3. ECONOMIC AND SOCIAL EFFECTS OF THE IMPROVEMENT OF THE STRUCTURE OF INDIVIDUAL FARMS

The evaluation of the economic and social effects of land consolidation is a difficult task and only a few countries have made an attempt to appraise them, though they neither have isolated the impact of land consolidation proper from the effect of other measures associated with land consolidation operations. For the purpose of this publication, however, the appraisal made in the reports of Austria, Germany, Italy and Switzerland is useful, since it evaluates the effects of an integrated approach to the problem of agrarian reconstruction of which land consolidation operations are an essential part. The Appendix to this Chapter contains a report by Dr. W. Sommerauer on the effects of Land Consolidation in Switzerland.

Measures adopted for improvement of the agricultural structure have resulted in a considerable increase in production and in a better utilization of agricultural labour in Austria, Germany, Italy and Switzerland. In Italy, production was in part tripled or quadrupled owing to changes in crop intensification and irrigation. Austria has reported that in one community milk production was increased by 50% after land consolidation had been introduced, while the gross yields of farms rose by 18–40%. The average increase in net production as a whole, amounted to 25% in Austria; this improvement was achieved with a labour force reduced by 14%. In Switzerland and Germany thorough investigations were carried out and established proof for the fundamental impact of agrarian reconstruction on labour productivity and the volume of agricultural production.

In Switzerland several farms were observed by investigators for one year prior to, and for three years after land consolidation. A rise in the agricultural output by 20–30% was noted, and in individual communities the cattle stock rose by 10–25%. In another community the yield of the livestock rose by 15% and the total gross yield of the farms by 20%. The net profit, therefore, increased from 62 to 152 Frs. per hectare. In every case, land consolidation has led to an increase in live-stock and to an expansion of the cultivated area. There is no doubt that land consolidation in Switzerland was associated
with increased intensification and improved methods of cultivation which altogether resulted in a substantial increase of productivity.

Specific attention has to be given to the productivity increase which was the result of the resettlement action. In accordance with expert estimates the direct and indirect effects of the resettlement of 642 farming families at the expense of around 60 million Frs., resulted in an annual production increase amounting to 6-8 million Frs., besides a considerable reduction of production costs.

In the Federal Republic of Germany the effects were not less considerable. Investigations in two villages have shown that prior to land consolidation, badly fragmented fields located at long distances from the villages, outdated farm buildings, and inadequate road communications and water supply, have kept agricultural production at a very low level. As a result of land consolidation operations and the implementation of complementary measures, the productivity increased considerably.

The operational organization was intensified by an increase in the production of root crops, the introduction of cash crops, the increase of livestock and the reduction of the forage area per cattle unit. At the same time the yields were increased by improved cultivation methods and a more intensive use of land, labour, and equipment.

The effects of agrarian reconstruction have greatly benefitted the farmers. The intensification of the operational organization and the reduction of the production costs very soon resulted in a better rentability of the farms and an increased standard of living. A keen analysis of the available material proves that the effects were at a considerable variance in individual cases, but that land consolidation in all cases had a most favourable effect, both on the production level and on the standard of living. With all reservations made for individual cases, it may be stated that under average conditions:

1. the gross yield of the holding can be increased considerably, probably between 20 to 70% in accordance with the extent of the operations introduced;
2. the working methods will undergo considerable changes following the structural improvements which eliminate unproductive efforts, such as long walks etc., together with other obstacles for the development of the farm;
3. the man power requirements will be reduced considerably.

The combination of increased production combined with a decrease in man power requirements probably will lead to a duplication of the labour productivity and in the case of resettlement, even to triplication. The result will be a considerable improvement of the farmers’ standard of living, provided that the size of the farm is well adjusted to the working capacity of the farming family and to the desired standard of living. Land reform programmes which place the emphasis on the settlement of the greatest possible number of people rather than on the standard of living, will have more limited effects on the social level of the farming population.

The importance of over-all planning and of the coordination of land consolidation operations with other improvement measures became evident by the striking success of

the agrarian reconstruction programmes in the Netherlands, Germany and Switzerland. The more comprehensive the structural reform, the greater the effects of the measures introduced.

The own initiative of the farming population contributed in many European countries to lightning improvements, at the same time cutting out administrative difficulties and red tape. The utilization of the improved conditions offered by the improvement for production remains largely the lone responsibility of the farmers, though it may be useful to guide them on their way to economic progress.

A well considered agrarian policy will strengthen the initiative and vitality of the farming population and help them to find their proper place in the economic life of the nation. This, however, can only occur, after agrarian reconstruction has made a considerable contribution to the equalisation of the technical, economical and social conditions for agricultural and industrial labour, and in this way to the maintenance and regeneration of social vitality in rural areas.
APPENDIX (to PART I)

Switzerland

DR. W. SOMMERAUER: EFFECTS OF LAND CONSOLIDATION IN SWITZERLAND

The present report is intended to deal in particular with the economic effects of land consolidation and to give a brief survey of the most important investigations carried out in Switzerland. Switzerland has not as yet carried out any large-scale research on the sociological repercussions of land consolidation upon the rural population. Moreover, in many instances the time elapsed since the completion of the re-allocation work has been too short to enable us to make any conclusive appraisal of the situation.

Naef was one of the first research workers to investigate the economic advantages of land consolidation. He carried out investigations at 30 farms in the Stammheimer Valley in the Canton of Zürich regarding changes in the gross output and the input, taking as the operative dates one year prior to and three years after the new properties had been taken over. According to Naef’s calculations, the gross output had increased by 12.5% while the net yield had increased by an average of Swiss fr. 95 per hectare. The farms thus investigated had tried to improve the farm results mainly by intensifying their activities. It ought to be noted that the farms comprised small or medium-sized family enterprises that relied principally upon family labour.

Studler carried out an enquiry into the economic effects of the land consolidation projects in the Canton of Aargau in 1936. According to the results of that survey, the output of the re-allocated farmlands had risen by 20-30%; in some of the communities, the head of cattle had increased by 10-25%. A considerable increase of arable farming, particularly of cereals could be noted.

Using the accounting data of the department of profitability investigations of the Swiss Farmers’ Secretariat, Hüni published a very illuminating study entitled: ‘The Influence of Land Consolidation upon farm results with particular regard to labour input and gross output.’ The study investigates the most essential soil utilization systems (types of farming) of Swiss agriculture and thus has taken into account most regions of our country. Hüni found the following results (average for 1933–1934) applying to the
soil utilization system of improved triennial crop rotation according to the extent of consolidation:

<table>
<thead>
<tr>
<th>Extent of consolidation</th>
<th>unfavourable</th>
<th>average</th>
<th>favourable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of parcels per farm</td>
<td>28</td>
<td>23</td>
<td>10</td>
</tr>
<tr>
<td>Labour input per hectare</td>
<td>Fr. 478.--</td>
<td>Fr. 459.--</td>
<td>Fr. 394.--</td>
</tr>
<tr>
<td>Material input per hectare</td>
<td>&quot; 448.--</td>
<td>&quot; 505.--</td>
<td>&quot; 506.--</td>
</tr>
<tr>
<td>Total gross output per hectare</td>
<td>&quot; 1034.--</td>
<td>&quot; 1132.--</td>
<td>&quot; 1133.--</td>
</tr>
<tr>
<td>Total gross output per 100 Fr. labour input</td>
<td>&quot; 216.--</td>
<td>&quot; 247.--</td>
<td>&quot; 288.--</td>
</tr>
<tr>
<td>Net yield per hectare</td>
<td>&quot; 108.--</td>
<td>&quot; 168.--</td>
<td>&quot; 233.--</td>
</tr>
<tr>
<td>Net value of yield</td>
<td>&quot; 1260.--</td>
<td>&quot; 2524.--</td>
<td>&quot; 3744.--</td>
</tr>
</tbody>
</table>

The increase in labour productivity as well as in net yields and net values emerges clearly from this comparison.

Upon a suggestion of Professor O. Howald, the author carried out an investigation during the years 1948–1950 on 'Effects on Farm Management and Results of Land Consolidation in a Municipality of the Jura Mountain Region in the Canton of Argovie'. The investigations were carried out in the municipality of Mandach with the dual purpose of enquiring into the effects of land consolidation upon farm management in smallholdings and likewise of critically discussing the problem of securing and analysing the economic results of land re-allocation on the basis of an example. For this purpose, a calculation of the results was carried out on behalf of all farms of the municipality in question as a whole. The most important findings were the following:

Labour-economic factors: The data pertaining to labour-economic factors provide the key to an understanding of the entire development of the farms after reorganisation of land ownership. The improvement of the parceling brought about a decrease in the time expended on work in the field. A reduction of the proportion of unproductively used time on the farm resulted in the release of labour which could be fully employed in order to increase the labour intensity on the farms. The arable acreage was increased; specifically intensive crops such as vegetables, viticulture and fruit growing were considerably extended. Considered as a whole, the labour input remained therefore rather constant in time; however, its internal structure changed as the proportion of unused time decreased. The increased growing of labour-intensive crops brought about a higher gross output again. The result was therefore increased productivity of human labour. However, the labour strength as well as the number of days worked per acre remained unchanged. This striking constancy in the conditions governing labour is a typical phenomenon pertaining to family farms, a type which predominates overwhelmingly in the municipality investigated. While the farm employing hired labour will in certain circumstances dismiss some personnel in order to adjust the labour force to the decreasing demand in this
manner, the sociological unit of the rural family is maintained on the family farm for reasons transcending the purely economic considerations.

Arable crops. The most striking phenomenon of the progress following land consolidation was a substantial extension of bread grain crops. This was coupled with a rapid improvement of the growing methods so that one of the earliest tangible results was a considerable increase in deliveries of bread grains. The average bread grain yield could be calculated fairly precisely from the bread grain statistics. It amounted to:

17.68 quintals per hectare for the 3 years preceding land consolidation (1929–1931),
23.50 quintals per hectare for the first eight years following land consolidation (1932–1939)
27.71 quintals per hectare for the war years (1940–1945).

The average of the increase in cereal yields during the first years following consolidation amounted to a full 33%.

As regards fodder crops, an essential improvement of the manuring system, a reduction of the hay harvesting time and an expansion of grassland farming were the most prominent features. Viticulture, a specifically labour-intensive crop of smallholdings likewise benefited largely from the release of labour. Within a period of 10 years following consolidation, the entire area under vine had been reorganised. The field vegetable crops were likewise enlarged.

The effects of the improved fodder production upon animal husbandry naturally took somewhat longer to make themselves felt; however, their presence could likewise be proved clearly.

The centre piece of the investigation was the proof of the economic success of land consolidation in the municipality of Mandach. The aim of the calculation of this success consisted of a comparison between the profitability and the income of agriculture prior to and after land consolidation. Thus the investigation was carried out according to the method of vertical temporal comparison. The periods of comparison selected by me were the last three years preceding land consolidation (1929–1931) and the period 1937–1939; there is a transitional period of 5 years between the two. The comparison is affected by a recession of the prices for agricultural produce. The average total index of producers' prices amounted to 182 points for the period 1929–1931 as against an average of only 149 points for the period 1937/1939. However, the costs of the means of agricultural production dropped along with the prices.

The most important results have been summarized in the table on page 43.

The agricultural capital assets of all farms rose from Fr. 5929 per hectare to Fr. 6450. This increase in value expresses clearly the all-round development of the farms.
Economic and social aspects

<table>
<thead>
<tr>
<th></th>
<th>1929–1931</th>
<th>1937–1939</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>total Fr.</td>
<td>per hectare Fr.</td>
</tr>
<tr>
<td>Agricultural capital assets</td>
<td>2229340.—</td>
<td>5929.—</td>
</tr>
<tr>
<td>Gross output</td>
<td>321481.—</td>
<td>855.—</td>
</tr>
<tr>
<td>Gross output per 100 Fr. labour input</td>
<td>190.—</td>
<td></td>
</tr>
<tr>
<td>Produce consumed on farms</td>
<td>92242.—</td>
<td>(32 %)</td>
</tr>
<tr>
<td>Market production</td>
<td>194389.—</td>
<td>(68 %)</td>
</tr>
<tr>
<td>Operating expenditure</td>
<td>298288.—</td>
<td>793.32</td>
</tr>
<tr>
<td>Net yield</td>
<td>23193.—</td>
<td>61.68</td>
</tr>
<tr>
<td>Net yield in % of the capital assets</td>
<td>1.04 %</td>
<td></td>
</tr>
<tr>
<td>Production costs</td>
<td>394893.—</td>
<td>1050.25</td>
</tr>
<tr>
<td>General income</td>
<td>204347.—</td>
<td>543.—</td>
</tr>
<tr>
<td>Agricultural income</td>
<td>139778.—</td>
<td>372.—</td>
</tr>
<tr>
<td>Labour income</td>
<td>75570.—</td>
<td></td>
</tr>
<tr>
<td>Property income</td>
<td>16243.—</td>
<td></td>
</tr>
</tbody>
</table>

The total gross yield increased by 3.4 % only, due to receding prices. The greatest increase to be noted was in arable production. The gross yield of arable production rose from Fr. 25,000 to Fr. 44,000.

The breakdown of gross yield into produce for consumption on the farm and produce for marketing is very significant. The proceeds from the sale of the marketed produce are at the disposal of the farmers in the form of cash that can be used for operating costs as well as for the consumer needs of the farmer and his family. The market production rose by 11 % from Fr. 194,000, to Fr. 216,000. Prior to land consolidation, 68 % of the gross output was marketed while afterwards 74 % was marketed. The greatest increase took place in arable production which formerly served almost exclusively for consumption on the farm. Prior to consolidation the market production amounted to only 28 % of the gross arable output; later, it amounted to 61 %.

The increased output in kind can be computed from the final gross output by multiplying the output in kind of both periods with the same prices. Thus the price differences of the two periods under review will be eliminated; the resulting difference derives solely from the increase of the output in kind.

The increased output in kind was:

(a) In the arable sector 29.7 %
(b) In animal husbandry 15.4 %
(c) In all farms of the municipality of Mandach together 20.4 %

The output increase for the community as a whole amounted to 20.4 %.

The operating expenditure dropped from Fr. 298,000 to Fr. 275,000, or from Fr. 793 per hectare to Fr. 731 per hectare. The causes of this drop can be found in a reduction of costs only, particularly in the lower valuation of human labour. If one presumed equal
prices to apply to the agricultural means of production, the operating expenditure would even have risen by several percent. The same holds true of the production costs. The net yield rose from Fr. 23,000 to Fr. 57,000, or from Fr. 62 to Fr. 152 per hectare. Thus there is an increase of Fr. 90 per hectare. This increase in net yield strikingly coincides with the results of NAEF's and HÜNI's investigations.

Furthermore we drew a comparison between gross output and labour input. Prior to reallocation, every Fr. 100 of labour input yielded a gross output of Fr. 190; in the period 1937 to 1939 however, the latter rose to Fr. 225. This relation clearly illustrates the increased productivity of human labour.

Considered as a whole, the profitability and income conditions prior to land consolidation proved entirely unsatisfactory—a phenomenon which is typical for the Jura Mountain areas with a fragmentation of holdings. In the period following land consolidation, there has been evidence of an improvement of the economic results which although it may not be revolutionizing is yet clearly proven.

The measures taken for the improvement of farming conditions took their full effect only during the farming activities of the Second World War. Since, however, agricultural production at that time was strongly influenced by factors external to agriculture, a straightforward comparison with the preceding period has not been made.

In conclusion it is to be noted that land consolidation in the municipality of Mandach became the point of departure for a rapid development of agriculture. The farms were developed in several directions; the production process was improved by the application of new working methods and the use of new machines.
INTRODUCTION

Since land consolidation comprises a wide variety of measures, legislation, financing and administration in this field is necessarily complex. Seen from a legislative and administrative point of view the reorganisation of agricultural holdings may proceed as:

a. Reallocation of scattered plots without expanding the size of the individual farms (equivalent exchanges - 'remembrement parcellaire');
b. Enlargement of individual farms (without any reallocation); or
c. Consolidation in the wider sense, reallocation of plots into larger contiguous units combined with the expansion of individual farms ('regroupement des exploitations').

When the reorganization of holdings is placed in relation to land improvement, a distinction has to be made between:

a. Consolidation of fragmented holdings without any construction work;
b. Consolidation of fragmented holdings with small improvements in the road system etc., but without major construction work; or,
c. Land Consolidation or consolidation in the wider sense combined with all kinds of construction work which may be connected with the reorganization of holdings ('amélioration intégrale').

Land consolidation is carried out in many European countries, but is termed very differently, i.e. as:

Kommassierung in Austria;
Remembrement avec travaux connexes in France;
Flurbereinigung in Germany;
Remembrement intégral in Greece;
Ruilverkaveling in the Netherlands;
Concentración parcelaria in Spain;
Integralmellioration in Switzerland.
One of the most significant features of land consolidation is its time-consuming aspect. No doubt, only well-considered planning and careful implementation can avoid the risk which is connected with operations of inferior quality. But the need for accelerated action is generally recognized and has led to a serious endeavour to use simplified procedures, in order to make the most appropriate use of the available administrative resources. It is, however, generally agreed that the quality of land consolidation and the security of and fairness to the participants should not be risked by speeded procedures. Of no less importance is the position of the landowner and cultivator in the procedure. Shall land consolidation be imposed on the farmers in a compulsory way, or on the contrary, shall it be based on their voluntary decisions, and shall the farmers and not the authorities carry the lone responsibility for the procedure? Closely associated with these questions is the protection of the minority and the determining of the qualified majority both in terms of land and participants.

Since land consolidation with all its technical and administrative aspects, is a highly expensive enterprise and far beyond the farmers’ paying capacity, it has to be decided whether and to what extent the State shall contribute to the costs, i.e., by straight grants, loans, provision of services, etc. Problems of land assessment are here of great importance, together with the careful balancing of the costs and benefits carried out derived by the individual farmer from land consolidation operations.

Consideration has to be given also to the organization of the services in charge of the implementation of land consolidation. Shall land surveyors be private professionals or officials? Shall the farmers be organized (as is the case in Germany and Switzerland) in administrative bodies of a cooperative type which deal under their own responsibility but under administrative supervision, or shall everything be directed by the authorities? One of the most important problems to be faced by legislation and administration is the prevention, or at least the retarding, of future sub-division and fragmentation of holdings; the fixation of farm sizes makes it necessary to take population trends and the probable rate of technical progress in consideration.

All these questions are closely associated with the relative problem of conflicting interest groups and problems related to the social grouping of the community. The community as a whole and their various groups, as for instance, owners and tenants, can rightly claim careful protection of their rights at the different stages of land consolidation. The various European countries have taken different approaches to the legal and administrative aspects. Switzerland and Germany e.g. have been greatly concerned with the time-consuming aspect of existing land consolidation procedures and Sweden has also tried to practice a simplified form of land exchange.

Reallocation of land in close coordination with the enlargement of individual farms is in the focus of the operations, in Ireland, Denmark, Germany, the Netherlands and Sweden. For this purpose wide powers for land acquisition have been granted to the Government and specific expropriation-legislation has been established in these countries.

All European countries give considerable attention to the administrative aspects of land
consolidation, as distinguished from its legal procedure. While for instance in Sweden the legal procedure includes road construction as the most urgent work, other improvements as e.g. enlargement of farms, improvements of buildings, etc., are executed or supervised by administrative authorities. Also in Norway reallocation and enlargement of holdings are controlled by different authorities. The Netherlands in their legislation distinguish between two parallel branches:

a. one to achieve the reallocation of parcels and the incidental construction work connected with it, which seldom is applied; and

b. the other to carry out the comprehensive program of integrated reorganization of the whole region including road and water-course construction, resettlement, demolition of old farms, slum clearance, reclamations and land improvement. In the majority of cases the comprehensive program is carried out.

This chapter will deal with all those issues both separately and in relation to the various stages of land consolidation.