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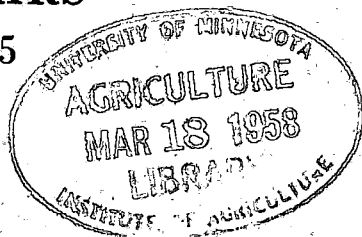
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**Agriculture
and Forestry:
Competition or
Coexistence?**

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NORWAY

THE relationship between agriculture and forestry in Norway is a dynamic problem. In the old days the extensive forest areas were a formidable obstacle to the expansion of cultivation, but today we regard them not as an enemy but rather as an indispensable foundation for the advance of material wealth and culture. More than half of the forest land is owned by the farmers and is managed as part of their farms. Farm forestry is a more predominant feature in Norway than in any other country in northern Europe.

The farm-forestry system in its traditional form contains inherent weaknesses, but it also has advantages. The decisive factor, however, is that combined ownership is an ancient and innate institution which, if altered, would have far-reaching repercussions on the judicial and social structure of the country. Thus, from the realistic point of view, it must be regarded as a fixed institution and must be treated as such.

Within the framework of farm-forestry ownership it would be futile to discuss agriculture *versus* forestry. It would be more fruitful to discuss the principles for drawing the boundaries between forest and arable land, an issue which is a favourite subject in Norway's agrarian politics though the arguments have tended more to the emotional than to the realistic.

Since the farm-forestry system is a predominant feature of Norwegian agriculture, the factors which appear to dominate it will be particularly emphasized in this survey.

I. The parts played by agriculture and forestry in the national economy

Statistics show something of the evolution and structure.

The number of persons employed in agriculture and forestry is steadily going down, both absolutely and relatively. The census of 1950 showed that 22 per cent. of Norway's population were obtaining a living from these two industries but, owing to the combined operation of the two, it is difficult to tell how many persons are actually employed by each. If one goes by the annual work unit we could assess the distribution to be 80 per cent. in agriculture and 20 per cent. in forestry.

Agriculture supplies the population with animal products, potatoes, berries and most of the vegetables needed, though considerable amounts of cereals and concentrates have to be imported. Eighty per cent. of the gross income is derived from animal husbandry and over 50 per cent. from cattle alone. In recent years agricultural production has managed to supply 40 per cent. of total food consumption. Agricultural net product is between 6 and 8 per cent. of total domestic product.

In forestry the annual production is 10 to 11 million cu. metres,¹ 25 per cent. of which is consumed on the farms, 5 per cent. sold for fuel, 30 per cent. sent to the saw-mills and 40 per cent. to the pulp- and paper-mills. Net product from forestry amounts to between 3 and 4 per cent. of net domestic product. The net product from saw-mills and the paper industry amounts to 5 or 6 per cent. of the net domestic product and 15 or 20 per cent. of the net product of all manufacturing industries. Between 50 and 60 per cent. of the total production in the paper and pulp industry is exported. This constitutes one-fourth of the country's total exports.

Despite the fact that there are eight fundamentally different agricultural regions, milk production is most important in all of them. Bacon, eggs and potatoes come next. Cereals are mainly grown in the Plain and Forest regions, whereas fruit is grown along the inner fjords. Sheep breeding is mostly dominant in the Mountain region, in the Inner Fjord region and in northern Norway. Forestry is of greatest economic importance, of course, in the Forest region, but it is also important in most of the southern region, the lower parts of the Valley and Mountain region and the inland areas of the Plain region. In Jæren and in the coastal districts forestry plays a minor part.

Some of the main structural features of the two industries are as follows. Ninety per cent. of the farms are owned by the farmers themselves. In recent years farm tenancy has become more frequent, one of the reasons being that farmers are very reluctant to sell because of inflation and government control of property prices. In the Forest and Mountain regions parts of the rough land are common property (commons) where the farmers are entitled to grazing rights and timber. In northern Norway, where the state owns considerable forests and rough land, the farmers have similar rights. Co-ownership of the rough land has been a common feature in western Norway, but is gradually being abolished as a reallocation of the rough land proceeds.

¹ 1 cu. metre = 35.31 cu. ft.

This activity has been speeded up in recent years owing to the extended afforestation plans in these districts. More than 50 per cent. of the total forest land is owned by farmers. Five per cent. is in commons, industrial concerns own 10 per cent., other private owners 15 per cent., municipalities 5 per cent., and the state manages 11 per cent.

The size of farm is another important factor. Generally they are very small. A middle-sized farm in the Plain and Forest regions has between 10 and 20 ha. of agricultural land, in the other regions from 5 to 10 ha. or even less. The forest land is also divided into small units. This is particularly so with the farm forests, 95 per cent. of which are of less than 100 ha.

A natural consequence of the conditions of tenure and the size of farms is that the farm family constitutes the main source of labour, a situation which is reinforced by the fact that the farmers find it extremely difficult to compete with other industries for labour.

The labour force in forestry comprises professional forestry workers, smallholders who do not own any forest and farmers who work on their private forest land. Farmers under normal conditions work between 50 and 100 days annually in the forest.

In most parts of Norway, especially in the southern, eastern and middle (Trøndelag) parts, most farms have some forest areas attached to them, and it is just this farm-forestry combination that has enabled the farmers to create reasonable living conditions for their families on the many small units. Farm Management Research shows that forestry has provided 25 or 30 per cent. of the total farm family earnings whereas farming alone has supplied 60 or 65 per cent. and other occupations 10 per cent. Farms in the forest districts have larger net incomes from their woodlands than from their crop and livestock production.

Many smallholders in the forest districts have very little or no forest but, during the winter, paid work in the forests is a substantial source of income, especially if they have horses which add value to their work.

II. *The interaction between agriculture and forestry*

Supplementary relations. Agriculture and forestry are concomitant industries in the economy of the forest districts. This is especially so when considering the supply of labour, since the farming sector needs

most workers during the summer half-year and the forestry sector during the winter half-year. In other words, labour peak periods in agriculture coincide with idleness in forestry, and vice versa.

A considerable and steadily increasing part of the hired labour in forestry works in the forests all through the year. Another group are seasonal workers who are employed in the building and construction industries during the summer. A third group are agricultural workers during the summer and forestry workers during the winter. A fourth group are smallholders who do not possess forests themselves. A smallholder who commands a horse is capable of earning a considerable income from transportation work. The supplementary relationship between agriculture and forestry not only affects the labour force but also the means of traction.

Sensitive to economic trends, forestry has been easily and badly hit by trade depressions, with consequent large-scale unemployment among its workers. In times of business recession, agriculture has absorbed a very substantial part of the unemployed.

Agriculture and forestry as joint industries. Most significant and of the greatest interest from a management point of view is this interaction between forestry and agriculture when seen *within the framework of the single farm*. This kind of management combination, as already pointed out, is widely practised in Norway. On the so-called farm forests this association is so intimate that it should be regarded as a mode of management within agriculture.

Because of this, a large part of the factors of production are common to the two enterprises. This is particularly so of labour, traction and capital and also, in a smaller degree, of implements and buildings. This, by and large, is the acknowledged view. However, when the management factor itself is considered, i.e. the directly integral factor of production, this view very often tends to be forgotten, especially by the professional technical specialists on both sides.

This combination presents advantages and drawbacks according to the way the possibilities are utilized, and also according to the different points of view. The disadvantages are easily perceived from an exclusively agricultural or forestry point of view, perhaps more so from the latter. First, it is maintained that the small farm forests are an obstacle for rationalized forestry; secondly, that most farmers give the forest too little attention (although the forests are the most remunerative factor, they are not properly taken care of as far as investment and cultivations are concerned); and finally, it is stated very

often that the operations of the farm forests are not done so regularly from year to year as they are in other forests.

The arguments concerning the small forest units carry some force despite the fact that the fixed costs are very low. The contention that most farmers do not give the forest proper attention has become less valid in recent years. It is quite natural that it should be hard for a farmer to acquire a sufficient knowledge of both agriculture and forestry and be fully informed about both. It has been pleasant to note in recent years, however, that the treatment of farm forests has made great progress. The volume of production has tended to be more even, partly because of a relatively stable market but also because of better management. The periodical oscillations in the harvest volume have only in rare cases been due to unfortunate speculation. This again is causally associated with the conditions of tenure and family traditions.

On a farm with adjoining woodland it is relatively easy to keep up a well-balanced employment level throughout the year. The difficulties lie rather in how to manage the farm in such a way that the work will give high productivity, and how to distribute labour to forestry and agriculture in such a manner as to obtain the best collective result. The choice of farming system is quite different for a farm with forest than for one without. The former as a rule goes in for few enterprises. If a diversified livestock programme were to be undertaken there would be no spare time to work in the forest.

The fact that most farm forests are small implies that a considerable part of the production is used on the farms. An investigation in 1936-7 showed that the consumption of wood from farmers' own woodlands amounted to 40 per cent. of total cutting in the farm forests. In recent years, however, the wood consumed on the farms is much decreased. This is partly due to the extension of electricity for cooking and heating and partly to the circumstance that the pulp and paper industry can utilize wood of smaller dimensions and poorer quality than before. The percentage of own consumption may now be 15-20 per cent. on average.

The farm-forest products are mostly marketed through the Timber Sales Associations, where a farm with a small woodlot is a member on equal footing with a big forest owner. The fact that production for sale from farm forests has increased and that the price trend has been more favourable for forest products than for agricultural products implies that forestry is playing a more important part in the

enterprise combination than before. At the same time, the scarcity of labour has promoted mechanization and tendencies towards specialization. The great increase of planting and other forest cultivation during the last five years has added to the need for summer labour in the forests. These tendencies have enforced experiments in new methods. Co-operation between several neighbouring woodlots has been organized until now, however, only in a few cases. An arrangement which has been very popular is the so-called forest cultivation gangs working for the forest owners in each municipality. These trends and incentives have to a large extent made the farm-forestry system more efficient than earlier, but have at the same time led to a less intimate management combination with regard to the organization of labour.

Now and again discussion about conditions of tenure crops up. The discussion is generally centred on the problems of whether forests should be in private or public ownership, whether they should be large or small units and whether forest land should be transferred to holdings without forests, as has been claimed recently by the small-holders as part of their effort to improve their productive capacity.

Competitive relations. In this connexion the main question raised concerns *land use for agricultural or forestry production*. The extension of arable land has always been partly carried out at the expense of the forest area. During the inter-war period when a considerable area of land was brought into cultivation, only a small part of the productive forest land was affected, one reason being that most of this cultivation was carried out in districts which are destitute of forest, i.e. the coastal districts and northern Norway. On the other hand, the extensive cultivation of pastures which has been going on during the last twenty-five years has affected the conifer forest areas to a much greater extent, and considerable areas of productive forests have been cleared for pastures. In this relation between forestry and agriculture, however, the case was clear: forest land could stand being reduced by 1 per cent. if the remaining part could be freed from grazing. The question whether the areas should be used for agriculture or forestry has been subject to much discussion. The question of grazing excepted, the representatives of the two industries have not always agreed. The arguments have changed greatly, however, in conjunction with the varying state of business and also according to the goals set forth in agricultural politics. The question naturally takes on a different aspect when seen from the point of view of national rather

than of private economics and the national judgement itself depends on whether self subsistence or free international trade is assumed. In whatever way one judges this problem, it is quite obvious that agriculture will normally yield the higher returns per unit area, whereas forestry surpasses agriculture in returns per unit of labour.

In recent years this complex of problems has been increasingly noticeable. New cultivation increased during and after World War II and also changed its character. While new cultivation in the pre-war era was an important factor in the employment policy, post-war cultivation has a clearer farm management aspect, i.e. to create larger and more rationalized farm units. The many smallholdings are an increasingly topical problem owing to their lagging behind in the race for mechanization.

New cultivation is still the most important means of increasing the size of farms and many holdings with adjoining forests, but no tillable, uncultivated land, could become good farms by clearing parts of the forest area. In this way the productive capacity could be greatly increased with the available labour and without any heavy investment in new buildings, &c. The fact that forestry yields a greater net income per day's work, and that the production per work unit is an increasingly important productivity measure, is of no relevance on a farm where the labour force is fixed but not fully utilized. In such cases cultivation of forest land might be justified when the tree stand has matured. In other cases it is natural to take the opposite course and plant trees on land which has previously been cultivated, particularly land which is too steep or has been found unsuited for other reasons, and whole farms which have been abandoned. This kind of farm is frequently found in remote localities in the valleys and fjord districts.

Although agriculture has its greatest need for labour in summer and forestry in winter, the two industries will partly compete for labour. As forestry develops from a mere harvesting procedure to production based on cultural treatment, this competition becomes a problem since most forest reproduction work must take place during the summer half-year. Under the farm-forestry system we need to find a solution for this ever-growing competition.

III. *Arrangements to make the farm-forestry combination more efficient*

Legislative reforms. The most important rules for acquisition of land, pre-purchasing, expropriation and control of land division, and

the administration of such affairs, are given in the Land Act of 1928. These laws were to a great extent based on a social view, the central point being the abandonment of old forms of land tenure and the provision of land for the greatest possible number of people. At the present time a new Land Act is under consideration. Under it the primary emphasis will be upon managerial considerations as far as the formation of farm units is concerned. One goal is to keep the combination of agriculture and forestry, another to get a more effective control over land division.

Another legal step is found in the Forest Protection Laws. With the introduction of F.P.L. in 1932, funds were established for planting and other forest cultivation. The funds were financed by subtracting 1 per cent. of the sale value of conifer timber. In 1938 the rate was raised to 2 per cent. From 1947 we have also had investment funds on timber. These funds have constituted 7 or 8 per cent. of the gross income and must be used for roads and construction work in the forest, and also for cultivation. With the enactment of these laws, cultural treatment and other investments have become more regular, and an important foundation is thereby laid for increased production and more efficient management of the forests, including those that till now have been lagging behind.

Research and advisory work. Forestry is an industry which needs long-run planning. The result of today's work will not be available until the next generation. Not least in farm forestry has the long rotation been tending to traditional and inefficient methods. How can the farm forester overcome this danger, and at the same time keep the advantages of the system?

The answer lies in increased research and advisory work, especially at the managerial level. Many managerial problems cannot be valued by looking upon either agriculture or forestry in isolation. What is important is to find how they may be co-ordinated. First, one must gather experience through exact experiment. Secondly, the owner must be assisted to set forth clearly his production aims and to judge the possibilities that are at his disposal. Finally, there must be set up combined management plans for agriculture and forestry. Co-ordinated planning for farming and forestry will bring about a more realistic evaluation of the available labour, the investment capacity and the economic possibilities as a whole. A greater and greater number of people are beginning to recognize the significance of planned management in agri-forestry, and the task is tackled from both sides.

In 1942 the Norwegian Forestry Society started appraisal and production planning for farm forests. The forests are mapped, the volume of stand and its rate of growth are estimated, the site quality is determined, and the stands are classified by maturity and condition. On this basis there is laid a 10-year plan for cutting, reproduction and other cultural improvements. This activity has highly stimulated the farm foresters to improved treatment of their woodlands and the first revised appraisals show that imposing results are being obtained.

This planning lies, after all, mostly on the technical-biological level. Economic analysis of farm-forest operations is the next step. Research in this field, however, will be profitable only if the farm forest is regarded as an integral part of the whole farm. Consequently, intimate team-work should be organized to solve the problems and make effective planning for combined farming and forestry management.

An impression of research and advisory work in this field may be gained by an examination of the problems of afforestation in western Norway:

In this part of the country considerable areas are covered with deciduous trees, shrubs and heather of little or no commercial value. Plantations and research have shown that the Norway spruce has excellent growth ability over much of this area. At the end of the pre-war era the main directions for afforestation were drawn up by the West Norwegian Forestry Research Station. With this research as the basis, the Director of the Forestry Department has drawn the main lines for the practical approach, and the work has been organized with public support according to a proposal in 1952 of the State Forestry Commission. The more feasible cultivation plans have been worked out by local agents and some of the municipalities have already carried out a good part of the plans. Most of the afforestation area belongs to the farmers and an important goal in the plan is to give more resources to the small farms. The areas that are being cleared and planted have yielded a little fuel and other minor wood materials and have been used partly as unimproved pastures. In order to get the cattle away, more pastures are being cultivated and mountain grazing facilities must be called in for those sheep that are not being kept at home on cultivated pastures. Parts of the rough land are, as mentioned, under common holding or lie in mixed parcels. Such forms of tenure will be abandoned by a forced reallocation of land. Owing to these facts and considering the available supply of plants, labour and capital, and future production, it is intended to plant

6,000 ha. annually during a sixty-year period. Expenditure will be borne as to 50 per cent. by the state, 25 per cent. by the municipalities and 25 per cent. by the owners.

The Institute of Agricultural Economics, in co-operation with forestry institutions, has started research work on agri-forestry management problems. Afforestation in western Norway was one of the first investigations carried out. After exact analysis a model plan was worked out for the farm-forestry system in a typical area in this region. The model plan shows that an efficient agriculture can yield a livelihood while the forest is growing. On an average farm in the rain-belt with 7 ha. of agricultural land and 20 ha. of land suitable for a plantation, the planting of trees will lead to a doubling of the farm income. When the afforestation plan in western Norway is completely carried out, this region will give a net production increase of 1.6 million cu. metres or 15 per cent. of what the country produces today.

Of course, in the farm-forestry system there are many technical questions in addition. They should, however, be regarded jointly. Thus, the farm-forestry problem is mainly a management problem and things should be seen not as static, isolated units but as one great interlocking process. In the agricultural business everything should fit together.