prevent them from developing a more intensive exploitation of their land. These characteristics, and the fact that these are irrigated estates with, for the most part, moderately fertile soil, are a clear indication that their production could be substantially increased.

Of the other five properties, one, situated just outside Santiago, was abandoned to natural pasture and devoted exclusively to the breeding and fattening of animals for slaughtering. Two were handed over to the administration of persons incompetent to manage properties of such size. Another was the property of a landlord with considerable estates, who, in spite of having excellent land and abundant water, at his disposal on this property, only had 80 per cent of its soil cultivated, in unsatisfactory conditions, leaving the remaining 20 per cent lying fallow. The last was a rented property situated on the outskirts of Santiago and soon to be split up into lots. The tenant, who paid a low rent, devoted a large proportion of the property to natural and cultivated grass crops for the pasture of horses and cattle. It is interesting to observe that, on an average, these eight properties had more than 57 per cent of their total area under natural pasture. 1/

1/ In the case of three other properties, it was considered that the apathy of the operator was the second most important factor in limiting an increase in production.

Among the remaining 15 properties belonging to this group, 9 were apathetically worked by their operators, owing to economic difficulties of varying orders. Three of them — two managed by professionals — had reached that condition either owing to the impossibility of obtaining capital to invest in them, or because they had reached a difficult economic position due to unfavourable marketing conditions or to high costs of production. In four others, pests, diseases and adverse climatic conditions had resulted in the repeated harvesting of poor crops, which weakened the economic situation of the operators to the point of making them lose interest in improving the operation of their land. This situation, moreover, was due in part to the incompetence of the administrators, whether employees or the operators themselves, and to the difficulties which some of them found in obtaining credits. In the remaining two water shortage was the factor which limited production and accounted for the indifference with which their operators viewed any possibility of increasing their production.

Finally, in the six remaining properties belonging to the group, it was found that indifference was due, in two cases, chiefly to the want of technical qualifications on the part of the farm operators, who had all the factors of production within their reach, but made inadequate use of them and had no means of improving this situation. A third was physically incapable of administering the property adequately. The organization of a fourth property was found to be deficient owing to the scant or non-existent interest of the administrator, who stated that his behaviour was due to the poor payment he received; it should be added that the landlord of this property exercised only occasional supervision over the activities of his employee. Difficulties of transport and a lack of relatively efficient labour were, apparently, the chief reasons for which the farm operators of the last two properties belonging to this group showed apathy towards the improvement of the farming operations.

Only a detailed study of rural administration could determine with any accuracy the losses to the national economy which the indifference, of this considerable number of farm operators, represents. As a result of the present survey, it is only possible to underline that given the inferior yields, the considerable area left under pasture and the absence of any desire to invest capital in agriculture, it is evident that there is every possibility, without a major effort, to increase farm production on these properties.

CHAPTER VI. Agricultural credit.

Type of farmers who request credit and the influence on production

The widely differing characteristics of Chilean agriculture and especially the unequal distribution of land, the system of payment for agricultural labour, the low standard of living of the bulk of the working population and the relatively good supply of manpower, have all led to capital investments being greatly reduced in agriculture.

The Report of the IBRD/FAO Mission on the agricultural economy of Chile stated that the gross annual investment in agriculture was nearly 12 per cent of the total gross annual investments for the country and that "this figure appears too low to enable agriculture to develop in proportion to its importance within the domestic economy". 1/ Regarding net investments, the Report notes that with the exception of 1948 and 1949, imports of agricultural machinery have been insufficient to counterbalance depreciation and that the maintenance of buildings, fences, irrigation channels, etc., has been inadequate. On the other hand, it points out that evidence of sizeable investments in these items is lacking. It particularly notes that the reduction of the livestock population, the fact that, in the last decade the area under cultivation and the agricultural yield remained stationary, are both indications of the paucity of net investments made in agriculture.

In the provinces of Santiago and Valparaiso, this appreciation still appears to be true for most of the properties. In fact, in spite of the limitations of this study and difficulties in obtaining information from farmers, it was remarked that just under 15 per cent of the farms visited showed evidence of definite progress and of net investments having been made. Such investments, however, appeared to be exclusively for the purchase of agricultural machinery (including irrigation pumps), the improvement of dairy cattle, small-scale irrigation constructions, and the planting of orchards and trees. Unfortunately, the difficulties referred to above have prevented an accurate statement of the amount of these and other investments. It was also possible to ascertain that in 36 per cent (144) of the farms visited there was no visible sign of investment having been made, or at least

1/ Agricultural Economy of Chile, Report of the International Bank for Reconstruction and Development and United Nations Food and Agriculture Organization, 1952, p. 113.

/not during

not during the last twelve months. On the contrary, all the farms provided evidence of clear disinvestment, as neither fencing, buildings, not livestock showed signs of maintenance or adequate replacement.

This situation mainly existed in smallholdings, inasmuch as, of the four groups with farms having a gross annual value of production below 104,000 pesos, 56 per cent showed no new investment. In the three groups of large properties, with a gross productive value of over 480,000 pesos, the proportion was reduced to only 14 per cent.

Those properties which were maintained under a "normal" system of operation, or which kept up a parallel level of investments to depreciation, formed 49 per cent of the total number studied. It is proper to insist that, because no reliable figures were obtained, these are only estimates based upon observations made by the research workers who conducted the enquiry and upon conversations held by them on this subject with landlords.

However, if accurate data could not be obtained, it was, however, possible to establish the origin of those capital investments of a permanent nature. In fact, it was found that 38 per cent (153) of the farms investigated derived their investment funds principally from profits received from the farm itself. 15 per cent (58 farms) derived their funds from capital transfers from other sources, either commercial or industrial, or from profits gained in other enterprises of an agricultural nature, and which are not dealt with in this study. Only 11 per cent (42 farms) requested agricultural credit. 1/ As already noted earlier, the remaining 36 per cent made no investments whatsoever, and the available capital was derived exclusively from profits accruing from the property itself.

Such a low investment rate is partly due to the scarcity of long-term credit, but is mainly caused by the disinterested attitude of the farmers towards making improvements. Many of them, to safeguard against the effects of inflation, prefer to transfer their profits to other activities chiefly investing them in the purchase of either urban plots or new agricultural properties.

---

1/ Of the 253 farm operators who derived their capital from the sources already indicated, 27 per cent of them, to complete funds lacking for investments, resorted to the reinvestment of profits as a source of secondary importance; while 18 per cent transferred funds from other enterprises; 12 per cent requested credit and the remaining 43 per cent looked for no additional source of capital.

/Agricultural credit

Agricultural credit

Although only 18 per cent (72) farm operators stated that they had used credit as one of their two principal sources of permanent capital, it was possible to determine that 44 per cent of all operators had recourse to credit to obtain part of the operating capital necessary for the working of their farms.

Such a great difference between the two types of credit was partly caused by difficulties for the farmer in obtaining long or medium-term loans with the aim of increasing their balance or of beginning new types of work. Normally the farmer is only able to obtain short-term credits, from nine months to a year, from one institution, which will provide them at a low rate of interest, the Caja de Crédito Agrario, a semi-fiscal institution. Lacking such means the farmer must turn to commercial banking loans, with a high rate of interest and to be repaid within 90 days.

The fact that the Caja de Crédito Agrario has reduced its medium or long-term loans from almost 30 per cent of the total during the thirties to less than 5 per cent during the last few years 1/ gives some idea of the difficulties with which a farmer is faced in raising investments by means of credit.

30 per cent (121) of the farm operators stated that one of the principal requirements to increase the quantum of production would be to obtain medium-term loans for investment in permanent improvements to their property. 2/

A somewhat different situation is apparent for credits for operating capital, since a higher proportion of the farmers, 44 per cent, indicated the necessity for obtaining loans of this kind, at a low rate of interest, as an essential requirement to increase their production. 2/

It should be explained that of the total interviewed, 57 per cent (226 farmers) indicated that they required credit as an essential element

---

1/ IBRD/FAO report on the Agricultural Economy of Chile.

2/ Of these 121 farmers only 41 per cent (50 farmers) considered this factor as the most important. Another 34 per cent thought it was of secondary importance and the remaining 25 per cent stated that it was of less importance.

3/ Of the 177 farmers who gave an opinion on this subject 53 per cent (94 of them) indicated that this problem was one of top priority. The group of farmers who thought it of secondary importance stood at 31 per cent (55 farmers) and only 16 per cent (31 of them) gave it little importance.

/to increase

to increase their production. Of these 86 farmers (38 per cent) stated that they required credits both for investment and for operating capital. The remainder only mentioned one of these two factors.

With the exception of the properties with a large gross value of production (Group No. 10), no significant differences were observed in the credit requirements between the different groups, but in all of them the number of farm operators who considered that they required credit for investments, for operating capital, or for both, fluctuated between a minimum of 54 per cent and a maximum of 66 per cent. By contrast, in Group No. 10, that with the highest gross value of production, this proportion was only 25 per cent.

Up to a certain point, it would appear inappropriate to use these replies as an exact index of the farmers credit requirements. During the conversations with these farm operators it was noted that many of them were not prepared to answer the questions on the incentives they would require to increase their production. Such measures did not figure among their immediate plans and consequently the answers that were obtained were, to a certain extent, improvised. On the other hand, a number of the farmers were entirely ignorant of credit facilities and the possibilities for obtaining them. In fact, it was observed that only 44 per cent of all the farmers had turned, in one form or another, to the procurement of banking, agricultural or commercial credits to finance their operations. The remaining 56 per cent, for differing reasons, could not or did not wish to use credit, as well as others who were ignorant of credit facilities.

From the replies obtained from the Survey it is possible to outline the principal obstacles to a wider use of credit; they are as follows in order of importance:

1. The term was too short and the interest too high on commercial credit.
2. Ignorance of the existence of credit facilities, particularly among small holders.
3. Long delays in obtaining credit and the necessity for guarantees, which in many cases were not readily available to farmers and particularly to small holders.
4. Difficulties in obtaining loans in time to carry out the work at the right season.

/5. The negative

5. The negative attitude of some banking institutions to the provision of credit, on the pretext of a lack of funds.

It should also be mentioned that a considerable number of the farmers simply did not ask for credit because they did not need it and were in a financial position to carry out every part of their work.

The opinions given by the research workers who interviewed farm operators on the more essential incentives to increase production coincided only partially with the statements of the farmers on the credit requirements. Indeed to compare their observations, it may be seen that the research workers indicated that credit was necessary in 106 out of the total 226 properties investigated. On the other hand, the researchers considered that in 4 per cent of the cases it was necessary, if not essential, for the farmer to obtain credit to finance his operations, even when the farmer felt no such urgent requirement.

It should be underlined, however, that the research workers only indicated the urgency for increasing production and in no case contradicted the opinion of farmers on the subject of credit. To arrive at an accurate statement on this problem, it would have been necessary to make a detailed study of the financial situation of each farm operator, together with a review of the possibilities of the property to determine the type of operation which would best suit it.

## CHAPTER VII. Systems of Agricultural Operation and the Interests of Society.

If the farmer like a businessman, normally tries to increase his income as much as possible, so the people of a country are directly interested in a farm accomplishing its role in society by increasing its gross production to the full. In other words, society judges the value of a property in terms of the value of its production. This is no more than the price which society pays for each article multiplied by the quantity produced and sold. The price can be established by society either through regulations of its government or through the free play of supply and demand.

In view of the impossibility of establishing the farmers net income, the gross value of production of a property has alone been mentioned in the present study. But, in practice, the net income is what a farmer considers, since his interest lies in the net profit on his capital, his

/work and his

work and his administrative capacity. Among other reasons, it is due to the incentive to increase the profit that some properties, managed by progressive and hard-working operators, obtain a greater yield per unit of area than others.

With the aim of measuring the production which an operator obtains from a unit of area, there is a simple system to express the size of the property in "units of irrigated land".[1/] Given thenumber of units in each property, they are divided into 10 tenths of 40 parcels of land each, beginning with the smallest. Each group was in turn subdivided into two groups in accordance with the gross value of production, and half those with a lower value were placed in one group and half those with a high value in the others. (See Table 20 and Plate 7.)

Table 20 Gross Value of Production and Work Input per "Unit of Irrigated Land" in 401 Properties in the Provinces of Santiago and Valparaiso

| Group | Gross value of production per "unit of irrigated land" (in thousands of pesos) | | Work-days per "unit of irrigated land" | |
|---|---|---|---|---|
| | Low income sectors | High income sectors | Low income sectors | High income sectors |
| 1 | 67 | 88 | 1,370 | 608 |
| 2 | 24 | 52 | 217 | 378 |
| 3 | 30 | 48 | 266 | 378 |
| 4 | 28 | 55 | 228 | 232 |
| 5 | 28 | 49 | 152 | 179 |
| 6 | 27 | 57 | 123 | 147 |
| 7 | 21 | 51 | 92 | 158 |
| 8 | 21 | 44 | 49 | 96 |
| 9 | 20 | 28 | 81 | 63 |
| 10 | 10 | 17 | 34 | 35 |

1/ To determine the measurement of "a unit of irrigated soil", a hectare of irrigated land was chosen. To it was assigned the average production value for the Provinces of Santiago and Valparaiso, weighting it both with the areas used for different crops and the area left fallow or in natural pasture (arable, not arable, irrigated and unirrigated). Taking the production values obtained in other agricultural sectors and comparing them with that of the given irrigated hectare it is possible to establish the following equivalents: 1 unit of irrigated soil is equal: to 3 hectares of unirrigated soil under cultivation; to 10 hectares of artificial woodland; to 50 hectares under unirrigated natural pasture; and to 200 hectares of unirrigated land which cannot be cultivated and are generally used for pasturage.

/For example

For example, in Group 6 the properties concerned average 5.5 units of irrigated land, corresponding in this case to an area of 22 hectares. Half these properties yield a gross income of approximately 27 thousand pesos per unit of land. The other half gives a return of over 57 thousand pesos per unit. In this way, two properties more or less equal in area can be shown to have entirely different types of production. An analysis of the reasons for this disparity immediately shows that there is a wide difference in the type of exploitation common to each sector, for whereas that of the smaller income sub-group is devoted almost entirely to wide spread cultivation, the tendency in the higher-income properties is strongly towards intensive cultivation.

The higher-income sector absorbs a greater amount of labour (see Plate 7), amounting to 175 man-days per unit of irrigated land, as against an input of 130 man-days for the lower-income properties. There is a similar relationship in practically all the other groups, with the exception of Group 9, where the lower-income sector has a greater labour input than the higher-income sector, due possibly to a more advanced state of mechanization on the part of the latter.

Itshould be noted that the difference between the two sectors is also affected, to a minor degree, by the fact that the lower-income properties contain a slightly higher proportion of unirrigated areas than those of the higher-income sector.

From an examination of Plate 7, it may be seen that production per unit of irrigated land is considerably higher in the group containing the smallest properties (Group 1). This, however, is due to outside factors which cannot appropriately be considered here. The value of production in the intermediate groups (Groups 2 to 6) is more or less the same; however, from Group 7 onwards there is a progressive decline which reaches a minimum in Group 10. At first sight this disparity in gross production per unit of irrigated land between the large and small-sized properties would appear to contradict the conclusions drawn in previous chapters as regards the greater productivity of labour on the larger properties. The smaller production per unit of land under irrigation is nevertheless due to the reduced value of natural pastures,

/whether irrigated

whether irrigated or not, in the total yield of a property. In this connexion it must be recalled that in the samples taken 87 per cent of the natural pasture under irrigation, and 95 per cent of those on unirrigated land fall within the properties belonging to Groups 9 and 10.

Taking into consideration the predominant part played by the larger properties (Groups 8, 9, and 10) in the samples taken together with their reduced production per unit of irrigated land compared to the smaller properties, it may be concluded that, with the raising of the production of the first to the level of the second, the total production of the region could be practically doubled.

As already pointed out, the farmer (like any other business man ) is mainly interested in his net profit, i.e. the difference between the gross value of production and his total expenses, which include not only outlay on seeds, machinery, labour and fertilizers or insecticides, but also the interest on and repayment of credit obtained, and an adequate return for his own work and invested capital.

It can thus readily be understood that in carrying out this objective many farmers plan their operations in such a way that, in order to obtain an adequate return for their investment, they actually decrease the overall production which is of such great importance to Society.

In embarking upon programmes involving more advanced techniques and intensification of production (including full use of the available land), with a consequent increase in the volume of production, farmers have to take greater investment risks and make a greater personal effort. This they tend to avoid, even though the results would be favourable to them, preferring simpler methods of exploitation.

A careful study of the differences between the personal interests of the farmer and those of the community as a whole would be of great service to the government in drawing up a system which would satisfy the requirements of both parties.

## CHAPTER VIII: Production Incentives as Viewed by the Farm Operator

One of the purposes of this Study was to determine the opinions of farmers regarding the incentives to increase their production,

As indicated, the method of direct interview has certain disadvantages preventing a precise classification of the problems with regard to their real order of importance. As a general rule, the farm operator considers his situation as more or less fixed and exerts little effort to bring about changes. In other words, with certain exceptions, he does not normally devote sufficient attention to an analysis of his problems or the manner in which they might be solved. Therefore, when questioned regarding the problem generally, the farm operator gave answers which were somewhat improvised and, in the majority of cases, lacked reflection or thought.

Nonetheless, and despite the fact that many of the answers contain more or less serious discrepancies, the Study has proved invaluable as a means for understanding the farmer's point of view with regard to his problems and the way in which he believes solutions might be effected. The opinions without doubt approximately illustrate the more urgent and pressing problems for an increase in production which demand solution by the farmer.

In analysing the replies, it is evident that only 1 per cent (4 cases) categorically indicated that there were no problems of any sort. An interesting aspect of these four cases according to the research workers conducting the Study, is that two of such farmers were exploiting their properties practically to full capacity.

### Credit

Judging from the number of farmers who expressed an opinion, the factor constituting the major obstacle to an increase in production is lack of capital. 57 per cent (226 producers) indicated a need for credit to invest, operating capital, or both. Since a mention of the importance of this problem has already been made in an earlier Chapter, no further repetition is necessary.

### Irrigation

Of all the problems mentioned by farmers, following a lack of capital, the problem of irrigation took second place, whether it was a lack of an

irrigation system altogether or the relative scarcity of water in some of the irrigated zones, particularly the area served by the river Maipo. 137 farm operators (35 per cent) emphasized this problem, but only 93 of them considered it to be of primary importance, 22 classifying it secondary. Of these properties 79 were unirrigated so that the installation of an irrigation system would require the investment of substantial capital for projects, which, in some cases, would necessarily be of considerable proportions. In a limited number of farms a partial solution to this problem has been sought through the drilling of deep wells, to be used by pumping. The other 41 properties already had irrigation systems but suffered from a scarcity of water, particularly during periods when it was most needed.

Without doubt this lack of water in some cases is a serious obstacle to the farmers, but it should be recalled that many of these problems could be solved with relative ease through a better utilization of the available water supplies. The general opinion of the research workers was that in Chile, and particularly in the central zone, the excessive waste of available water provides one of the fundamental reasons for scarcity in certain areas.

Fertilizers

As a general rule, capital investment for the fertilization of the soil is normally effected only by the medium or large farm owners, the small holder only employing reduced quantities, principally for vegetable produce. It was interesting to note, however, that the need for their use, added to their scarcity on the market, were only considered to be of third in importance among the obstacles to production. A substantial percentage of the farmers who so classified it were small holders, some owning unirrigated land.

31 per cent of the farm operators interviewed underlined the need for employing fertilizers, many of them stating that the principal difficulty lay in the scarcity of fertilizers on the market. It is of interest to this report that 23 farmers considered this to be their primary problem, 38 classifying it as of secondary importance.

Such interest in the problem of fertilizers - particularly among smallholders - constitutes a most promising sign for a possible productive increase, because it means that farmers are learning the

importance of enriching the soil, as well as the results which this may have on yields and, as a net result, the improvement of their own economies. According to certain farmers, the use of fertilizers would have spread more rapidly if there had been an agency equipped to teach them the advantages, as well as the techniques of using them, particularly if these instructions had been accompanied by a reduction in price.

Prices and distribution

Judging from the number of answers received, prices were considered to be of next importance as an obstacle to production. It was considered that these, in addition to the Government programme of price fixing, afforded insufficient remuneration for certain produce. Actually, only 26 per cent (102 producers) showed dissatisfaction with certain prices; two thirds of this group indicated that the problem of prices primarily affected milk, followed by vegetable produce, and to a smaller extent, fruit and wheat as well. Little more than 3 per cent of the total expressed their intention to abandon dairy production as a result of the unfavourable ratio between the fixed prices and the high production costs.

A similar problem, but apparently of minor importance in the opinion of farmers, was the extreme variation in seasonal and long-range prices. 20 per cent (79 farmers) considered this to be a primary obstacle to production increases, particularly with regard to vegetable produce and poultry. 39 farmers indicated that price fluctuations should be classified as of secondary importance.

There were few producers who appreciated the intimate relationship existing between prices and distribution. As a matter of fact, only 12 per cent (48) considered it necessary to improve the distribution system as a means of receiving a greater share of the value paid by consumers. The majority holding this belief were producers of perishable or semi-perishable goods which require almost immediate distribution to markets, since there are at present insufficient refrigeration facilities. Furthermore, the general opinion was that the principal difficulties in establishing a more adequate system of distribution lay in the number of middle-men absorbing a large share of the price paid by the consumer.

Transport and Roads

Closely related to the problem of prices and distribution is that of transport and roads. Compared to the rest of Chile, the Provinces of Santiago and Valparaiso enjoy the most complete and, possibly, the best road network. However, there are still various zones linked to the consumption centres by dirt-roads, which can only be used during dry periods. There are other areas where the road conditions and the somewhat long distances involved, contribute to a definite increase in transport costs - an adverse situation for the farmer. Areas lacking improved roads, which can only be used by carriages or horses, are relatively few; these are generally sectors of little economic value, located in valleys where only unirrigated agriculture can be practiced.

But 9 per cent of the producers (34) indicated that bad roads, or a complete lack of transport facilities, should be classified amongst the first two factors limiting production. 10 per cent (41) classified it as secondary in importance.

Techniques

Modern agricultural operating techniques have actually penetrated to only a small sector of the agriculture practiced in the Provinces of Santiago and Valparaiso. Their effects have not been felt to any great extent in the major areas of production. It has already been shown that only 16 per cent of the farms are utilized to full capacity. Even in this small percentage, there are some sectors exploited solely by experimental methods, whose efficiency is far below the level of agriculture in more highly developed countries. Among the remaining 84 per cent, a high proportion still work under experimental and traditional methods. In fact, judging from answers received from farmers, a half of these, particularly those of smallholders, do not have any knowledge of the advantages which modern techniques might bring to yields and productive efficiency. This explains why only 35 per cent indicated a need for technical advice to increase production, and 23 per cent (93 operators) the need for improved seed. Only 43 farmers classified the lack of technical advice as an obstacle of primary or secondary importance; 30 others considered that classification more appropriately reserved for the need for better seed. A possible explanation is that a great majority

/of farmers

of farmers do not receive sufficient co-operation on the part of the Government. Government agricultural officials, as a general rule, are not provided with adequate transport means for visiting the farms in their respective districts and, therefore, limit their inspections to those properties where aid has been specifically solicited. Their consultations are normally conducted in their offices which obviously are not as effective as those realized at the farm itself. Added to this inconvenicne, not all farmers are in the position to visit the Agricultural Offices of their respective district capitals. At the same time, there does not appear to exist a close enough collaboration between the Extension Services and the Experimental Stations, with the result that the task of providing instruction has barely reached its preliminary stages.

The smallholders are more affected by this problem of co-operation than any of the others, since half of them are not even aware of the existence of Extension Services, nor of the possibility of obtaining free instruction. In this respect, the farmer has a certain inherent mistrust towards the introduction of new methods for production, and any intensive programme will meet with some resistance. This can only be overcome by a practical demonstration of the advantages.

It is considered that the disorganized operating methods used in the area, are primarily due to the lack of an efficient Extension Service which is not sufficiently supported by an adequate number of Experimental Stations. The farmers maintain their own individual methods as to the type and variety of cultivation which they consider appropriate to a given soil. It has been observed - except where the advantage of a certain type of cultivation has been universally acknowledged - that cultivation methods and crop rotation systems bear no resemblance from one farm to another within the same area, resulting in significant divergencies in yields, production and profits.

Taxation

Taxation obstructs Chilean agricultural activities to a smaller degree than in the majority of more highly developed agricultural communities. Nonetheless, 80 producers (20 per cent) indicated it as a serious hindrance to an agricultural production increase. It would

/appear that

appear that a greater pressure is imposed upon the smaller farms, particularly those in the unirrigated areas. As a matter of fact, of the 29 farmers who declared that taxation constituted a primary obstacle, 55 per cent belonged to the four smallest production units and none belonged to the two groups of large properties. A similar proportion of the smallholders maintained that taxation was a problem of secondary importance. However, the 10 per cent (7 farm operators) supporting this opinion were owners of the ninth and tenth largest farm classifications employed in this Study.

Agricultural Machinery

The scarcity of agricultural machinery on the market, as well as the high purchase price, was considered, by 7 per cent of the farmers, to be a problem of primary importance for agricultural production increases. An additional 11 per cent maintained that it was of secondary importance. The farmers considering this, indicated that prices for agricultural machinery were high and out of all proportion to the manufacturers' cost price as compared with prices for agricultural products. In their opinion, the cost of mechanization in Chile might even attain higher levels than in the majority of other Latin-American countries, due to high initial costs and the even higher prices of spare parts. It was also indicated that, added to the high prices and scarcity of new machinery already obstructing proper mechanization, it was often impossible to obtain the specific models required by the farmer.

Other Problems

Other problems hindering a productive increase may be listed, although they were mentioned by relatively few farmers. They were: the low productivity of labour; an inadequate labour supply; the effects of plant diseases. The first of these was indicated by 19 per cent of the producers, the second by 15 per cent and the last by only 3 per cent. In addition, 2 per cent mentioned the need for drainage, and others the lack of electric power.

ANNEX

Sampling Proceedure

The choice of an adequate sampling system for an area with such differing characteristics as the central zone of Chile, presented various difficulties.

When this study was initiated, the proposed field of action was practically unknown inasmuch as the only detailed information available was the agricultural census of 1935-36 which, in addition to bein, out of date, had serious deficiencies, precluding its possible use.

Furthermore, the list of taxpayers furnished by the Income Tax Office not only was unclassified but did not give exact data for each zone. Only information as to ownership registration was available but lacked the aggregate number of agricultural enterprises in operation.

In view of these difficulties, it was decided to base the sampling only upon definite information, the area, for which purpose the topographical maps - 1/100,000 and 1/25,000 scale - prepared by the Instituto Geográfico Militar were used. At the same time, it was decided to narrow samplin, to the only completely mapped provinces of the Central Zone - Santiago and Valparaiso. This choice was further supported by the fact that these two provinces cover a complete cross-section of the country extending, as they do, from the foothills of the Andes to the ocean. This section is representative of the Central Zone of Chile.

The differences between the agricultural areas of the region, as regards irrigated and unirrigated cultivation, presented serious difficulties in determining the physical extent of the study. These were heightened by the unequal distribution of property, as demonstrated by the co-existence of extensive large properties encircled by hundreds of smallholdings.

After many experiments in the selection of the percentages to be used, it was decided that 5 per cent of the given area would produce a sample suitable for the results required and to coincide with the budget for this project. This selection of sample production units was conducted in the following manner:

/a) The selection

a) The selection of a square kilometre for each sample unit, in order to facilitate field work;

b) The division of the topographical maps - 1/100,000 scale - into square kilometre areas, choosing by lot one out of each twenty squares, or 5 per cent of the total area;

c) The transfer of the selected units to 1/25,000 scale map sections which for clarity and ease in finding and plotting limits, contained detailed points of reference of the terrain.

As a result, 93 sample units were chosen, or, approximately 5 per cent of the total area of the two provinces.

For the enumeration and study of each unit, it was decided to visit each and every one in order to determine the presence or absence of the landlord. To avoid duplication and to ensure that both large and small properties would appear in the sample according to their respective degree of importance, only such holdings where administrative buildings coincided with the selected sample squares were tabulated. If a large property fell within a square, this was numbered as a whole even though it comprised various units. Conversely, if various small holdings were found to be included within one unit, each was numbered separately.

The selected squares were fixed, closely approximating to the site in the actual terrain by means of the points of reference indicated in the map sections, as well as through the use of the speedometres of motor vehicles, the distance measured between the reference points, as well as the margins of the chosen squares. Directions for these were obtained by means of the compass.

The actual properties were visited by 8 experienced agricultural engineers, the majority of whom knew the area well. In cases where a farmer refused to give information, or was absent, an alternate property bordering the sample unit in question was visited.

The Questionnaire

A short and concise questionnaire was drawn up to facilitate interviews. It comprised questions referring not only to the incentives which the farmer might consider necessary for increasing production,

/but also

but also to the most likely solutions. In addition, it attempted to obtain data concerning the available factors of production utilized in the soil cultivation. Complementary questions were used in order to cross-check certain answers, particularly those regarding factors of production. An effort was made to avoid all questions not directly concerned with the aims of the study.

Research-workers

The research workers conducting the survey received concrete instructions regarding the ultimate purpose of the Survey, as well as the technique to be employed in conducting an interview. A training period was given beforehand, to ensure that the research workers would be sufficiently experienced.

The interviews were not limited merely to answering the questionnaire but extended over various topics, thus enabling the research worker to form a definite opinion of each unit visited. A section of the questionnaire was devoted to the opinions of the research worker, and in addition to which, he was required to complete the report with a brief analysis of the problems he considered required solution in order to increase production.

Reaction of the Farmers to the Study

On the whole, the reception of the research workers by the farmers was cordial and only in isolated cases were refusals to grant information experienced. At the same time, however, a marked reticence to reveal data concerned with net or gross income was noted. Nor was it possible to obtain adequate information regarding the actual yields of the units.

The limited nature of the information prevented the presentation of certain aspects, including some of a technical nature, such as the influence of prices upon production, the role of administration in the efficiency of production and agriculture in general, as well as the use of other methods of evaluation.

Tabulation

Tabulation of information was accomplished through the use of a well known model of calculating machines wherever possible, but where information was partial or merely an opinion, such work was performed manually.

Readjustments

As a consequence of the unequal property distribution, two common types of errors recurred. Firstly, some areas containing large properties did not receive adequate representation in the sampling, whereas in others their representation was exaggerated. In order to correct this anomaly, the number of farms necessary to provide a complete picture of the area was added, choosing them by lot from among such properties which had not appeared in the sampling. In order to correct exaggerated representation, the method of choosing by lot was employed, to eliminate those farms which appeared to have been over-represented.

Secondly, the sampling revealed an area greater than originally envisaged. Upon further analysis, the various farms comprised in the groups concerned indicated that their areas - compiled at the time by the Economic Commission for Latin America, utilizing the Property Evaluation Registry - provided an over-representation in the case of large properties and a corresponding under-valuation in smallholdings.

This problem was not considered as serious owing to the custom of many of the production units to accumulate more than one ownership title. Furthermore, the aggregate area of these properties had only a slight influence upon the total.

In order to adjust the large properties, which were over-represented, those contained in the sample were compared with the others in the different groups according to size, extracting properties to lower the area of the group by 5 per cent from the total area of all groups. To avoid errors through the arbitrary elimination of some properties, it was preferable to establish a coefficient representing the ratio between the total area of the properties eliminated and the total area of the group to apply the coefficient to the data for the entire group. In this way, the varying information obtained for properties in the group would be weighted by the same factor and would represent, in a ratio corresponding to their actual size, a greater number of properties. The results of this readjustment multiplied by twenty are illustrated in Table 21.

Date of Survey

The properties were visited during the months of April and May, 1952.

/Table 21

Table 21 Readjustment of the Sample as a result of data obtained from the Property Evaluation Registry for the Provinces of Santiago and Valparaiso.

| Size of property | No. of ownership titles | No. of properties analysed following readjustment | Area corresponding to the ownership titles | Area studied multiplied by twenty |
|---|---|---|---|---|
| | | SANTIAGO | | |
| 1 - 4 | 5,610 | 75 | 16,179 | 3,740 |
| 5 - 19 | 3,041 | 102 | 30,370 | 20,700 |
| 20 - 49 | 1,003 | 38 | 31,069 | 23,040 |
| 50 - 99 | 430 | 16 | 30,511 | 23,280 |
| 100 - 199 | 318 | 23 | 44,120 | 63,320 |
| 200 - 499 | 259 | 12 | 80,256 | 85,740 |
| 500 - 999 | 114 | 5 | 80,795 | 76,260 |
| 1000 -4999 | 173 | 10 a/ | 388,423 | 361,660 a/ |
| 5000 and over | 55 | 4 b/ | 887,258 | 883,880 b/ |
| Sub-total | 11,003 | 286 | 1,588,981 | 1,541,620 |
| | | VALPARAISO | | |
| 1 - 4 | 3,780 | 51 | 8,179 | 1,980 |
| 5 - 19 | 1,379 | 30 | 13,012 | 5,400 |
| 20 - 49 | 419 | 6 | 12,383 | 4,280 |
| 50 - 99 | 143 | 4 | 9,708 | 5,520 |
| 100 - 199 | 104 | 7 | 13,854 | 20,840 |
| 200 - 499 | 79 | 3 | 26,555 | 23,080 |
| 500 - 999 | 50 | 4 c/ | 35,949 | 62,140 c/ |
| 1000 -4999 | 99 | 5 | 214,554 | 210,700 |
| 5000 and over | 12 | 1 d/ | 119,945 | 143,420 d/ |
| Sub-total | 6,065 | 111 | 457,138 | 526,960 |
| | | SANTIAGO AND VALPARAISO | | |
| 1 - 4 | 9,390 | 127 | 24,358 | 5,720 |
| 5 - 19 | 4,420 | 132 | 43,382 | 26,100 |
| 20 - 49 | 1,433 | 44 | 43,451 | 27,320 |
| 50 - 99 | 573 | 20 | 40,219 | 28,800 |
| 100 - 199 | 422 | 30 | 57,974 | 84,160 |
| 200 - 499 | 338 | 15 | 106,811 | 108,820 |
| 500 - 999 | 164 | 11 | 116,744 | 138,400 |
| 1000 -4999 | 272 | 15 | 602,977 | 572,360 |
| 5000 and over | 67 | 5 | 1,007,203 | 1,027,300 |
| Unclassified | | 4 | | 2,140 |
| Area less than 1 hctre. | | | | 7,040 |
| Area not recognized as agricultural | | | | 17,959 |
| | 17,068 | 401 | 2,046,119 | 2,046,119 |

Note: a/ Reduction of 15 properties comprising 726,640 hectares.
b/ Three farms larger than 10,000 hectares each, and totalling 70,815 were reduced to 1 unit containing 23,605.
c/ Reduction of eight farms comprising 111,740 hectares.
d/ Two farms larger than 4,000 hectares each totalling 14,342 were reduced to 7,171 hectares.