

CHAPTER IV

AGRICULTURE AND IRRIGATION

LAND RECLAMATION AND UTILISATION

The bigger part of the district lies under perpetual snow and a considerable area is rocky and barren. Cultivation is, therefore, limited to the river valleys and the gently sloping hills. The usual limit of cultivation is up to about 2,000 m. above sea-level, but certain crops are also grown up to a height of about 2,750 m. Owing to increase in population, the forests in the valleys and on hill slopes have been gradually cleared and more and more land are being brought under the plough. The cultivated area, which was 10,75,592 *nalis* and 9 *mutthis* at the Settlement of 1900–1902, had increased to 24,13,955 *nalis* and 1 *mutthi* (48,844.7 hectares) at the Settlement of 1964-65, which was about 6.6 per cent of the total area and 24 per cent of the total measured area of the district.

For centuries, the gently sloping hillsides have been brought under the plough by way of terracing. Stones down the slope are built into a wall and the upper part is excavated until the whole becomes approximately level. As the crust of the soil is very shallow on most of the hillsides, this operation is not carried out simultaneously, but during the first year, only a small wall is built up and a small excavation made, the operation being completed in course of time by weather, tilth and diluvium from higher fields. Most of the villages are situated about half way up the ridges, which aids the cultivation of arable lands situated both below and above the village, the best lands existing lower down. These terraces cost a vast amount of labour and capital to make and maintain. Mr. Goudge, who conducted the Settlement of 1900–1902, writes: "The most distinguishing characteristic of hill cultivation is the continued improvement in existing terraces. Every year's ploughing removes more stones, improves and strengthens the retaining wall, levels the slopes and makes the crop more remunerative. The labour involved is of course very great and the least neglect results in an overgrowth of the thorn bushes, wild raspberry, barberry, *ghingar* and other scrub jungle which grow so quickly and profusely in the hills." At places, where the slope is so steep that it cannot be cultivated with the help of bullocks and ploughs, the practice of cultivation is known as *katil* and consists in burning the scrubs and bushes after which the land is turned over with the help of a hoe and sown. After the harvest, the land is allowed to lie fallow for three or four years.

Cultivated Area

According to the Settlement of 1964-65, the total cultivated area in the district was 24,13,955 *nalis* and 1 *mutthi* (48,844.7 hectares) of which the assessed cultivated area was 20,89,345 *nalis* and 15 *mutthis* (42,276.2 hectares).

Cultivable Waste

At the time of the Settlement of 1900–1902, only the cultivated area was measured. During the Settlement of 1964-65, the measured area was 89,88,565 *nalis* (1,81,877.2 hectares) about 28.5 per cent of the total area of the district. The remaining area which was covered with perpetual snow and forest was left unmeasured. Out of the measured area 65,74,609 *nalis* and 12 *mutthis* (1,33,032.4 hectares), about 73 per cent were barren, covered with forests or water or occupied by habitation, roads, buildings and burial grounds.

IRRIGATION

Besides height and aspect, cultivation in the hills depends very much on irrigational facilities. The worst land if capable of being irrigated is often of more value than the best land un-irrigated. At the time of the Settlement of 1900–1902, the irrigated area of the district was 1,96,514 *nalis* and 9 *mutthis* (or 18.3 per cent of the total cultivated area) the un-irrigated area being 8,79,078 *nalis* (or 81.7 per cent of the total cultivated area). According to the Settlement report of 1964-65 the irrigated area in the district was 3,96,531 *nalis* and 7 *mutthis* (8,023.3 hectares), or 16.5 per cent of the total cultivated area. Thus an additional area of 2,00,016 *nalis* and 14 *mutthis* (4,046.8 hectares) was brought under irrigation during the period of 62 years, which shows an increase of 102 per cent over the irrigated area of 190-1902.

AGRICULTURE INCLUDING HORTICULTURE

Soils

Cultivation in the hills depends upon factors like height and aspect and irrigational facilities, rather than on the composition of soils. The northern slopes of the hills are less abrupt and less denuded by the action of rain than the southern slopes. Lands with a north aspect, therefore, are more cheaply excavated for turning into fields which when made, contain thicker and richer soils, and, not being exposed so much to the solar heat, retain moisture for a longer period. But most of the soils are poor, shallow and stony. According to the Settlement of 1964-65, the cultivated land of the district has been classified into five classes, *talaon*, *upraon I*, *upraon II*, *ijran* and *khil* or *katil*.

The *talaon* lands are found nearly in all the villages of the district, and area under them, which was 1,96,514 *nalis* and 1 *mutthi* in 1900–1902, increased to 3,70,593 *nalis* and 9 *mutthis* (7,498.4 hectares) in 1964-65, showing an increase of about 89 per cent during a period of 62 years. The *talaon* lands again are of two kinds, the *sera* and the *panchar*. In the first, the water-supply is perennial and the fields are carefully leveled and can be flooded with 2 cm. to 5 cm. of water, when required. This kind of land is usually sown with the finest rice and occurs generally lower down near the irrigating stream. The soil being fertile, and the water-supply and heat being constant, these lands are the richest and most productive. Where the water is apt to be scanty, except during and immediately after the rains paddy is sown in seedbeds at the proper season (usually April) and transplanted into other fields with the advent of the rains, when the stream has increased in volume sufficiently to flood the whole of the *sera*. Some part of this land is known as *simar* land and contains marshy areas and abundance of water. Only paddy is grown on them. The term *panchar* means land capable of being irrigated, rather than irrigated land. Such fields are found in the uplands and are frequently not well leveled, but water can be led to them in a canal and they can thus be sprinkled occasionally. The importance of this somewhat intermittent irrigation is not great. The lands are not suitable for the best kind of rice, and in ordinary seasons irrigation is not necessary as the rain if normal, does all that is required. In dry years, on the other hand, when artificial watering is necessary the canals are naturally lower than usual and in practice prove barely sufficient for the *seras*. At the same time, in such years every effort is made to give the fields a sprinkling sufficient to germinate the wheat, and if canals are not available for the purpose, the women carry up water from the nearest spring or stream in pitchers. The *panchar* land, therefore, hardly differs in value from the *upraon I*.

The *upraon I* lands are as good as *talaon* but they are not irrigated and totally depend for their cultivation on the rainfall. These lands are found in the valleys near the habitations and are

suited for the cultivation of paddy, *jhangora*, wheat, barley and *mandua*. The area under this group of land which was 3,32,279 *nalis* and 11 *mutthis* in 1900–1902, increased to 8,97,917 *nalis* and 6 *mutthis* (18,168.3 hectares), in 1964-65 the increase being 169 per cent during 62 years.

The *upraon II* (second class un-irrigated terraced land) is slightly inferior to *upraon I* and lies above the villages near the top of the hills. It is suited for the cultivation of *jhangora* and *mandua*. The area under this group of land, which was 2,11,735 *nalis* and 7 *mutthis* in 1900–1902, increased to 7,38,228 *nalis* and 4 *mutthis* (14,937.3 hectares) at the Settlement of 1964-65, the increase being about 249 per cent during 62 years.

The *ijran* is the worst type of terraced land which is found on the steep slopes of high hills and depends for its cultivation on the rainfall. Cultivation is carried on here once in two to three years.

Khil or *katil* lands are also found on the steep slopes of high hills and their soil is full of stones and pebbles. Terracing and ploughing is impossible, and therefore, they are sparsely cultivated, the crops being poor. The area under *ijran* and *katil* lands which was 3,35,062 *nalis* and 14 *mutthis* in 1900–1902 had decreased to 82,606 *nalis* and 12 *mutthis* (1,671.3 hectares) in 1964-65, the decrease being about 75 per cent during the period of 62 years. The cause of reduction in *ijran* and *katil* lands is improvement effected in soil due to constant cultivation and better arrangements for irrigation.

Soil Erosion—Owing to the high gradient and a large number of rivers and streams, the problem of soil erosion in the districts is acute. Several schemes have been started to check the soil erosion such as rising along the banks of rivers, of trees like *tun*, *pangar*, *kaful* and *bel* which have economic value in the hills as well as help in checking soil erosion. Similarly, cultivators are being advised to plough against the slope and take to line sowing of crops.

Harvest

Throughout the greater part of the district there are, as in the plains, two harvests—Kharif and Rabi. But owing to the cooler climate, the crops require a longer period for their full development and are, therefore, sown somewhat earlier and reaped somewhat later than in the plains. The Rabi crops include wheat, barley, *masur*, peas, linseed and mustard. Sugar-cane is grown in the valleys in the southern part of the district. The Rabi crops are sown from October to November and harvested from April to May but in fields at 2,150 m. the spring crop does not ripe until June and in those at 2,450 m. it ripens as late as July. In the snows *uajao* (Himalayan Barley), a beardless variety, is grown at the height of 1,825 m. and upwards, being followed by the *phaphar* or *chuwa* in the Kharif. In the higher snow valleys close to the glaciers a fine species of wheat, known as *napal*, is grown as a Kharif crop. The seed is sown in May or early June when the snow melts and reaped in November, unless, as sometimes happen, heavy snow falls early in the autumn and prevents the crop from being reaped at all.

The Kharif crops include paddy, *mandua*, *madira*, *kauni*, *china*, maize, *ugal*, *urd*, *bhat*, *gahat*, *ras*, pulses and mustard and are sown between April and June and harvested between September and November. Most of the crops are already well above the ground before the onset of the monsoon. If the monsoon is delayed, second sowings are often necessary. Dry paddy for instance, is sown as early as the beginning of April and sometimes by the end of March. It depends for its existence upon the rather uncertain storms that sweep across the hills from the north-west during April and May. These storms often go astray or fail altogether, so that dry paddy is a most precarious crop and the cultivator is satisfied if he gets only about half of the harvest. *Kauni* (the

kakwan or *kagni* of the plains), *chana* and maize come to hand rather earlier than the main Kharif crops, each of the first two being normally a 60 day crop, and are frequently reaped by the middle of July. *Jhangora* is reaped by the middle of August and *mandua* and rice in late September and October. In the lower hills *tur*, a kind of pulse, resembling the *arhar* of the plains is sown in March and reaped with the main Kharif crops.

Method of Cultivation

In order to prepare the ground for deed, it is first of all ploughed once in the case of coarse Kharif crops, such as *jhangora* and *mandua*, and twice in the case of others. In the double-cropped area, the land is less carefully prepared for wheat or barley than for the Kharif crops. The Rabi seed is often sown among the half-ploughed-in stalks of the preceding crop. On the other hand, the fields are scrupulously cleared after the Rabi harvest before they are deemed fit for reception of the Kharif seed. In the case of rice, and sometimes wheat, the clods are broken up, after each ploughing with a long handled mallet (*dalaya*) and the ground is smoothed over with a toothless harrow which is a flat wooden log (*maya*). The seed is then sown and ploughed in with the manure. When the Kharif crops have reached some height above the ground the toothed harrow, called *dandyala*, is applied. Then until they begin to come into ear, they are regularly weeded. The crop is cut with a sickle, paddy being cut off close to the root, while in the case of *jhangora* or *mandua* the ears only are first cut, and after the stalks have dried they are cut and stored as fodder. Wheat and barley are cut about the middle. The sheaves are brought to the threshing floor. The ears are chopped off for threshing, while the stalk is given to the cattle. In normal years the remains on the field are grazed off by cattle or even burnt, but when grass is scarce they are carefully preserved for fodder.

In irrigated land rice is usually sown in a seedbed from which the young plants are transplanted into the remaining irrigated land. All the finer kinds of rice are produced by this method, which has the advantage of rendering land for which no water is available during the hot weather as valuable as perennially irrigated land. Pepper is similarly cultivated. Rice is not taken to the threshing floor but the paddy is separated from the stakes on the spot. It is usually left on the field for three days after being cut and then spread in sheaves in a matting of *ringal* or of wheat straw. The grain is then pressed out by the feet. In case of *mandua* and *jhangora* all that is done in the way of transplantation is to fill up the barer parts of the field by putting in seedlings taken from the more thickly sown parts so that the crop may be even all over.

Threshing-floors are usually constructed on a ridge, where a good current of air may be anticipated. They are commonly paved with stone flags. The grain is trodden out by oxen in the usual way and winnowed by pouring it out of a basket held high up on to a mat below. The grain is then stored in big baskets in the upper storey of the houses till required for use. Rice is husked when required for use by pounding it a sort of stone mortar hollowed out in the courtyard, with a stick about 6 cm. in diameter and 1.5 m. long, narrow in the middle where it is grasped, and bound at the end with iron rings and is known as *ginjyala*. If required for sale, rice is husked immediately after harvesting.

Principal Crops

The chief Kharif crops are paddy *jhangora*, *mandua*, pulses and potatoes; and the chief Rabi crops are wheat, barley and *masur*, Ginger and pepper are also grown in abundance in the district. Among vegetables, potato, onion, radish, *ghuia*, *gaderi*, *louki*, *turai*, *palak*, *methi*, brinjal, lady's-finger, *gethi*, cauliflower and *tarud* are grown in all parts of the district. Hemp grows wild in the waste lands and forests of the district. Local people obtain fiber from its plant for making

ropes and sack-cloth. Efforts are made as early as 1840 to popularize tea plantation in the Kumaon region and three places in the district, Bering, Jhaltola and Chaukori, were selected for establishing tea gardens. Because of the popularity of tea grown in Assam and the Nilgiris, tea cultivation in these areas could not flourish and at present it is in a very declining state. The tea gardens had an area of 41,358 *nalis* (836 hectares) in Chaukori, 27,510 *nalis* (556.6 hectares) in Jhaltola and 9,667 *nali* (195.4 hectares) in Bering in the district in 1964-65.

Horticulture and Fruit Utilization

The district has an ideal climate for orchards. Besides the land brought under the plough, there are suitable tracts, rich in humidity and organic matters, between the heights of 1,800 m. and 3,000 m., which are suitable for horticulture, but they are under the jurisdiction of the forest department. Farmers own limited land and generally aim at growing food crops. Their reluctance is but natural as horticulture operations require much investment in the beginning and have a late return.

After the formation of the district, a number of schemes have been taken up by the horticulture department of the State for fruit and vegetable cultivation in the district.

Long-term Loans and Grants-in-aid— This scheme envisaged assistance to orchardists to enable them to effect improvements in existing orchards and for laying out new orchards. Under this scheme loans are given to orchardists for 15 years at Rs. 1,500 per hectare, subject to a maximum of Ra 3,000 and the repayment of the loans starts after 5 years, 1/6th of it is converted into subsidy on proper utilization of the loan. The following statement shows the amount of such loans and grants-in-aid sanctioned and disbursed in the district from 1960-61 to 1965-66:

Year					Amount (in Rs)	
					Sanctioned	Disbursed
1960-61	..	..	..	..	1,00,000	61,700
1961-62	..	..	..	..	50,000	50,000
1962-63	..	..	..	..	80,000	77,400
1963-64	..	..	..	..	50,000	47,750
1964-65	..	..	..	..	50,000	40,000
1965-66	..	..	..	..	50,000	40,000

Multipurpose Horticultural Farms— In 1966, there were six multipurpose horticulture farms in the district at Pithoragarh, Balanti, Sirkha, Quenti, Thal and Badala and eight progeny orchards at Gangolihat, Munakot, Munsyari, Kanalichinna, Balwakot, Berinag, Bhataura and Didihat. They had been set up by the government to raise fruit seedlings and saplings to meet local demand and to serve as demonstration units for the protection of fruits, fruit plants and vegetables from pests by use of insecticides, etc. They have also been established with a view to augment the limited local supply of vegetables and demonstrate the best methods of grafting and pruning. The stress is on making known to the public the economic prospects of growing orchards systematically in order to meet the increasing demand for fruits and vegetables in the hills and plains. They have also saved the orchardists considerable expenditure in transporting saplings from outside and have improved the survival rate of saplings since the distance covered in transport has been greatly minimized. There are 8 model orchards, each of about two hectares established at the block headquarters in the district. Horticultural activities are demonstrated in these farms which also include technical guidance to growers. The year-wise physical achievements in these farms and model orchards from 1962-63 to 1965-66 have been as follows:

Year	Number of fruit plants produced and distributed	Vegetable seeds produced (in kg.)	Vegetable produced/sold (in kg.)	Potatoes produced (in kg.)	Fruits produced (in kg.)	Vegetable seeds distributed/sold (in kg.)
1962-63	1,40,278	260.00	..	730.00	1,500.00	433.00
1963-64	78,993	348.85	11,144.20	9,883.00	2,738.00	348.85
1964-65	70,403	493.04	16,077.49	20,170.50	2,341.15	189.85
1965-66	91,578	1,163.00	28,399.00	18,187.00	1,354.00	937.00

Horticulture Plant Protection Mobile Teams—There were eight such teams in the district in 1966. They were established in 1961-62, for disseminating knowledge of the use of insecticides and pesticides, and methods to take care of old and new orchards. These teams move throughout the district and assist the orchardists by distributing improved variety of fruit plants, suggest sites and ideal lay- outs for orchards, distribute vegetable seeds, educate people about the utility of vegetables and scientific methods of growing them, demonstrate proper budding and grafting, pruning and culturing of fruit trees and treating trees, plants, crops, vegetables and seeds against pests and diseases. The principal achievements of these teams from 1962-63 to 1965-66 were as follows:

Year	Fruit plants supplied (no)	Vegetable seeds distributed (kg.)	Budding demonstration (nos.)	Manorial demonstrations covering areas (in hectares)	Treatment of/fruit plants against pests and diseases (nos.)	Vegetable/ agricultural crops treated against pests and diseases (hectares)	Systematic lay-out of land (hectares)
1962-63	..	..	9,872	186.6	41,434	28.4	123.5
1963-64	75,738	952.57	23,977	84.9	12,132	161.8	221.4
1964-65	91,925	532.93	9,826	63.1	36,461	231.4	150.3
1965-66	65,041	937.00	12,928	167.2	165.9 (hectares)	158.6	196.2

Besides the above, the teams dug 18,398 pits around saplings and 184 pits for planting new saplings and established 184 kitchen gardens in 1964-65.

Grants-in-aid for Transport Subsidy—It is essential to ensure that the orchardists in the various parts of the district are able to get fruit plants at reasonable rates. Under this scheme therefore, the cost of transport from the farms and nurseries to the block headquarters is subsidized by the government and vegetable seeds are distributed free. A sum of Rs 10,000 was sanctioned as grant-in-aid towards transport subsidy in 1962-63, of which Rs 7,619 was utilized. In the next three years the grants sanctioned were Rs 10,200 Rs 10,000 and Rs 10,000 respectively.

Purchase and sale of Fruit Plants on no-Profit-no-Loss Basis— This scheme, which was started in 1962-63, has greatly helped the distribution of fruit plants to actual beneficiaries. The year-wise grants from 1962-63 to 1965-66, sanctioned for the purchase and supply of fruit plants and vegetable seeds to prospective buyers, against cash payment, on a no-profit-no-loss basis were Rs 25,000, Rs 28,000, Rs 30,000 and Rs 30,000 respectively.

Mali (Gardener) Training Scheme—Starting in 1961-62, it envisages training, by a trained staff, in the art of pruning and grafting, plant protection measures and use of insecticides, for a period of three months at the multipurpose horticultural farms. A trainee is awarded a stipend of Ra 40 per month. The number of *malis* trained in the district in the year 1963-64 was 44 which increased to 64 in 1964-65.

Community fruit Canning Centres—Hill fruits, such as apples, pears, plums and peaches, have a short season of production though are in considerable demand. A community fruit canning centre was opened at Pithoragarh in 1962, and it was proposed to establish two more such centres in the district in the near future. The main functions of the centre are to provide training to the people in the methods of scientific preservation and canning of fruits. The work done by the centre from 1962-63 to 1965-66 was as follows:

Year	Fruits canned (kg.)	Training in fruit preservation and canning given to persons (nos.)
1962-63	1,220.0	..
1963-64	815.0	63
1964-65	469.3	48
1965-66	1,591.0	198

Rewards to Orchardists—The local people are extremely poor and have frequently found it difficult to switch over to orchard plantation of their own volition, particularly because this results in a reduction in agricultural income for the period taken by the orchard to start bearing fruit. Incentives in the shape of a cash award, i.e. first and second prize of Rs 200 and Rs 100 at the district level and Rs 100 and Rs 50 at the block level from the year 1964-65 are being given to encourage the cultivators to grow more and better fruits.

Improvement of Agriculture

Agricultural Implements—To impart knowledge about the use of improved implements, demonstrations are held in the villages and the fact that improved and modern implements are superior to the old and indigenous ones is increasingly being realized by the cultivators. Improved agricultural implements like ploughs, cultivating machines, seed drills, and threshers, numbering 247 were supplied in the district by the agriculture department in 1964&65 and 236 in 1965-66.

Seeds—Under the foundation seed scheme a number of cultivators in each village are provided with improved seeds by the agriculture department. They cultivate and multiply the seeds and distribute them to other cultivators. The following statement gives the details of foundation seed scheme for the year 1965-66:

Item	Kharif	Rabi
Quantity of foundation seed distributed to Gram Beej Sahayaks (in quintals)	59.23	57.33
Quantity of seeds multiplied by Gram Beej Sahayaks (in quintals)	540.55	933.97
Quantity of seeds exchanged by Gram Beej Sahayaks (in quintals)	713.72	921.70

Vegetable seeds other than potatoes are also distributed to the cultivators. In 1965, the total distribution of vegetable seeds was 1,072 kg. in the district.

Soil Nutrient—The traditional manures for maintaining the fertility of the soil are cattle dung, farmyard reuse and stable litter. Unlike the plains, a large quantity of cow dung is utilized as manure by the cultivators as little of it is used as fuel.

Compost Manure—Conversion of farm refuse into compost is being popularized in the district. There were 1,209 *pucca* and 9,319 *kutchha* compost pits in 1964-65 and 1,351 *pucca* and 7,831 *kutchha* compost pits in the district in 1965-66 for preparing compost manure.

Chemical Fertilizers—The use of chemical fertilizers is being popularized and its consumption is steadily increasing. In 1964-65, nearly 121 tones of fertilizers of nitrogenous group and 80 tones of phosphoric group were distributed and in 1965-66 the quantity of such fertilizers distributed in the district was 218.42 tones of nitrogenous and 168.18 tones of phosphoric group of fertilizers. To popularize the use of manures and fertilizers, 415 general manorial and 248 fertilizer demonstrations were held in the district in 1964-65, and in the following year 262 general and 354 fertilizer demonstrations were carried out in the fields of cultivators.

Rotation of Crops and fallowing—The top soil is generally not very thick and at places it is scanty in the fields. As such the practice of growing different crops in rotation on the same piece of land has been followed since time immemorial. The standard rotation found throughout the *upraon* land occupies a period of two years. Rice is sown in April and reaped in September. It is followed by wheat, sown in October and reaped in April. Then *mandua* is sown in May and harvested in October after which the land remains fallow till the next April. Barley is sometimes substituted for wheat and *jhangora* for rice. The *upraon* land of each village is divided into two parts, locally known as *sars*. The whole of the *upraon* is cultivated during the Kharif, one part being sown with *mandua* and the other with rice. The part in which *mandua* is sown is left fallow during the succeeding Rabi season. In the following year the *mandua sar* is sown with rice and the rice *sar* is sown with *mandua*. Beans and vetches such as *urd*, mung, *bhat* and *gahat* are sown in Kharif, as subsidiary to *mandua* and with the object of checking exhaustion of the soil. The system of leaving fallow a whole block of land instead of scattered fields here and there has its advantages when the cattle are turned loose to graze on the remnants of the straw, and the grass that can be found on the terrace walls. For this reason nearly half the village is always found apparently lying waste in the winter.

The above rotation is, however, practically confined to *upraon* land or land in which irrigation is very poor. Irrigated land is generally found at the bottom of the valley, and is, as a rule, the warmest part of the village. Moreover, there is no risk even if the paddy is somewhat late. It is protected by irrigation against any damage which might be done to late paddy on dry land by an early cessation of rains. The rice harvest begins at the top of the hills and goes towards the bottom and the spring harvest proceeds in the opposite order. For these reasons in *talaon* (irrigated lands) it is always possible to grow two crops: one of rice and another of wheat, in the same year. The wheat crop in the cold weather besides being poorer than in the corresponding *upraon* land (as the soil in the *talaon* land is too damp and cold), has a prejudicial effect on the quality and yield of rice and is therefore often omitted altogether.

Agricultural Diseases and Pests

There are three classes of pests that are generally common in the district, animals, birds and insects. Plant diseases—fungi and weeds—also cause a great deal of damage to cereals, vegetables and orchards. Similarly, monkeys, rats, squirrels, wild animals, bats, parrots and other

birds damage the crops to a considerable extent. The usual means of protection that are employed against them are fencing, keeping a strict watch and adopting various means to destroy the pests. Leaf stripe, rust diseases, leaf roller, covered smut of barley and termites attack the wheat, cotton, barley and pea crops. The paddy crop is generally damaged by leaf spot and *gundhi* bug. Among the vegetables, potatoes are damaged by early and late blight, pink boll-worm and leaf spot. Citrus canker and wither tip damage citrus fruits. The methods for scientific control of pests have recently been introduced in the district. About 231.4 hectares of vegetable and agricultural crops and 36,461 fruit plants were saved from diseases and pests in 1965. Common weeds which are harmful to healthy crops are *bathua* (white goosefoot) and *chaulai* (a kind of spinach). Systematic weeding, destroying of affected plants in the season, inter culturing and sufficient ploughing of fields are the traditional methods, generally practiced by the farmers of the district, in order to destroy these weeds. People are advised on matters relating to the cultivation of healthy crops of fruits, vegetables and cereals by the staff of the plant protection department and of the development blocks which also provide spraying apparatus, dusting machines and chemical insecticides as and pesticides at moderate rates.

ANIMAL HUSBANDRY

The hill cattle are usually small in size, active and sure-footed. The cows are wretched milkers, producing normally not more than a kilogram of milk a day. The sheep found in the lower hills differ from those of the plains in some minor characteristics, the chief being the shortness of the tail. The hill men refuse to eat the flesh of the sheep found in the plains because they consider it a species of dog, owing to its long tail. The sheep in the northern *pattis* are strong and long legged and the goats there are also stout, shaggy animals of the local breed or that of the western Himalayas and are reared for their wool. Buffaloes are preferred to cows for milk purposes as the latter are of an inferior quality.

Poultry—Due to local prejudices and social customs, poultry breeding was not popular among the people. Slowly eggs and chickens are being accepted by the people as part of their diet. According to the live-stock census of 1966, there were 7,101 hens, 2,558 chickens, 3,977 cocks and 28 ducks in the district. There were eight poultry development blocks and three poultry extension centres in the district in 1966. The numbers of poultry birds and eggs for hatching distributed to private breeders during the Third Plan period were 5,112 and 20,972 respectively.

Dairy Farming—The demand for milk products is generally met by private cattle owners who have their own dairies. During the summer, herds of buffaloes and cattle are housed in rough huts made of branches thinly roofed with grass, in places called *kharka*. They are located in pasture lands, far away from habitation, and a small staff attends each herd, collects the milk and turns it in to ghee for sale.

Fisheries—Fish of various kinds abound in the rivers and perennial lakes of the district. Potentialities for the development of fisheries, especially of the indigenous trout and mirror carp, are being explored and the fisheries department is undertaking a survey in the district for this purpose. The fish are caught by means of nets, baskets, traps and weirs and if in smaller rivers, by diverting the stream.

Cattle Diseases and Veterinary Facilities

The cattle in the district is subject to black-quarter, rudderpost, fowl pox, Ranikhet disease, enterotoxaemia, sheep and goat pox, anthrax, horse-sickness and rabies. Sometimes the animals owned by the exporters of northern region are the usual carriers of *khuria* (foot-and-

month) disease. The prevalence of foot-rot disease is attributed largely to the practice of tethering cattle in the open fields, with the object of manuring the land. They often have to stand for hours in the wet mud for this purpose, which results in their suffering from *khuria*. *Manrog* (rudderpost) which generally proves fatal to cattle is not endemic in the district.

There were eight veterinary hospitals and 42 stockman centres in the district in 1966. The number of animals treated in the district during the Third Five-year Plan period was 2,35,975, the number of animals castrated during the same period being 17,389.

Housing and Feeding

Generally the cattle are housed in the *goth* (a small room on the ground floor of the dwelling house) or in separate cowsheds. Well ventilated and well-lit cattle sheds are to be seen mostly in government shelters, Oak leaves are spread on the floor of the sheds at least once a year. Fodder consists chiefly of grass carried in from the more precipitous hillsides by the women. The cattle graze the stubble of harvested fields, or in forests, village pastures, or hillside pastures. Grazing facilities are available in the reserved and other forests under stipulated terms and conditions. In the summer, the cattle are driven up to rich forests on higher hills where there are more or less permanent cattle stations. The cattle stay there until the rains set in and grass grows near the habitation site. In the extreme north the grassy expanses between the upper limit of the forest and the region of perpetual snow are the summer grazing grounds for cattle belonging to the villages in the vicinity. The government provided a sum of Rs 1,36,555 to the *gaon sabhas* of the district in the Third Plan period for improving the pasture lands, and nearly 1,123 acres of land was thus converted into good pastures.

FORESTRY

Forests covered nearly 96,018 hectares in 1966 occupying about 13.3 per cent of the total area of the district. The main forest products are timber and resin from which rosin and turpentine oil are made. They also provide grazing facilities to thousands of sheep and local cattle. During the year 1965-66, the forest products consisted of 1,947.8 cubic meters of timber, 14,800 quintals of firewood and 7,883 quintals of resin. Among the minor products are charcoal and various types of medicinal plants and herbs. Firewood, charcoal and grass are consumed locally but the timber and resin are sold on commercial basis. The local inhabitants take medicinal plants and herbs, fallen firewood and fodder grass for their bonafide use without any cost.

For scientific development and exploitation of the forests, working plans are prepared for a period of 10 to 15 years by the forest department. The felling of trees and exploitation of other forests products are regulated in accordance with the programme laid down in the working plan. The forest growth is re-assessed and the prescriptions suitably modified or altered so as to fall in with the required working plan. The working conditions in the forests have considerably improved partly because of the opening of the roads and partly due to the construction of many buildings in the remote forest areas of the district.

These forests have great importance in the economy of the district. They conserve soil, regulate the climate, improve fertility of agricultural land, provide pastures for cattle, meet the daily requirements of the local people for fuel, fodder, agricultural implements and structural timber and give employment to many of them. Under the forestation scheme, the degraded forests have been rehabilitated and trees of economic importance have been planted. It has been propagated that the plantation of deodar, *chir* and *kail* was necessary for checking soil erosion.

NATURAL CALAMITIES

The heavy rainfall of the hills insures the people to a great extent against periodical crop failures which so devastate the plains. On rare occasions, when both the monsoon and storms of local origin fail the stable financial position of the people generally carries them over the failure of a single crop. The famines of 1868 and 1878 which occurred in the region, of which the district was a part, were very severe but their records are not available, In 1889, the monsoon, though copious, was untimely, and staple food crops such as *mandua*, *mandira*, *kangni* and *bhat* were very short in supply paddy being also deficient. The scanty autumn harvest was followed by a complete failure of the usual cold weather storms except in the *pattis* immediately below the snow ranges. In 1920, there was scarcity in the district owing to deficient rains in the preceding year which raised the prices of food-grains. Relief measures had to be taken and consisted of distribution of *taqavi* for subsistence, and for purchase of pack animals. Several cheap grain shops were opened by persons with the aid of money advanced without interest. Distress was experienced almost in every part of Pithoragarh tahsil and a part of Didihat tahsil. *Taqavi* was distributed in Saun, Nayades Seti Malla, Waldia Malla, Waldia Bichla, Kharayat, Mehar, Rawal, Seti Talla, Waldia Talla, Bel, Bherang and Athigaon Palla *pattis* of Pithoragarh tahsil and *patti* Mali of Didihat tahsil. Part of the big river valleys of the Sarju and Gori were not hit much. On the pilgrim routes prices of food-grains went up to one seer to the rupee. A feature of this period was that one noticed very little begging or desertion of children and of old and weak persons. There was no marked fall in wages. This increase in stamina and endurance was largely due to the existence of considerable savings which were made by people during the war of 1914–1918, and to money received by way of military pay, pension, etc. Forest operations and the resulting employment materially helped the pockets of people. Though extensive droughts or famines have not been reported, the district, at times, suffered from the onslaught of heavy rains, extensive landslides and avalanches. Hailstorms, too, have occasionally occurred and caused considerable loss to standing crops of vegetables and orchards. The year wise statement from 1961-62 to 1965-66 of the area affected by natural calamities and the relief measures adopted by the government is given below:

Year		Calamities		Area affected (in hectares)	Relief provided (in rupees)
1961-62	..	Heavy rains and landslides	..	102.3	3,335
1962-63	..	Hail-storm	..	1,962.7	1,141
October, 1963	..	Heavy rains	..	777.1	300
September, 1964	..	landslides	..		
October, 1964	..	Heavy rains	..	..	..
September, 1965	..	Drought	..	905 villages	..
October, 1965	..	Hail-storm	..	1,416.4 (121 villages)	