

# REPORT

OF

The Committee to Survey Agricultural and Rural  
Conditions in Bhor State.



1942

# REPORT

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in Bhor State.

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Map of Bhor State

**REPORT**  
**OF**  
**The Committee to Survey Agricultural**  
**AND**  
**Rural Conditions in Bhor State.**  
*(Appointed by His Highness The Rajasaheb of Bhor)*

To

**His Highness The Rajasaheb of Bhor.**

**MAY IT PLEASE YOUR HIGHNESS,**

We, the undersigned members of the Committee, appointed as per Extra-ordinary Gazette of Bhor Government dated the 31st January 1942, to examine the existing practices of agriculture and the conditions of rural areas in Bhor State and to make recommendations for agricultural improvement and rural development, beg to submit our report.

The Committee met at Bhor on the 17th February 1942 and after preliminary deliberations commenced its work from the following day. With the object of getting first-hand knowledge, the Committee toured all the five talukas of the State and inspected some of the important agricultural tracts and paid visits to several villages and gardens and fields of progressive agriculturists. The Committee met the village people in meetings and addressed them on its objects. It also interviewed some of the officials of the State and leading agriculturists. The Mamlatdars furnished the Committee with statistical



information regarding land, crops, holdings, cattle etc., and the Committee has used these figures in the report. The questionnaire drawn up by the Committee and circulated in advance was replied to by about 40 people. The names of villages and places of agricultural importance visited, meetings held and the number of people that attended the meetings are shown in the two tables in the Appendix. The itinerary of the Committee in different talukas was as under :—

<i>Name of taluka</i>	<i>Dates of touring.</i>
1 Vichitragad	18th February to 23rd February 1942
2 Sudhagad	24th February to 1st March 1942
3 Prachandgad	8th March to 11th March 1942
4 Rajgad	12th March to 15th March 1942
5 Pavan-maval	1st April to 4th April 1942.

During this period, the Committee visited 60 villages and places of agricultural importance and held 39 meetings. It could meet over 2800 people either in meetings or individually and discuss with them various aspects of agricultural and rural conditions. The people showed great interest in the inquiry of the Committee and discussed their problems freely. They expressed a strong hope that the efforts of the Committee be fruitful in introducing measures to put the rural population on the road to a prosperous and fuller life.

The survey undertaken was necessarily of a broad and general nature. Detailed survey was neither suggested nor possible in such a short and hurried tour of the State. Detailed surveys will have to be undertaken later, for the preparation of projects from time to time on the various proposals contained in the report. The Committee inquired into the present state of agriculture and subsidiary occupations and studied economic and social conditions of the rural population. In its report it has made definite proposals for improving the agricultural production and for developing the natural resources of the hills and dales. Finally, the essential measures for securing the benefits of the economic improvement for a higher and happier life of the population have been recommended.

In its report, the Committee has not touched the subject of "scope for the establishment of large scale industries in the State," as it was beyond the terms of reference. But as industries have a direct bearing on the prosperity of the people, the Committee recommends that a special inquiry be instituted for the purpose. The Committee thinks that there exist in the State facilities of (a) cheap electric power from the Bhatgar Power House and (b) supply of raw material, for establishing factories for (1) manufacturing tannic acid from *hirda* fruit (Myrobalans), (2) tanning of hides and skins, (3) bone-crushing, and (4) sugar making. The Committee also thinks that suitable sites for storage tanks for hydro-electric projects may be found in the Mossay and other valleys in the Maval tract. It, therefore, recommends that the Maval tract be surveyed from this point of view.

Your Highness's genuine anxiety for the welfare of Your Highness's subjects and keen desire for their all-sided progress inspired the members of this Committee to respond to Your Highness's call for carrying out in honorary capacity, a general survey of the existing conditions of agriculture and rural economy in the Bhor State. The members of the Committee considered this call as the opportunity for service and their acceptance of this call is a proof of their high appreciation of Your Highness's efforts for the advancement of Your Highness's subjects. The Committee hopes that its humble work will result in bringing about the necessary measures for the development of agriculture and for the further promotion of the welfare and prosperity of the rural population of Your Highness's State for which Your Highness is so keen.

The Committee is thankful to Rao Saheb K. V. Naik, B. A., Dewan of Bhor, who in pursuance of Your Highness's noble intentions took personal interest in the work of the Committee and rendered all possible assistance throughout.

The Committee wishes to record its appreciation of the help given by the Mamlatdars and their subordinate staff in the survey work and for the excellent arrangements made by them for lodging and boarding of the members of the Committee at the head-quarters and in distant villages. It also wishes to ex-

press its gratitude to the people for meeting the members of the Committee in large numbers in different centres and for the information given by them.

The State had placed at the disposal of the Committee the services of Mr. S. B. Mone, B. A., of the Huzur office, who toured with it throughout its itinerary. He rendered valuable help and made arrangements in advance. He showed good organising capacity, industry and willingness in his work. But for the help of such a man the Committee would not have been able to carry out its programme in the scheduled time smoothly and comfortably. The Committee wishes to place on record its high appreciation of Mr. Mone's help. Similarly the peon Hari Dagdu Avale, who was with the Committee throughout, attended to the needs and comforts of the members with willingness and care and also deserves special mention.

The Committee is also thankful to the Deccan Agricultural Association, Poona, for having allowed the use of its survey report of the village of Arvi in the Shiwganga valley.

We remain,

Your Highness's most obedient servants,

Poona,

Dated 20th October 1942.

K. V. JOSHI

V. K. KOGEKAR

H. P. PARANJPYE.

## CHAPTER I

### Physical features and agricultural conditions.

The territory of Bhor State is largely a hilly country formed by numerous spurs of the Sahyadri range of mountains known as the Western Ghats. It lies between  $18^{\circ}$  and  $18^{\circ}-45'$  North Latitude and  $75^{\circ}$  and  $74^{\circ}-12'$  West Longitude. It is bounded on the east by Purandar and Haveli talukas of Poona district, on the south by Wai taluka of Satara district, on the west by Mahad, Mangaon and Roha talukas and Nagothana peta of Kolaba district and on the north by Maval taluka of Poona district. The gross area of the State is 910 square miles.

The area of the State, however, is not all contiguous to form a single compact block (see Map No. 1). Nearly five-sixth of this, is situated above the western ghats in the Deccan tract, at an elevation exceeding 2000 feet above sea-level and one-sixth at the foot of the ghats in the Konkan tract. It is divided into five talukas of Vichitragad, Rajgad, Prachandgad, Pavanmaaval and Sudhagad. The last of these is situated below the ghats and the first four above the ghats. The up-ghat country starts from the ridge of the ghats and extends east-wards to varying distances of 16 to 35 miles. Vichitragad has the maximum length of 35 miles and Prachandgad has only 16 miles. Pavanmaaval taluka is divided into two blocks, the southern—Muthekore—which is contiguous with Prachandgad taluka and the northern—Kolwan—which is separated from the southern block by the Mulshi peta of Haveli taluka.

The upghat country slopes eastwards and consists of a number of valleys separated by ranges of hills which run from the ridge of the ghats in a more or less easterly direction. In close proximity of the ghats and a few miles inland, the country is very hilly being traversed by high spurs and cross spurs of the Sahyadri range. The valleys are irregular and narrow, and the country is rugged and undu-

lating. Advancing eastwards the valleys become steadily broader and well defined and towards the eastern boundary of the State the country is tolerably open. Thus the topography and physical features of the up-ghat country go on changing steadily from the west to the east and the country may be divided into three strips running more or less parallel to the ridge of the western ghats and each having its own physical, climatic and agricultural features more or less distinct from the others.

The western strip of 10 to 12 miles in breadth is known as Maval. It is largely hilly and the hills are covered with forest growth which is sparse and not very tall. The trees are mostly of an evergreen type. The eastern strip abutting on Purandar taluka is 6 to 10 miles in breadth and is known as Desh. The country in between Maval and Desh is known as Deshi Maval. Most of Prachandgad and Pavanmaival talukas fall in Maval but Vichitragad and Rajgad which extend much to the east have all the three strips of Maval, Deshi Maval and Desh. The Desh part of Vichitragad forms Shirval division and that of Rajgad "Khedebare" division.

The below-ghat taluka of Sudhagad has physical features similar to those found in its adjoining parts of Kolaba district. It is also a hilly tract but the hills are comparatively low and the valleys are broad.

The rainfall in Maval is very heavy varying from 150 inches near the ridge of the ghats on its western boundary to 90 inches at Vele—the head-quarters of Prachandgad taluka on its eastern boundary. It rapidly declines in its advance towards the east and at Bhor, situated more or less on the eastern boundary of the Deshi Maval tract and about 20 miles to the east of the ridge, the average annual rainfall is only 40 inches. In the Desh tract, it further declines to 22 inches at Shirval. Thus the rainfall in the Deshi Maval tract varies between 80 inches on the west to 40 inches on the east and in the Desh tract between 40 inches on the west to 20 inches on the eastern-most end.

In Maval the rainy period is generally confined to the four months of June to September and most of the rains are from the

south-west monsoon. In the Deshi Maval and the Desh tracts the rainy season is longer extending upto the middle of November. In these tracts the rains received from October onwards, known as rabi rains, are generally from the north-east monsoon. In the Shirwal division however, the rabi rains are either scanty or often absent even though the tract is situated much to the east. Except in this tract the rainfall is generally abundant and seasonable all over the State and people do not generally suffer from scarcity or famine. In the below-ghat taluka of Sudhagad the rainfall is heavy, the average fall being 123 inches. It is restricted to the four months of June to September and most of it is received from the south-west monsoon.

**Climate** In Maval, the climate in the rainy season is rather uncongenial to life in general and also to the growth of vegetation, as the heavy rains are accompanied by strong chilly winds in the months of June, July and August. Hereafter the conditions improve and during the cold and hot seasons the climate is bracing. In the Deshi Maval tract the rainfall is moderate and the climate is slightly warmer than in Maval and is generally pleasant. In the Desh tract and particularly in the Shirwal division, the climate is warmer and dry and is healthy throughout the year. In the Sudhagad Taluka at the foot of the ghats the climate is warm and humid and is invigorating for the growth of vegetation during the rainy season. Here in summer the temperature rises very high particularly due to the heat radiated from the Western Ghats.

**Rock formation** The basic rock all over the State is the Deccan trap and the hills have step-like formation characteristic of it. The hills rise to great heights of 1000 to 3000 feet above the general level of the tract which, as said before, is itself about 2000 feet above the mean-sea-level. The lower slopes of the hills are gentle and with every step higher up they become steeper and finally precipitous in the case of lofty spurs. The rock formation shows two types, namely (1) horizontal sheet formation and (2) concretionary formation. The latter type is easy to wear and forms soft murum which is generally fairly deep. Such formations are more common in the Maval valleys.

It is known that even with the same rock the soils formed differ in their characters depending upon the nature and extent of rainfall, air temperature topography etc. Thus, starting from the ridge of the ghats and moving towards the east the soils show variations with the rainfall. In Maval where the rainfall is heavy the decomposed rock and the resulting soils are deep red in colour resembling the laterite soils. They are coarse grained and are generally poor except in the centre of the valley where good rich alluvial deposits are formed. In the Deshi Maval tract the rainfall is moderate and the climate warmer than in Maval. The soils formed under these conditions are brown in colour on the higher slopes of hills and are thin and gravelly. At the lower levels and in the basin of the valleys, the soils are reddish black in colour and are fairly deep. In the Desh tract, under conditions of low rainfall and with high air temperatures the soils are medium to deep black in colour, fine grained in texture and rich in fertility.

In Maval tract the rain water is drained away rapidly with considerable velocity and the rivers and streams go dry soon after the rainy season, except in certain depressions where water remains in pools for a long period. In the Deshi Maval and the Desh tracts, however, where the valleys widen and the country becomes less undulating the rivers and streams have water for a greater period of the year. Besides, due to porous nature of the surface material, rain water soaks into lower layers and gives rise to perennial springs. Some of these flow into rivers and streams as the Shiwaganga and the Mangadari stream in Rajgad, and the Rambag and the Dhoolganga in Vichitragad. In a few cases advantage has been taken of the perennial supply for irrigation purposes by constructing permanent dams across the streams. In the Desh tract wells are sunk with success and used for irrigation.

As a considerable portion of the area of the State is occupied by mountains and ranges of hills, the land available and suitable for cultivation of crops is limited. In Maval, which is the most hilly tract, people are required to utilise hill slopes for growing crops of

Soils

Underground Water

Land development and kinds of crops grown

various hill-milletts (*nachani, vari, sawa* and *kathal*) and sesamum, nigerseed etc. and the cultivation is often extended to varying heights of a thousand to fifteen hundred feet above the general level of the country. Even then, the scope for the growing of crops is limited; the same piece of land on the slope of a hill cannot be utilised for cultivation for more than 2 to 3 years in succession, as the land gets exhausted due to heavy soil erosion that occurs on the sloping land under heavy and beating rains. The land is therefore required to be given rest after two to three years of cropping for 6 to 10 years according to its situation. During this period of rest, grass steadily covers the land and allows the soil to be built up. Thus, out of the extensive hill slopes only a part can be used for crop production each year. The lower and comparatively flatter slopes of the hills, however, are made into permanent fields by terracing and levelling and are utilised for growing hill-milletts, *tur*, early varieties of rice, kharif *jowar* (*Argad*), *pavata*, wheat etc. The low lying area in the basin of the valley is made into rice fields by bunding and is utilised for growing late varieties of rice. The numerous water-courses of hill sides and subsidiary streams are dammed at different levels with stones often of huge dimensions and with much labour and expense. The water is diverted to the adjoining lands which are made into rice fields. The ingenuity shown by the people in developing the rugged and highly undulating country to form fields for cultivation of crops and in constructing the dams and in keeping them in thorough repairs is indeed remarkable. Rice fields in valleys produce excellent crops and several of them retain sufficient moisture in the soil for taking a second crop of wheat, gram, peas, lentils etc. in the cold season.

In the Deshi Maval tract, the method of land development for bringing the land under cultivation is just the same as that adopted in Maval. But, here, as the valleys are broad, more area becomes available for cultivation and the sizes of individual fields are much larger. In this tract the rainfall is heavy enough for growing rice and hill-milletts and at the same time not excessive for dry crops of bajri, Argad jowar etc., in the kharif season and shalu jowar and wheat in the rabi season. Rice is



restricted to fields made by terracing and bunding in lowlying situations and by damming streams and in other favourable situations where adequate supply of water becomes available by drainage from higher lands. Bunds of rice fields as well as those of dry crop fields are used for growing nachani, pavata, beans, etc. In favourable localities where soils are retentive of moisture, gram or wheat are grown as a second crop after rice. In the rest of the area, fields are made by terracing and leveling and these are utilised for growing dry crops of jowar, wheat, bajri etc.

In the Desh tract where the country is less hilly and is tolerably open, the proportion of land available for cultivation is still greater. The land slopes but very gently and extends to considerable lengths from the foot of hills to a stream or a river in the centre of the valley. It is used for various jirayat and bagayat crops and orchards. Argad jowar, bajri with various pulse crops of udid, kulthi, chavali, mug, matki etc., nigerseed, groundnut, green peas, bhendi and French beans are grown as rain-fed crops in the kharif season and shalu jowar with a sprinkling of safflower, and wheat and gram in the rabi season. Under flow irrigation with katcha and pacca bandharas on streams and rivers and under lift irrigation from wells, garden crops of onion, garlic, sweet potato, sugarcane, brinjal, chillies, carrot, tomato, French bean, coriander, potato etc. and fruit trees of mosambi, santra, lemon, papaya and figs are grown. The tract is also renowned for mango plantations of old standing and a tendency to plant more mango trees is noticeable.

In Sudhagad taluka, where the average rainfall is 123 inches, rice in terraced and banded fields and nagli, vari and til on slopes of hills are the crops grown. In favourable localities where the fields retain moisture, wal, gram and mug are grown as second crops after rice in the cold season.

An idea of the proportion of area under crops in different talukas would be had from figures in the following table.

**Gross and cultivated areas and Percentage of cultivated area  
to gross area in different Talukas of Bhor State.**

Taluka	Nature of the tract	Gross area in acres	Cultivated area in acres	Percentage of cultivated area to gross area
Prachandgad	... Maval	1,22,068	26140	21.4
Pavanmaval	... Do.	90,645	24631	27.1
Vichitragad	... Maval, Deshi Maval and Desh	1,28,716	51471	40.0
Rajgad	... " "	1,08,774	44836	41.2
Sudhagad	... Konkan	99,709	28544	28.6
Total	..	5,49,912	1,75,622	32

The acreage under different crops by talukas is shown in the following table.

The figures show that out of the total area under cultivation in the State, 49 per cent is under varkas crops of *nagli*, *vari*, *sawa*, *kathal* and *til*. Rice occupies 18 per cent and shalu jowar and *bajri* together 20 per cent. The various pulse crops are responsible for only 4.3 per cent. The kharif variety of *jowar*, namely Argad and wheat together occupy 5.2 per cent. Orchards of mosambi, santra, lemon, fig. etc. and garden crops like onion, garlic, chillies, sugarcane etc. are grown on an area of 2270 acres only, which is slightly more than 1 per cent of the cropped area, while groundnut occupies only nearly half of this proportion.

Thus out of the total cropped area two-thirds is under rice and hill-millet. The remaining one-third is under dry crops of jowar, bajri, wheat and pulses. The State territory is therefore an entirely food grain producing country. All the produce of these crops however, is not retained in the State but a part of it is sold in

Export of agricultural produce

Table showing area under different crops in acres.

Taluka	Rice	Nachani	Vari	Sawa & Kathal	Til	Argad jowar	Bajri	Tur	Matki	Mug	Chavli	Udid	Vatana	Ground nut	Shalu jowar	Wheat	Gram	Wal	Bagayat crops and orchards	Total
Prachandgad	4640	13000	4200	2000	1000	400	..	..	..	..	..	..	..	..	200	500	200	..	..	26140
Pavanmaval	12107	8000	1000	1000	..	..	..	..	..	..	..	..	..	..	1520	800	200	..	..	24631
Vichitragad	3010	6900	1395	3879	1028	1149	12030	300	203	507	504	662	500	1162	11940	2016	2016	..	2270	51471
Rajgad	2617	12400	6077	3000	3000	1241	..	..	..	..	..	..	..	..	10500	3000	3000	..	..	44836
Sudhagad	10044	9500	9000	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	28544
Total	32418	49800	21672	9879	5028	2790	12030	300	203	507	504	662	500	1162	24160	6316	5416	..	2270	175622

Poona and other markets outside the State. The most important grain thus exported is the fine and scented variety of rice known as Ambemohor, which seems to occupy more than fifty per cent of the area under rice in Maval. It is a valuable variety and is always in great demand in the Poona market. The area under rice in Maval and Deshi Maval is 22374 acres. Taking half the area to be under Ambemohor variety, the produce of 11187 or roughly 11000 acres is sent out. Taking 12 local maunds ( by measure ) as the average yield of paddy per acre, the total yield of the area would be roughly 6600 khandis. This is sold at about Rs. 60 per khandi. The value of this comes to about Rs. 4,00,000. The cultivator sells the fine rice with two objects. He needs money for paying land assessment and meeting other cash expenses. He purchases cheaper grains like jowar, bajri etc. and also pulses in exchange, for domestic use. In Sudhagad, the area under rice is about 10,000 acres. Out of this two-thirds is under coarse rice and one-third under the fine variety known as " Kolamba ". Generally all the fine rice is sold and also a portion of coarse rice at an average price of Rs. 30 per khandi. Taking 10,000 khandis as the yield of paddy, nearly half of it is sold outside the taluka at an approximate price of Rs. 1,50,000. In this taluka nearly 90 to 95 per cent of the land is owned by absentee land-lords who get nearly half the produce as land rent from the cultivators. What is therefore sold is from the share of the land-lord, and the amount does not go to the cultivator.

In addition to the sale of paddy, considerable quantities of the hill-millet " vari " are also sold to outside customers. Nachani is not generally marketed but the surplus if any is sold within neighbouring villages. Other agricultural products sold are a part of wheat and the garden crops of onion, garlic, sugarcane, vegetables and fruits like the mosambi, santra, fig, mango and lemon. The acreage under garden crops and fruit trees is 2270 acres and most of the produce from this area is sold.

The area other than that used for crop production is classified as under.

**Statement showing the classification of the area other than under crops.**

Name of taluka	Government forests Acres	Grass land Acres	Assessed fallow Acres	Unassessed waste Acres	Assessed waste Acres
Prachanugau	28223	22425	29683	14245	194
Pavanmaval	9856	31586	2515	9988	19
Vichitravad	14968	6618	17073	23426	...
Rajgad	11818	1050	52	13229	...
Sudhavad	31846	18500	4346	17614	6

The grass land and the area under fallow generally form part of the varkas land. These are used in turns for the shifting cultivation of varkas crops of nachani, vari, sawa, til etc. and also for cutting grass for ridding the seedbeds of rice and hill-millets. After harvesting the crops, cattle are grazed in the area. Cattle are also grazed in the unassessed waste land.

The forests in the Maval are not valuable except for the myrobalan (Hirda trees) and bamboo. The latter is largely found in the Mossay valley. Minor forest products like *shikekai*, gum, honey etc. are collected and sold by the people. Teak and *ain*, the two important timber trees, occupy largely the forests of Sudhavad. They are also found in the eastern half of Deshi Maval but are sparse. The forest revenue in Sudhavad alone was Rs. 17173 in the Fasli year 1350 while that in the remaining four talukas together was Rs. 20632.

In Maval the forest growth does not develop to its fullest stature as nearly half of the forest area is cut down and burnt in turns every 10 to 12 years for utilising the land for Kumri cultivation. In this system of cultivation the forest growth is cut down and burnt on spot and crops of *nachani* in the first year and *vari* or *sawa* in the following year are taken. Due to

hilly nature of the country, people contend that their own cultivated holdings are insufficient and hence they apply for additional land for crop growing from the Government Forest area. After taking two crops in this way, the plot of ground is left fallow for recuperation of soil and regeneration of forest growth. A new plot of forest land is then taken for similar cultivation. This system is destructive in two ways. It promotes heavy erosion of soil so much so that in two to three years all the surface soil is lost and the land becomes unfit for further crop production without rest for a period of about 10 years. Again during the period of rest or fallow, very little produce of importance becomes available from the forest as all the trees except the Hirda trees are cut down and burnt on spot every 10 or 12 years.

The question of developing the forests for maximum production by systematic planting does not seem to have received attention. The forest growth is, therefore, uneven and uneconomic. There are also very few forest roads for transport of produce.

The following table shows the number of cattle taluka by taluka classified under different heads.

Name of Taluka	Cows	Bullocks	Young ones	She-buffaloes	He-buffaloes
Prachandagad	5732	5387	5482	3436*	860
Pavanmaval	4070	6054	2826	2943	278
Vichitragad	6147	9000	5301	4942	3394
Rajgad	5376	6971	...	3987	433
Sudhagad	5356	5432	4715	1800	1257

This figure includes the number of young ones of buffaloes also.

The cattle in the Maval and Konkan tracts are of small stature while those in the Deshi Maval and Desh parts are bigger ones. Nowhere however they are of any particular pure breed. They are also often undernourished and in the hot season get considerably emaciated.

Cattle

The he-buffalo is used in Maval and Sudhagad for draught purposes. Foot and mouth disease is very common and of annual occurrence. Rinderpest occurs in epidemic form periodically when it takes a large toll. There is no veterinary aid.

Most of the cultivators keep some poultry and sell eggs. In suitable localities she-buffaloes are kept for sale of milk and milk products but the quantities sold are not very large. Recently trade in milk with Poona has been established from the Khedebare division of Rajgad and Shirwal division of Vichitragad. This has become possible as regular bus services ply along the Satara-Poona road which passes through these tracts. Milk collecting centres have been established at Shirwal, Kapurvahal, Nasrapur, Varve etc. and milk from a radius of about 4 miles is brought regularly at each of these centres for sale. Another secondary occupation is the plying of carts on hire. This occupation however has received a great set back during recent years with the introduction of motor lorries for transport of goods. The total number of bullock carts in Prachandagad is 303, in Sudhagad 595, in Pavanmaval 733, in Rajgad 859 and in Vichitragad 1116. The cartmen get work of the carting of the agricultural produce mentioned above and also the various forest produce such as myrobalans, *Shikakai*, bamboo, timber, charcoal etc.

Subsidiary Occupations

In the absence of any general secondary occupation in the State, many of the small farmers who have no additional source of income migrate to industrial centres like Bombay and Poona or to the canal tracts in the Deccan for labour work. We were told that about 1000 persons from Prachandagad, 2000 from each of Rajgad, Vichitragad and Pavanmaval migrate to cities every year for a period of about six months and bring for their families from Rs. 25 to 50 each, as their saving.

## CHAPTER II

### Economic Condition of the Rural Population.

As already stated in the preceding Chapter the territory of Bhor State is entirely rural in character and the chief means of subsistence of the people is agriculture. There is a small non-agricultural population of village artisans, village servants and tribal classes. But most of them cultivate some land to supplement their income. It is therefore reasonable to take the whole population as agricultural for the consideration of this Chapter. The population figures of 1941 census are given in the following table.

Name of taluka	Area in sq. miles	Population	Density per sq. mile	Number of villages	Average area per village in sq. miles	Calculated No. of families
Prachandgad	202	22985	114	115	1.75	4597
Pavanmaval	150	26554	177	67	2.24	5311
Vichitragad	213	47037	220	110	1.90	9407
Rajgad	180	29724	165	119	1.50	5945
Sudhagad	165	29776	180	87	1.87	5955
	910	156076	171	498	1.85	31215

For finding out the average population per village it is better to exclude from consideration the localities with larger population of Bhor, Shirwal, Pali and Nasrapur having the population of 6334, 2609, 2559 and 1059 respectively and also the hamlets with population below 20. In the following table population figures and the number of villages in different talukas thus calculated are shown :



Taluka	Population excluding that of cities and Notified areas and of small hamlets below the population of 20	No. of villages according to column 2	Average population per village	Calculated number of families
1	2	3	4	5
Prachanandgad	22919	98	233	4584
Pavanmaaval	26544	65	408	5509
Vichitragad	38038	103	369	7607
Rajgad	28611	113	253	5722
Sudhagad	27211	83	327	5442

If the population of villages in the foregoing table is divided in classes of 100 each, the following figures are obtained.

Taluka	Number of villages with population between							Above 701
	20 to 100	101 to 200	201 to 300	301 to 400	401 to 500	501 to 600	601 to 700	
Prachandgad	19	33	28	5	5	4	1	3
Pavanmaaval	2	8	12	16	10	9	1	4
Vichitragad	12	23	23	13	5	9	5	13
Rajgad	12	48	23	8	10	5	5	2
Sudhagad	14	22	11	8	10	7	6	5

### Average population per village.

In Prachandgad taluka the population of the villages is the smallest (233) and the majority of them fall within the classes of 101 to 300. Out of the total number of 115 villages in this taluka, as many as 17 are only hamlets with a population of less than 20 souls in each. Rajgad follows Prachandgad with an average population of only 253 per village and the majority of villages falls in the classes of 101 to 300. In the remaining three talukas the villages are larger and their distribution in different classes of population is fairly even. Although Pavanmaival shows the highest average population per village, Vichitragad has several large villages in the Shirwal division with population above 701. There are 4 villages with a population varying from 1300 to 1500 and 22 villages with population from 501 to 1000 in the taluka.

### Number of members per family.

The figure of the number of families per taluka has been arrived at by dividing the population by 5, which is taken as the average number of souls per family. During our survey we made inquiries in several villages and found that the average number of members per family was 5. Our calculations are further corroborated by the report of the village survey of Arvi situated in the Shiwaganga valley which was carried out by the Deccan Agricultural Association, Poona, in the year 1934. According to this survey, the average number of members per family is 5. According to Mr. N. M. Joshi, M. A. (vide his article in the special issue of the Suryakant Magazine of Bhore 1934,) out of the total population of the State, 60% are adults and 40% are children below the age of 16. This means that out of the five members of the family 3 are adults and 2 children.

### Area of villages.

The figures of average area in square miles of villages in different talukas show that in Rajgad, villages are the smallest with area of 1.50 sq. m. followed by Prachandgad 1.75 sq. m. The average area of villages in Pavanmaival is the largest, being 2.24 sq. m. These areas however are not great when compared with those found in the greater parts of the Deccan districts. Speaking generally, the villages in Bhore State are small and closely situated

Average area in  
sq. miles per  
village

and resemble in most cases the *wadis* of villages of the Desh part of the Deccan proper.

#### **Situation of villages and housing conditions.**

In the Maval and Deshi Maval tracts the villages are mostly situated between valleys, on uplands, on both the banks of the river or stream passing through the valley. In Maval and Sudhagad the houses have generally wooden structure and they are thatched with grass or rice straw. The sides are made of *harvi* reeds or of bamboo wattles and plastered with mud mixed with cowdung. In the Deshi Maval tract, houses are better and have brick or stone walls with corrugated iron sheets or tiles for the roof. In the Desh part of Khedebare and Shirwal the houses have stone walls built in chunam or mud and have tiled roofs.

#### **Supply of drinking water.**

In Maval and Sudhagad the supply of drinking water is from wells or from a river or a stream, but this lasts only for about 8 months of the year. In the hot weather, however, from March to the middle of June, the rivers and streams run dry as also the village wells in several cases and great scarcity of water is experienced. Pits are then dug in the beds of rivers or in fields where there is some chance of striking water. Water is brought from long distances from some natural springs in some places. Even then the supply is meagre, and considerable time is wasted each day in getting the water. In the Deshi Maval tract there are some perennial streams but the villages having this advantage are not many. Through out its itinerary the Committee's attention was drawn to the hardships and inconvenience suffered by villagers all over the State caused by scarcity of drinking water during summer months and the people's first and foremost request was that the State should remove this disability as soon as possible. In Sudhagad taluka some villages have tanks from which people take water but in many instances they have been silted up and the water is not potable due to the growth of a variety of algae and various kinds of vegetation.

#### **Guinea-worm.**

Another grievance with regard to the water used for drinking in several villages is that it is highly polluted with guinea-worm-causing organism. This is very common in Sudhagad as

well as in Maval and Deshi Maval tracts and also in the villages situated in the Desh parts. During our tour we came across a number of people suffering from guinea-worm and in the village of Zap near Pali in Sudhagad there were as many as 150 patients out of the total population of 340 suffering from this painful disease. The Committee is of the opinion that guinea-worm is more wide-spread than malaria in Bhore State. It disables people and confines them to their houses and thereby causes not only acute suffering but also loss of considerable valuable time during the working season. Guinea-worm is a preventable disease. There is no medical cure for it but if efforts are directed in an organised manner, it should be possible not only to control it but even to eradicate it.

#### Communications.

As regards communications, the Desh and Deshi-maval tracts are fairly well provided with metalled roads. The Maval tract however has practically no metalled roads and the country being largely hilly, it is difficult to have bullock cart communication from one valley to another. In the absence of road communications people in Maval find it extremely difficult and time-taking to take their agricultural and forest produce to the Poona market. Some people use ponies as pack animals and bullock carts ply for about 5 months only in the year from January to May along fair weather cart tracks.

#### Holdings.

The average cropped area per family in different talukas is shown in the following table :—

Name of Taluka	Total cropped land in acres	Total number of families	Average cropped area per family in acres
Prachandgad	26140	4597	5.68
Pavanmaval	24631	5311	4.63
Vichitragad	51471	9407	5.47
Rajgad	44836	5945	7.54
Sudhagad	28544	5955	4.79

We shall shortly examine whether the returns from the average cropped area per family are adequate enough to sustain the family of a cultivator. Before doing so, however, it may be necessary to note that this average cropped area does not represent the size of the holdings of the majority of cultivators' families. The size of the holding differs from family to family within wide limits. During our inquiry in each taluka and in different tracts of each taluka we tried to get an idea about the size of the cultivated holding which the large majority of cultivators cultivate. In general we gathered from the people that (1) the size of the cultivated holding in Sudhagad taluka was 4 acres of which  $2\frac{1}{2}$  to 3 acres were under rice and 1 to  $1\frac{1}{2}$  acres under hill-millet; (2) in Maval parts of Vichitragad, Rajgad and Pranchadgad the size of the cultivated holding was about 8 acres. Out of this area, 1 to  $1\frac{1}{2}$  acres are under rice, about 4 acres under nachani and about 2 acres under vari, sava or kathal and  $\frac{1}{2}$  acre under til or niger. We were told that in terms of yield the holding was such as would yield about two khandis (40 local maunds by measure) of grain; (3) in Pavanmaval the valleys are comparatively broader and therefore the area under rice is greater; the average cultivated holding in this taluka was of 5 acres, 3 of which are under rice and 2 under nachani or other hill millets; (4) in the Deshi-maval tract the size of the cultivated holding varied from 5 to 6 acres of which  $1\frac{1}{2}$  to 2 acres are under rice and  $3\frac{1}{2}$  to  $4\frac{1}{2}$  acres under jirayat crops of jowar, wheat, gram, etc. In this tract it is common to take crops of nachani, pavata, beans etc. on *bandhs* of fields which are generally broad; (5) in the Desh tract of Rajgad, known as Khedebare, the cultivated holding of the majority of cultivators was 6 to 7 acres, of which about 5 to  $5\frac{1}{2}$  acres are under the jirayat crops of bajri mixed with pulse crops of hulga, matki, or tur, jowar with safflower, gram, groundnut, niger-seed etc. and about  $\frac{1}{2}$  acre under drilled rice. In some cases shalu jowar is preceded by green pea, bhendi or French-bean. Some cultivators have about  $\frac{1}{2}$  to  $\frac{3}{4}$  acre under seasonal irrigated vegetable crops or under fruit trees; (6) in the Desh part of Vichitragad namely Shirwal division, the size of cultivated holding varied from 12 to 15 acres in dry villages and about 7 acres in irrigated villages. In dry villages bajri, jowar and other jirayat crops are grown. In

Size of cultivated holding

the bagayat villages like Bhade, Yelke, Bavde, Shirwal etc. about 2 acres are under irrigated crops like onion, garlic, chillies, sweet potato etc. and 5 acres under jirayat crops of bajri mixed with pulse crops in kharif season and jowar with sufflower, gram etc. in rabi season.

The sizes of average cultivated holdings in different agricultural tracts mentioned above do not tally with the average cropped area per family in different talukas given in the foregoing table for two reasons:—viz (1) all the talukas except Sudhagad, are not agriculturally homogeneous. For instance though Prachandgad is mostly Maval, its eastern villages lie in the Deshi-maval tract. Similar is the case with Pavan-maval. Vichitragad and Rajgad have three distinct agricultural tracts viz.—Maval, Deshi-maval and Desh. The average cropped area per family in a taluka, having varied agricultural tracts, does not therefore give a true picture of the area of what the majority of cultivators cultivate. (2) The cropped area of villages is not divided equally among all the families; some have larger holdings while others have smaller ones. This is illustrated from the survey of Arvi village (situated on the eastern boundary of Deshi-maval tract near Khedebare) already referred to in the preceding portion. The study of cultivated holdings from family to family carried out for 45 families selected by random sampling in that village gave the following information.

	Area in acres of cultivated holding.									
	Below 1 acre	1 to 2	2 to 3	3 to 4	4 to 5	5 to 7	7 to 9	9 to 12	12 to 22	22 to 35
Number of families cultivating such holding	4	6	4	6	3	5	1	5	8	3

The figures in this table show that the area of cultivated holding varies very widely from family to family and it would be wrong to assume that the figure of the average size of holding

holds good for the majority of cultivators. Out of the 45 families as many as 23 i. e. fifty per cent cultivate land, the area of which is less than 5 acres. Again 11 families or 25 per cent of the total number cultivate holdings of much larger size, varying from 12 to 35 acres as shown in the last two columns. The remaining 25 per cent of the holdings are of intermediate size of 5 to 9 acres.

Again the whole of the cultivated holding is not necessarily owned by the cultivator. In Arvi village nearly 28 per cent of the cultivators own the whole of the area which they cultivate. These holdings are fairly large varying from 12 to 22 acres.

Sixty per cent of the cultivators have a mixed holding of owned and rented land and the holding is also small, the average area being 7 acres, while the remaining 12 per cent of the cultivators have all rented holdings. It has been found in the Arvi survey that 14 acres of owned land forms an economic holding. With holding of such a size the family of 5 members can maintain itself without incurring debt. The report also states that the income from 2½ acres of rented land is equal to that from one acre of owned land. Thus an economic holding in the tract represented by Arvi should not only be 14 acres but it should be of land owned by the cultivator. The average area of cultivated land per family arrived at by calculation or from the information collected during our inquiry in the Deshi-maval tract or in Khedebare tract, which adjoins Arvi, was no where found to be as large as 14 acres. As regards the proportion of owned land we were told that in Sudhagad, only as small a proportion as 5 to 10 per cent of the cultivated land belongs to the cultivator and thus practically most of the cultivators are tenants. In the upghat country the proportion of land owned by the cultivator is much higher. Thus in Pavanmaval 75 per cent of the cultivated land belongs to the cultivator while in Prachandgad the proportion of owned land is as high as 90 per cent. In the Deshi-maval and Desh tracts of Rajgad 66 per cent of the land belongs to the cultivator while in Vichitragad taluka, we were told, that this proportion is as low as 25 only for the Deshi-maval and Desh tracts. This means that three fourth of the holding in these tracts consists of rented land and thus the returns to the cultivator

are lower as a part of the produce goes to the owner of the land as rent.

The foregoing considerations lead to two conclusions :—that

Fragmentation  
of the holding

(1) a large proportion of the families has holdings much below the size of an economic holding and  
(2) the majority of the cultivators in Deshi-maval and Desh parts have mixed holdings of owned and leased land and practically all the cultivators in Sudhagad are required to cultivate lands taken on lease. Besides, our inquiries showed that the holdings are not compact but are fragmented. We could not ascertain during our hurried inquiry the number and size of fragments. This would need a critical field to field survey. We therefore again refer to the Arvi report. According to this report out of the 184 holdings, 81 were in single blocks, 40 were in two blocks, 22 in three blocks, 12 had their holding scattered at four places each, while 18 had five fragments. In the rest the fragments were still higher and varied from 6 to 11. When the holding is fragmented the quality of cultivation suffers, time is lost in movements to different fragments, crops cannot be watched properly and the returns are therefore comparatively lower.

*With such under-sized, fragmented and partly rented holdings*

Economic condi-  
tion of the culti-  
vator

*a large proportion of the cultivators is unable to obtain adequate returns for sustaining the family.* In Sudhagad from the average cultivated holding consisting of 3 acres of rice land and 1.75 acres of varkas land the cultivator gets on an average 66 local maunds of paddy and about 10 maunds of nachani. Out of this he has to give 30 maunds of paddy and two maunds of nachani by way of land rent in kind. This leaves him 36 maunds of paddy and 8 maunds of nachani while he needs on an average 40 maunds of paddy and 8 maunds of nachani. He has therefore to borrow 4 maunds of paddy each year at 50 per cent interest in kind. Thus he is annually short of 6 maunds of paddy. Besides he requires cash money for his clothing, and other house-hold requirements of grocery, fish, expenses on marriage, replacement of bullocks, remuneration to village servants and for religious rites etc. There are no secondary occupations worth mentioning. He earns some money either by



labour or by cart-hire if he has a cart. A very small proportion of the population goes to Bombay for work during the slack season. On the whole, the condition of the family is always precarious and the standard of living extremely low. People told us that towards the end of the year in the month of August and September many people do not get even two meals a day and have to be content with only one meal.

Our inquiries showed that the cultivator in Maval was in a slightly better condition than in Sudhagad. This may be due to the fact that nearly 75 to 90 per cent of the land is owned by him and he has not to pay much by way of land rent. Besides, each family earns money by collecting and selling *Hirda* fruit from the forest. We were told that an average family collects about  $1\frac{1}{2}$  to 2 khandis of *Hirda* fruit which is sold at Rs. 8 to 10 per khandi. Before war the rate varied from Rs. 12 to 15 per khandi. Besides, the people collect and sell *shikekai*, gum, honey and other minor products from the forests. They also cut and remove *Oodha*—a kind of hollow bamboo and sell the same in the Poona market. Some carry on carting work of agricultural and forest produce while some keep she-buffaloes and sell butter and ghee. Some persons annually migrate to Bombay, Poona and other industrial centres and bring from 30 to 50 rupees per head as savings each season. They also sell a part of their paddy and purchase cheaper rice or bajri, jowar and pulses in exchange and make good the deficit. Our inquiries showed that more than half the number of families has no debt. Some have to borrow food grain of hill-millet. We were told that on an average 2 maunds of grain (*nachani*) is thus borrowed per family. Cash debts are small and vary from 25 to 50 rupees per family. The rate of interest is as high as 25 per cent for cash loans and 50 to 75 per cent in kind for grain loans. The standard of living is very low.

In the Deshi-maval and the Desh tracts the standard of living seemed to be better and the people also are robust and healthy. Their annual family expenditure is said to be nearly twice as high as that of the people of Maval. They are engaged on their lands for nearly 8 months of the year as crops are grown both in the kharif and rabi seasons. There is also some area under irrigated crops and orchards in Desh tract. Besides

a large number of people migrate to the canal tracts of the Deccan and to Bombay and Poona, each year for about 6 months in the year for work and bring back with them from Rs. 25 to 50 each by way of savings. We could not get any data during such a rapid survey to give us any idea about the extent of indebtedness. But if we refer to the report of the survey of Arvi village, we find that out of the 41 families studied in that village by random sampling, 22 were in debt. The total amount of debt of these 22 families was Rs. 5425, which works to the average debt of Rs. 247 per indebted family. The average debt per family therefore for the whole group of 41 families works to Rs. 132. The indebted families had holdings, the average size of which was 7 acres and a part of this was of land held on lease. These findings may be applicable to the Deshi-maval and Khedebare tracts of Rajgad.

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## CHAPTER III

### The Problems

The agricultural and economic conditions described in the preceding chapters reveal that the following are the outstanding problems that demand immediate attention of the State and its people.

(1) As the greater portion of the State is hilly the area suitable and available for cultivation of crops is limited and the average cropped area available per family is not sufficient for its sustenance. The crops are mostly rain-fed and are restricted to food grains only ; the level of yields is also low. There are very few subsidiary occupations in villages to provide remunerative work for all the spare time of the cultivator for supplementing his income. Many cultivators are therefore required to incur debts at high rates of interest by mortgaging their lands, which ultimately pass into the hands of the money-lender. The problem therefore is how to increase the income of the cultivator and make him economically sound.

(2) A large part of the cultivator's holding in Maval, Deshimaval and Konkan consists of hill slopes, i. e. varkas land. This is cultivated with hill-millet by the system of shifting cultivation. This use of hill-slopes is wasteful and uneconomic as it promotes soil erosion and the yields are not sufficiently remunerative. The problem is how to develop the varkas lands and make them more productive.

(3) The State forests which occupy hill-slopes consist of vegetation that has sprung up voluntarily and very little planned development is visible. The returns from such forests are therefore poor. The problem is how to improve the forests and get much better returns.

(4) A part of the forest area is given out annually for Kumri cultivation which involves wholesale cutting down of forest growth of 8 to 10 years' standing on the area. This system is definitely harmful to the land and to the full development of the forests. The problem is how to stop this destructive system and substitute it by a more rational and more

productive one without depriving the people of the present benefits.

(5) The local cattle in the State do not belong to any particular pure breed and are small in size. Nor are they well nourished. They are also subject to epidemic diseases like Rinderpest, foot and mouth disease etc. and there are no facilities for their treatment. The cattle are therefore inefficient and uneconomic. The problem is how to improve the cattle.

(6) The most pressing need of most of the villages is the adequate and pure supply of drinking water both for men and cattle, particularly in the hot season of March to June. This entails much labour and time of the family members for procuring necessary water and also much hardship and suffering from water-borne diseases like the guinea-worm, diarrhoea etc.

(7) Guinea-worm is rampant in most of the villages. This causes prolonged suffering and loss of several working days often in the busy season.

(8) With the object of securing full benefits of economic improvement to the rural population it is necessary to protect it against exploitation by passing necessary Acts and to educate the people in the laws of health and nourishment and in the proper use of wealth leading to higher and happier standard of life.

Most of these problems are possible to be solved to varying degrees. The means to be adopted will be discussed in the chapters to follow.

## CHAPTER IV

### Improvement of agriculture.

In chapter I it has been shown that a considerable proportion of the territory of Bhore State is occupied by mountains and hills and hence the land available and suitable for cultivation of crops is limited. In Prachandgad and Pavanmaval talukas which lie mostly in Maval tract, of the gross area of these talukas the area under crops is only 21 and 27 per cent respectively. In Vichitragad and Rajgad talukas which extend much to the east and have nearly half their areas in Deshi-maval and Desh tracts the proportion of land under crops is about 41 per cent of the gross area. Even in Shirwal division of Vichitragad, which is Desh proper, the proportion is not more than 56 per cent. In Sudhagad taluka situated at the foot of the ghats only 29 per cent of the gross area is under crops. Taken as a whole, the cultivated area in the State is only 32 per cent of the gross area. The problem of agricultural improvement is thus restricted to this area.

From our personal enquiries, observations and discussions with the cultivators during the survey of the State we have sufficient reasons to believe that there is room for improvement of yields both in quality and quantity of the existing crops. Some of the important measures for bringing this about are (1) land development and soil conservation, (2) increasing the fertility of the soil, (3) adoption of improved methods of cultivation and use of improved implements, (4) use of improved varieties of crops and selected seeds, (5) supplementing rainfall during periods of long breaks by water stored in dams across hill streams and in tanks, (6) control of pests and diseases, and (7) better marketing of produce. The possibility and scope for each of these are considered below.

#### (1) Land development and conservation of soil.

Reference has already been made in Chapter I to the remarkable development of the rugged and undulating land in Maval and Deshi-maval tracts by converting slopes of hills into series of systematically terraced, levelled and banded fields

and to the ingenuity and industry in this direction of the past generations. The result of such land development has been that soil has been well conserved and crop production made stable. The practice of conserving soil in this way is seen even at present and people show keenness to extend these methods to other areas and to keep the tals and bunds of fields in good repairs.

Although the tradition and practice of land development in the aforesaid manner exist in Maval and Deshi-varkas lands Maval tracts, the Committee found that they are restricted to lands along the lower slopes of hills and the more or less flat areas of the basin of the valleys. The upper slopes of hills the gradient of which is generally high and which are used periodically for varkas crops like nachani, vari, sawa, til etc. are not developed in this way and are cultivated without any protection against soil erosion. The result is that most of the surface soil from these lands gets washed during the period of two to three years of their periodic cultivation. In some cases this eroded soil gets deposited into the terraced rice fields lower down carried there along the stream water. The deposits are often huge and have to be removed entailing much labour and expense to the cultivator. The area under hill-crops in Maval, Deshi-Maval and Konkan tracts is nearly 50 per cent of the total cropped area and the greater proportion of it is not protected against soil erosion. Leaving apart nearly half of this area as being situated along steeper slopes, the remaining half can lend itself to protection. Our recommendation is that people should be advised to do this and should be given the facilities needed.

Similarly, the Committee found that in Desh tract particularly in Shirwal division and in the Pirangut valley of Pavanmaval, practically very little attention is paid to soil conservation by field bunding. Here the rainfall is low varying from 20 to 30 inches and the country is open and less undulating. People therefore probably think that soil erosion is not serious. This belief however is erroneous. During our visits to field areas in these tracts we came across several fields which had lost the cultivated surface layer of soil by erosion making them

very shallow. In several fields gullies were also visible. The fact is that even in low rainfall tracts sharp and heavy showers are received 5 or 6 times in the season and soil erosion is a usual phenomenon as a result of these. The loss of soil occurring under the sharp and heavy rains probably does not always become perceptible as it occurs uniformly over the whole area of such fields causing what is known as sheet erosion. The people in Desh tract have therefore to be educated in the importance of soil conservation by proper bunding of fields. Rain water causing run-off carries away with it the fine particles of soil, plant food and all and makes the soil steadily coarse, thin, less fertile and incapable of conserving rain-water.

The Committee wishes to emphasise the necessity of recognising the importance of soil conservation as the basic need of agriculture by both the people and the State authorities. For, soil is the basis of agriculture and in most cases the only capital of the cultivator in this country. The annual crops are the dividend on this capital. The magnitude and stability of this dividend depends largely on the amount of care taken in preserving this capital. In its own interest and in the interest of the people, the State which is the guardian of the people and the superior holder of land, should make every endeavour to see that all lands are properly protected against soil erosion and the tals and bunds of fields are kept in good repairs each year. After a few years of propaganda and encouragement for the construction of bunds and tals, the State may have to enact a law, making it penal for a cultivator to till the soil unless it is properly protected against soil erosion. In addition to education by propaganda, the people should be assisted in the following ways.

The first help is the technical advice and guidance to the cultivator of the Desh tract in the alignment of contour bunding, after surveying the whole area with the help of surveying instruments. Such a survey may not cost to the State more than a couple of rupees per acre but such technical advice would save the cultivator the heavy cost of repairing the breaches to bunds that are often caused during intensive rainfalls of September and October if

Soil conservation  
the basic need of  
agriculture

Survey for con-  
tour bunding

the bunds are not constructed on contour lines and provided with waste-weirs of suitable dimensions. The work of general bunding of the tract as a whole is likely to give rise to several difficulties with regard to rights of easement, boundaries of fields, water logging, drainage and the like and the new Department of Agriculture and Rural Development recommended to be established in this report, will have to solve these difficulties as they arise and carry on the work of soil conservation.

Construction of bunds in Desh tract and of tals and levelling of fields in Deshi-Maval and Maval Tagai loans for land development tracts involve cash expenditure in addition to family labour, for the purchase and carting of stones, payment of wages of labourers etc. but the cultivator in most cases has not the money.\* During our survey of the State we came across several industrious and intelligent cultivators who were anxious to develop new land and to keep the existing bunds in good repairs but who were unable to carry out the works for want of monetary help. We recommend that the State should lay down as its policy, that it is ready to encourage cultivators to develop lands in this way. For this purpose we recommend that the State should set aside a sum of Rs. 20000 for advancing as tagai loans for the construction of tals, bunds and for levelling of fields and also for carrying on annual repairs. The rate of interest on the tagai should not exceed 5 per cent per annum and it should be repayable in ten annual instalments commencing from the third year when the cultivator is generally expected to get a reasonable return from the investment from which to pay the instalment. Care should also be taken to see that the amount of the tagai loan is fully utilised for the purpose for which it is granted by inspecting the works during progress and again on completion.

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\* During our tour we came across a cultivator at Bamanghar in Prachandgad taluka who was busy in constructing a new tal and levelling the field inside it. He showed us a series of rice fields prepared by him during the last few years by diverting a hill stream and constructing a series of stone dams across the original narrow valley. He also explained to us his future plans of developing the area lower down these fields in a similar manner. He seemed however to be handicapped for want of money and on asking we found that a help of about Rs. 100/- was all that he needed.



Abolition of tax on stones and bunds and repairs to existing tals. There are certain restrictions put on the removal of these from Government lands and from quarries in private lands. There is also a small tax levied by the State on stones. Throughout our tour people at various places brought to our notice the restrictions and the levy of the tax both of which in the opinion of the people prove as handicaps. We gather that the total annual income from the tax on stones does not exceed a few hundred rupees to the State but the abolition of the tax would mean an appreciable relief to the individual cultivator whose resources are usually lean. In the interest of conservation of soil which ultimately means stable crops and stable land revenue we strongly recommend that the tax on stones required for all kinds of agricultural purposes such as tals, wells, tanks, bandharas etc. be abolished immediately.

Bringing more land under cultivation While discussing the question of land development it may be relevant to refer to the problem of the growing pressure on agricultural land, consequent on the growth of population and the steady decline of village industries of the past. It is desirable to bring more land under the plough to meet the situation. This seems to be possible in Maval, Deshi-Maval and Sudhagad tracts where new fields can still be opened by developing varkas lands by terracing, levelling and bunding. Efforts should be made to survey the lands in various villages from this point of view and people should be encouraged to develop private lands by advance tagai loans for the purpose. In the case of Government lands these may be given for development on non-transferrable, indivisible and un-seizable lease of a permanent nature. Such cultivators should be given tagai loans and assisted in every other way. This measure would also lead to increase of land revenue.

Preventing fragmentation of holdings Reference has already been made to the evil of fragmented holdings which is one of the causes of reducing profits from agriculture. In the Rural Development programme, the new Department should encourage the people to bring about consolidation of holdings by mutual consent and also by grant of adjoining Government

land wherever available. In individual cases it may be found advantageous to acquire a piece of land of a recalcitrant landowner and give it to another cultivator to form a compact holding if the rest of his neighbours have agreed to the consolidation. In doing this, however, care will have to be taken to see that injustice is not done to any party.

## (2) Increasing the fertility of soils.

From the point of view of improving the yields of crops improvement of soil fertility is next in importance to soil conservation.

The soils in the Maval tract are rather coarse and less fertile in majority of cultivated fields. In Sudhagad (Konkan) the soils are comparatively finer and more fertile. The average yield of paddy in Sudhagad is about 1600 lb. per acre while that in Maval it may be put at 1100 lb. In Deshi-Maval and Desh tracts, the soils are comparatively deeper and retentive of moisture with more finer particles. The general level of yields however is not very high but can be increased if attention is paid to manuring on the lines indicated hereafter.

It is common knowledge that soils in the Deccan are much deficient in organic matter and in combined nitrogen, and that lime, potash and phosphoric acid are generally adequate. With regard to nitrogen deficiency, even though little of the nitrogen removed by crops is returned to the soil in the form of manure, the level of fertility, which is already low, is maintained constant by the annual increments of nitrogen which accrue from natural recuperative processes in the soil (Sahasrabudhe and Kanitkar).<sup>\*</sup> Improvement of nitrogen fertility beyond this natural recuperation is necessary if yields of crops are to be raised substantially high and this can only be done by increasing the supply of manurial substances.

The chief source of manure is cowdung. In Maval and Sudhagad, all the available cowdung is used for 'rabbing' seedbeds and nothing is directly applied as manure to the fields. In these tracts the recuperation

<sup>\*</sup> Nitrogen Recuperation in soils of the Bombay Presidency, Part III—Indian Journal of Agricultural Science, 1932, by D. L. Sahasrabudhe and V. V. Kanitkar.

of fertility of rice lands takes place by the annual deposition of raw or decomposed organic matter of various kinds that is brought down with the rainfall run-off water from the surrounding hills and forests. Such recuperation, however, does not take place in all the fields as the position of several of them, especially, of those situated at higher levels, is not favourable for receiving the run-off direct. Again, this recuperation is comparatively small in Maval where forest growth is sparse, the forests are undeveloped and the hills are often bare. In Sudhagad (Konkan) the forest growth is comparatively thick and hence greater volume of organic matter is brought down into the fields.

In the Desh-Maval tract where both rice and dry crops are grown all the cowdung is not required for rabbing rice seed-beds. It is estimated that only one-third of it is required for rab burning and an equal quantity is made into farm yard manure and used for dry crops. The remaining one-third is made into cakes for fuel. In the Desh tract one-third of the cowdung is made into cakes for fuel and two-thirds becomes available for manuring. It is estimated that on an average, three cart-loads of farm yard manure could be had in a year from the dung of each head of cattle in this tract. Calculating on this basis, it is estimated that even if no cowdung is used for fuel and even if all the cowdung is carefully collected and preserved it would not suffice even for half the cultivated area in the Desh part. Again, in the use of farm yard manure preference is given to irrigated crops which are grown to appreciable extent in Khedebare and Shirval divisions. Thus the quantity of farm yard manure that becomes available for the dry area is further limited. Some of the cultivators therefore resort to sheep folding. Shepherds visit different parts of the State regularly each year with their flocks of sheep and the cultivator takes advantage of these flocks for manuring his fields by rotation, periodically, according to his means. But as this involves expenditure, this source of manuring is possible only to a limited number of cultivators. Concentrated manures like oil-cakes, fish manure etc. are not used for jirayat crops but in irrigated fields the use of these and of the fertilisers, like sulphate of ammonia has been steadily increasing in recent years.

A study of the manurial practices of other countries brings out that supplies of manurial material could be appreciably increased in Maval, Konkan and Deshi-Maval tracts of Bhor State. There are a variety of organic material, such as poudrette, green manure, bones of animals etc. which is at present largely wasted. With regard to the use of organic matter, it is best to quote from the Report of the Royal Commission of Agriculture in India (1928). On page 83 of that report it is stated that "The Indian cultivator has much to learn from the Chinese and Japanese cultivator in regard to the manufacture of composts. Artificial fertilisers are used as little in China as they are in India; but there is no organic refuse of any kind in that country which does not find its way back to the fields as a fertiliser. Not only all human waste is carefully collected and utilised but enormous quantities of compost are manufactured from the waste of cattle, horses, swine and poultry combined with herbage, straw and other similar waste. Garbage and sewage are both used as manure."

In India during recent years investigations on the best methods of bringing about rapid rotting of organic refuse like weed, grasses, straw and other plant residues, have been carried out and methods evolved to break down organic refuse to form excellent compost. There is considerable scope for the adoption of the practice of compost making in the Bhor State as it is a hilly country abounding in coarse organic matter like green and dried leaves of forest trees, grasses of all kinds, tender plant tissues and the like. Compost making should form an important item of demonstration and intensive propaganda amongst cultivators so that within a few years, compost making forms a routine practice. The method described in Leaflet No. 4 of 1936 of the Bombay Agricultural Department will be suitable for Bhor State.

Urine has high nitrogen content, but no special efforts are made to collect the urine of the cattle from byres. Cultivators should be advised to spread dry fine earth in cattle byres to absorb the urine and remove the wet earth to the manure pit and renew fresh earth in the byre.

(Leaflet No. 6 of 1932 of the Bombay Agricultural Department).

Human excreta and urine is another source of nitrogenous manure which is at present wasted. In the Rural Development programme it is desirable to introduce the system of trench latrines or pit latrines of the dry-earth type in villages. This would result in providing some valuable manure to the cultivator. In cities like Bhor, Shirwal, Nasrapur and Pali, the Municipalities and Sanitary Committees should be induced to prepare poudrette manure from night soil. Poudrette is manufactured by a number of Municipalities in the Deccan and the same practice should be followed in Bhor State. This would add to the manurial supply of the surrounding cultivators. Proper disposal of human excreta is also essential from sanitary consideration in villages as it is often a source of human diseases.

Another important source of manurial material is the bones of animals. Bones contain about 3.5 per cent nitrogen and large quantities of phosphoric acid and lime. There is some export trade in bones from Bhor State but this is undesirable from the point of view of maintenance of soil fertility. We recommend that a bone-crushing factory be established at a central place for the three talukas of Vichitragad, Rajgad and Prachandgad with electric power that may be obtained from the Bhatghar dam and bone meal be sold to cultivators as manure. Bone meal is highly useful for all kinds of fruit trees like mango, jackfruit, citrus trees etc. and there would be demand for the meal in the State and also in the surrounding districts of the Deccan.

Until a bone-crushing factory is set up, it is best to advise the people to use roughly crushed bones for fruit trees. Bones can be made brittle by smother burning in which dried twigs and bones are heaped up in alternate layers in the proportion of 4 to 1 by weight and smother-burnt. This method should be demonstrated to the people. In this process the nitrogen in bones is lost to some extent but the phosphoric acid is not affected and it is valuable for fruit trees.

Increase in the supply of organic matter and nitrogen can be effected by growing green manure crops like sann, dhaincha, til and udid in fields and incorporating the whole crop with the soil. The method should be recommended in garden areas where there is ample water for decaying the huge quantities of organic matter so added. There is a leaflet on green manuring issued by the Bombay Agricultural Department which may be distributed and actual demonstrations of the method should be arranged on cultivators' fields. ( Leaflet No. 2 of 1911 ).

With a view to release more cowdung for manurial purposes the possibilities of increasing fuel supply should be investigated in the Forest Development plans. Each village should develop its own fuel reserve in a given number of years and wherever possible the State should provide the land.

Leaflets on manuring of onion, sugarcane and other garden crops issued by the Bombay Agricultural Department should be distributed in irrigated areas for the guidance of cultivators. ( Leaflet Nos. 4, 15, 8, 17 and 11 of 1921, 1929, 1930, 1927 and 1930 respectively ).

As regards rice, fields should be manured with compost recommended above. Rice has also been found to respond favourably to oil cakes like castor cake, groundnut and safflower cakes. These would prove economical during the present times when prices of paddy have nearly doubled. The quantity to be applied should be such as would supply to 40 pounds of nitrogen per acre.

If the various recommendations for increasing the supply of manurial material are adopted it is estimated that the present level of yields of all the crops would go up by 25 to 30 per cent in the State. As most of the methods recommended do not involve cash expenditure they are practicable to all those who are prepared to put in the necessary industry.

### 3 Improved implements and methods of cultivation.

#### (a) Implements

In order of importance next to the improvement of soil, is its cultivation or tillage for crop production. The most common implement of tillage is the plough

Iron ploughs

and the size of this differs from a hand plough used on hill slopes for hill-millet to a large size plough drawn by 6 to 8 bullocks in Desh tract. In the Deshi-maval and Desh tracts, iron ploughs have been found to be more efficient and easier to draw and they have already been introduced in Bhor State. Propaganda for the popularisation of the iron plough is no longer required. What the people told us every where during our enquiry was that as the iron plough costs much, it is not possible for every cultivator to purchase the same. Some cultivators and landlords who own iron ploughs, give them on hire after finishing their own work. Stocking of ploughs for hire purposes is also done in some large villages on business lines. The rent for a plough charged per day was reported to vary from 3 to 4 annas and cultivators expressed that the State should make some arrangements to stock the ploughs and let them on hire at one anna per day.

In the neighbouring British district also, iron ploughs though commonly used are not always owned by individual cultivators and the system of obtaining them on hire is in vogue. The rent charged used to be as high as it is in Bhor State at present but the work of stocking ploughs for hire was subsequently taken up by Taluka Development Associations and other non-official bodies like Co-operative Societies and Agricultural Associations from where they are obtained on hire. These bodies generally charge one anna per day per plough to their members and annas two to non-members. This example should be copied in the Bhor State also. In Maval and Konkan and in parts of Deshi-maval the iron plough is not suitable. People told us that they experience considerable difficulty in procuring suitable pieces of wood for the various parts of the wooden plough. They, therefore, expressed a desire that Government should stock suitable pieces of wood in depots for sale to cultivators at reasonable prices. We recommend that this may be done either by the Forest Department or by non-official bodies.

Another improved implement of a labour saving type is the iron leveller or *petari*. It is drawn by a pair of bullocks and is very useful in removing loosened soil in the field and dumping it in depressions in the process of levelling and also for raising bunds. As this implement is no

of every day use and is not required by every cultivator, it should be stocked by non-official bodies as in the case of iron ploughs and made available to cultivators on hire. A wooden plank drawn by bullocks is also an improvement over the local bamboo petari used for levelling of fields and for raising bunds. This is known as "Keni". This is very common in Nasik district and should be introduced in the Deshi-maval and Desh tracts of Bhor State. It used to cost Rs. 3 to 4 only but can be made by a local carpenter if a *babul* plank 4 feet long and  $1\frac{1}{2}$  feet broad is available for the purpose.

Broach harrow is another useful and efficient implement that should be introduced in the Desh tract for deep harrowing. The speciality of this harrow is that the blade is a curved one. In years when ploughing of fields is not possible the Broach harrow would largely bring about effects of tillage similar to those of the plough. If the field is harrowed with the Broach harrow, it makes furrows and ridges on account of which rain-water is held and run-off controlled. This operation is more useful in the case of rabi crops. Entire blade hoes for interculturing should be introduced. These should be made of different breadths to suit the distances between rows of crops. There are no other bullock drawn implements which could be introduced with advantage except the iron mot for lifting water from wells. But at present due to abnormal rise in the prices of iron this is out of the question.

#### (b) *Methods of Cultivation*

Regarding the methods of cultivation in vogue they are generally satisfactory under the peasant proprietary system of husbandry. In the Desh tract of Shirwal and Khedebare, however, the improved method of growing bajri and jowar by the Dry Farming system should be introduced. The principal features of this system are:

(1) Division of each field into suitable compartments by bunding on contours at regular intervals across the sloping fields.

(2) Ploughing the land every third year for jowar, on deep soils and thorough preparatory tillage before sowing.



(3) Manuring the field with 5 cart loads of fram yard manure or its equivalent in any available form every third year i. e. in the year of ploughing.

(4) Repeated preparatory harrowings during the monsoon in the case of rabi crops.

(5) Wider sowing of bajri or jowar at a lower seed rate with rows 12 inches apart in the case of bajri and 15 to 18 inches apart in the case of jowar, according to local conditions.

(6) Three or four hoeings with entire blade hoes or tooth oes during the growing period of the crop.

#### (4) Improved varieties of crops

The Bombay Agricultural Department has evolved improved strains of rice, jowar, wheat etc. Some of these are suitable for introduction in the different parts of Bhore State. Thus, in Sudhagad, Kolamba rice Nos. K. 42, K. 540 and other strains should be introduced as these have been found to be superior in the adjoining tracts of Kolaba district (Leaflet No. 1 of 1937). During our itinerary, however, we found that the people, although they admitted that K. 42 was a distinctly higher yielding strain, considered that their local variety of "Jada Kolamba" was in great demand in the Poona market as it is specially preferred for the special preparation of puffed rice known as "churmure". Hence the economics of K. 42 must be first worked out before people could be advised to take it. The other rice strain K. 540 is a semi late variety and is suitable. Being a fine grained variety, it fetches greater cash-income. The Bombay Agricultural Department has not introduced any improved strain of Ambemohor for Maval. Recently, however, they have started a Rice Breeding Station at Vadgaon in Maval Taluka of Poona district and watch should be kept to introduce any improved strain in Bhore up-ghat country when announced from that Station.

Pusa wheat No. 4 is a rust resisting strain suitable for both the irrigated and dry wheat areas and should be introduced. (Leaflet No. 2 of 1937). Trials may also be made of this strain in dry areas and if found equally good yielder with the local strain it should be introduced.

ed. During our tours people complained about rust on wheat as a disease of common occurrence and the most practicable remedy against it is the growing of a rust-proof or rust-resistant strain. The area under wheat in the State is 6316 acres and if Pusa 4 proves successful the annual loss caused by rust would be controlled.

With regard to groundnut the early and intermediate types of Small Japan, Big Japan, Virginia have already been taken up by the people. In the case of green peas—Matar—the Wai seed has already been taken up by the people. This is an earlier variety and gives its yield in two to three pickings.

Akola bajri has been found to be a higher yielding variety in the Deccan. Arrangements should be made to try this variety in the bajri tracts of Rajgad and Vichitragad and if found better should be introduced. The trials should be made on fields of progressive cultivators. There is a variety of bajri from Purandhar taluka popularly known as Sakurdi bajri, which is also worth trial.

(a) *Seed selection and supply of selected seed.*

During its tours of the different talukas the Committee examined several samples of seeds of rice, jowar, bajri and other crops and was rather disappointed to see that enough attention to the selection and multiplication of selected seed was not paid. It is common knowledge that a homogeneous produce fetches distinctly better price than mixed produce and one of the ways of increasing the returns from the yield of crops is to pay special attention to seed selection and use of selected seed. The new Department should devote its attention to securing seeds of varieties of rice, nagli, vari, jowar etc. from villages reputed for good and selected seeds and make arrangements to multiply the selected seeds on farms of progressive agriculturists who may be given reasonable subsidy for the work. The produce from the selected seed should be purchased by the new Department and stocked with the same cultivators for distribution. If the seed growers undertake to stock and distribute the seeds either on cash payment or on exchange system now prevalent in the country

with 25 per cent interest in kind they may be allowed to do so.

**Tagai for seeds** Or Government may give tagai advance in the form of selected seed and recover the amount at the harvest season with 5 per cent. interest only on the original value. The whole work of seed multiplication and the subsequent distribution of seed either by exchange system or with the help of tagai loans should be entrusted to the Taluka Local Boards which bodies as recommended hereafter should also take up the functions of the Taluka Development Associations. In the initial years assistance in recovery work may be given to the Taluka Boards by the Mamlatdars. It is estimated that a sum of Rs. 5000 may be necessary to be set side for each taluka for issue as tagai loans specifically for seed distribution activity as all the cultivators would not need tagai and some seed would be distributed in kind on exchange system.

**Renewal of seed** In this connection it is to be noted that in the case of crops like wheat, rice etc. which do not cross-fertilise to any appreciable extent, it is enough to change the seed every fourth year to maintain its purity. In the seed multiplication plan, therefore, arrangements of seed supply will have to be made for only 25 per cent. of the total area under each crop every year. Again some industrious cultivators have maintained the old tradition of selecting their own seed each year before threshing the general crop. Such people do not need any seed. Hence if arrangements are made each year to grow and stock seed for 20 per cent of the total area under each crop it should suffice.

The same arrangement proposed for the supply of selected **Registered seed growers** seed should also be adopted in the case of supply of seed of improved strains. A number of growers will have to be registered for this purpose situated at definite intervals all over the tract. These people should be given a reasonable subsidy for the rouging operations, for special labour involved in threshing the crop separately and for stocking the produce till required in the next sowing season.

Taking on an average that homogeneous produce fetches **Increased money return** about 5 per cent higher price than the general mixed produce coming in the market, the net annual increase as a result of this improvement alone would be

5 per cent increased money-return in the case of money crops like rice, wheat etc. in addition to the improvement of the quantity of yield which generally occurs by use of selected seeds.

(b) *Introduction of new crops and extension of some of the existing crops.*

Betel-vine, ginger and double-bean are paying crops and these can be grown successfully in Khedebare and Shirval divisions in garden cultivation. Tobacco is likely to succeed in these divisions as a non-irrigated crop. Straw-berries may be introduced on the table lands of Torna, Rajagad, Rayareshwar and other high spurs.

Guinea grass is worth introducing in the garden areas to be grown along with the sides of water channels. It is a hardy grass and provides nutritious green fodder for the work cattle and gives a cutting once in 3 to 4 weeks. It has also good binding effect on the soil and keeps the water channels firm and water-tight. Napier grass is another nutritious grass worth introducing. It grows without irrigation on mal and varkas lands. It gives three cuttings of green grass in the year. (See September 1941 issue of the Shetki and Shetkari Magazine).

Regarding extension of some of the existing crops, the problem of extending the cultivation of second crops of *wal*, gram and *mug* after rice in Sudhagad stands out prominently and calls for attention. At a rough estimate from 25 to 30 per cent of the area under rice in that taluka is capable of growing a second crop after rice in the cold season. But due to certain disabilities the area under these crops is declining. The most important handicaps are :- (1) nuisance of stray cattle of the village and (2) damage by the wild animal Rohi (an antelope more or less of the size of a small horse), (3) high rent in certain villages like Madhali, charged by the land-owners for the growing of the second crop.

The present practice is to fence the fields against stray cattle but people find it a costly affair. During the kharif season when all cultivable area is under crops people keep their cattle under control but after the harvest of rice, they are let

Extension of already grown crops

Protection against stray cattle and wild animals

loose, the reason being that only a small proportion of the rice area is grown under second crops. This contention has good deal of force in it. At the same time from a broader consideration it seems necessary that a way must be found out to give protection against stray cattle to the industrious cultivators growing cold weather crops as it provides remunerative occupation to the cultivators in their own village. The fencing of fields is not at all effective against the *Rohis*. They can jump over very high fences. The only way to control is to shoot them. Government will have to assist the people in this measure. We shall refer to this subject later on. Regarding the problem of high rent of fields, Government can bring about a compromise and give protection to the people against unreasonable demands of land-owners.

(5) Provision of irrigation facilities for supplementing rain-fall for ensuring yields

It is the common experience that in most of the years the rainfall though abundant is not necessarily seasonable and is often ill-distributed causing too heavy falls at one time and too light showers at another. Similarly, long breaks in rains are also experienced in several years which arrest the growth of crops and lead to poor yields. As the country is hilly and the rainfall is generally abundant it is possible to save the crops from the adverse effects of such irregular rainfall in a number of localities. The idea is to harness the numerous streams and nallas running from hill sides at different levels to store small quantities of the rain-water at each point and take it to fields lower down. The construction of such dams across the streams is not a costly affair as the work to be constructed need not be pucca. If people are given tagai loans for this purpose they would harness a number of streams for preventing crop failures by a couple of waterings and return the amount in suitable, easy instalments with interest. At suitable places in all the valleys bigger dams should be constructed so as to impound larger quantities of water for irrigating the rabi crop of jowar which needs only two waterings. This type of protective work has high potentiality in stabilising the yields of crops at a high level every-where in

Harnessing the streams and nallas

Construction of Dams as protective irrigation works

the State including the Sudhagad taluka. The new Department when started should prepare a list of all suitable sites and see that they are harnessed by the people concerned with the help of tagai grants wherever necessary. The Officer in charge will have to assist the people in settling the rights about the water of the various individuals coming in the scheme and also overcoming other difficulties in the proper execution of the projects. This is a very fruitful activity and should be started at once. It would add materially to the welfare of the people and indirectly to that of the State.

**(6) Control of damage by small and large animals and of pests and diseases of crops and fruit trees**

An appreciable loss occurs annually from damage to crops and fruit trees by small and large animals and from insect pests and diseases. The table in the Appendix No. III shows a list of crops and fruit trees with names of animals, insect-pests and diseases, commonly found doing damage to them.

Of the whole list of pests and diseases ( Appendix No. III ) the crab and the wild pig are the most commonly occurring and the most damaging creatures every where and especially in the Maval, Deshi-maval and Sudhagad tracts. The people earnestly and emphatically demanded that measures be taken to combat these. It is claimed that the crab causes damage from 20 to 25% to the rice seedbeds. It also damages the transplanted seedlings to the extent of about 10 per cent., particularly those in the neighbourhood of the field bunds. The damage does not stop there. By boring innumerable burrows in the bunds of fields, they weaken them to such a degree that breaches are caused resulting in destruction of fields. The repairs in such cases are costly and the cultivator has to be alert and unless he takes precautions or immediate action after the breach the loss is heavy. The local remedy is to pour cowdung water in burrows during the early part of the rainy season so that crabs come out which then are destroyed. This process is, however, laborious and cannot be adopted on a large scale. Besides, the season is extremely busy. The Bombay Agricultural Department had carried out investigations to study the life history of the crab and to devise remedial measures. The results do not seem to have borne practical fruit and no remedy

has been found out that could be taken up by the cultivator on a large scale.

Owing to the hilly nature of the country and the existence of forests the wild pig breeds in this tract and **Damage by wild pigs** damages the crops of rice, *nagli*, *vari*, *argad jowar* etc. in the kharif season and shalu jowar in the rabi season. The pig damages the crops when they are in grain and the cultivator's labour of the whole year is wasted. The damage may roughly amount to 10 per cent. of the various crops affected. But in individual cases and especially in fields situated near forests, the damage is often as heavy as 50 to 75 per cent. of the crop. The cultivators of Kanjale village in Khedebare tract used to grow potatoes but they have given up the crop recently owing to trouble from wild pigs. Similarly in Pavan-maval taluka damage to crops has increased, after the construction of the Mulshi dam, the wild pigs from the valleys of the dam having moved permanently to the adjoining parts of Pavan-maval. In their visits to different tracts the Committee heard the people complaining bitterly about the damage by the wild pig and expressing that the State should help them in controlling the damage which is of annual occurrence.

The only effective remedy against the wild pig is its **Formation of Gun-clubs** eradication by shooting and hence we found great demand for more gun licences. The Committee however thinks that if the wild pig is to be effectively controlled the shooting must be carried out systematically and regularly for 5 to 6 years in an organised manner, simultaneously in all the affected parts. In the British districts the Government encourages the formation of regional gun-clubs on co-operative lines in which cultivators in the affected areas join and carry on systematic hunting operations with the help of paid shikaris and spearsmen. The villagers help them by providing beaters as the shikar party moves on in their village areas. Separate gun-clubs are formed for separate valleys or regions and the whole area is hunted periodically and regularly. The Committee recommends that people should be encouraged to form gun-clubs for each valley or region. These clubs should be given some initial grant to purchase guns, spears and nets etc. and some ammunition. The shikar work should be carried

on under the guidance of the new department. Individual villages should also be encouraged to form shikar parties of their own which may hunt the area regularly once a week during the crop growing season. The State may also issue the available confiscated guns for these clubs in addition to those which people would purchase. The issue of gun licences should be for crop protection only for a given period to be fixed by the State each year and no animal other than the wild pig and the *Rohi* should be allowed to be killed. Hunting should be freely allowed in all forest areas. Prizes for the destruction of wild pigs and *Rohis* should also be announced and given to individual shikaris.

Another way in which Government can render assistance to the people in eradicating the wild pig is to send out its own shooting parties to different valleys which would carry on shikar work in an organised manner throughout the crop season. The State has some extra police for emergencies and these policemen may be asked to assist the people in eradicating the wild pig.

While discussing the subject of the eradication of the wild pig, damage to crops by another wild animal namely *Rohi* (an antelope) may be taken into account. This animal lives in herds and is very common in the Sudhagad taluka. It is bigger than a deer and is very swift and jumps over high fences with ease. It damages the crops of *wal*, gram, *mug* etc., that are grown in rice fields in the cold season as second crops after rice. The same organisation as may be set up against the wild pig should undertake shikar work against the *Rohi*.

The various insect pests and diseases of crops and fruit trees shown in the table in the Appendix No. III can be dealt with by remedial measures shown in the last column of that table. The new department should demonstrate the methods of using the various insecticides and fungicides that are effective in controlling them. The control of insect pests needs co-operative action and this should be organised.

#### (7) Marketing of crops—facilities needed.

The important large market for most of the produce of the Bhor State is Poona. This is accessible by metalled roads from



Shirwal by the Satara-Poona road and from Bhor, Nasrapur and Vele via Nasrapur by branch roads joining the Satara-Poona road. There is a branch road of six miles joining Kolwan, the head quarters of Pavanmaval taluka, to Poud on the Poona-Mulshi road. In Sudhagad, there is a road running from Pali to the Khopoli-Dharamtar road. Shirwal is also linked up to the market at Lonand by the Pandharpur-Mahad road which crosses the Satara-Poona road near this town.

The following are the important lines of communication in the State.

Table showing the roads in Bhor State.

Road From	Road To	Approximate length in miles	Remarks
Shirwal	Poona	32	This is a section of the Satara-Poona road.
Shirwal	Lonand	17	
Lonand	Varandya Ghat	37	...
Bhor	Ambavade	6	Through Shirwal and Bhor. This is a section of the Pandharpur-Mahad road.
Bhor	26th mile of Satara-Poona road	7	...
Vele	Nasrapur	20	Branch road via Bhatghar Dam.
Nasrapur	21st mile of Satara-Poona road	1	...
Ranze	15th mile of Satara-Poona road	2½	Branch road.
Kolwan	Poud	6	Kondhanpur branch of Poona District Local Board.
Pali	5th mile of Khopoli-Dharamtar road	14	Joining the Poona-Mulshi road.
Pali	Nagothna	6	...
			Kolaba District Local Board road.

From the foregoing table and by a reference to map No. 1

Road in Ambad-  
khind Rohida  
valley

it will be seen that more than half the area of the State is fairly well served by metalled roads.

The Poona-Satara road which enters the territory of Bhore in the 13th mile passes through the Khedebare tract of Rajgad taluka and the Shirwal division of Vichitragad taluka. The Pandharpur-Mahad road crosses this through Shirwal. A branch road starting from Bhore joins the Poona-Satara road at the 25th mile passing over the Bhatghar Dam. There is also a branch road from Ambavade to Bhore. Vichitragad taluka is thus well connected by road to the important markets at Poona, Lonand and Bhore. There is however one important valley in this taluka which is in urgent need of a metalled road, namely the Ambad-Khind Rohida valley.

There is a fair weather cart road in this valley joining Bhore to Wai via Ambadkhind. The length of this road is about 8 miles. The valley is very fertile and densely populated and a metalled road is very essential. The people are very keen on having the road and expressed their willingness to negotiate with owners of land for free gift of their land for the road and also to contribute in the form of labour for its construction. The proposed new department should start negotiations with the people and prepare plans and estimates with the help of the P. W. D. and get the sanction of the Government.

The existence of roads in Desh and Deshi-maval tracts has materially helped the people in marketing the farm and other produce in a profitable way. The development of quick transport facilities of motor service in recent years along these roads has given impetus to the growing of cash crops requiring quick transport like peas, bhendi, French beans, brinjals, chillies, tomatoes and various fruits in Shirwal and Khedebare divisions. A new trade in milk with Poona from the Khedebare and Shirwal tracts has come into existence during recent years as regular buses are available for quick transport. This illustrates the importance of roads for the development of agriculture.

In the Maval tract in the densely hilly parts the country is inaccessible even by bullock carts and farm and forest produce is required to be taken to local markets several miles away on head-loads or on

New roads in  
different valleys.

pack animals. The valleys from where the farm and forest produce cannot be easily taken to Poona market in the absence of roads, are the Gunjan-maval, Ambegaon and Mosey in Prachandgad taluka and the Mutha and the Pavana of the Pavan-maval taluka. A road is also essential from Pali in Sudhagad to its southern boundary. In the absence of metalled roads, the cost of transport of produce is very high and the time spent on travel is comparatively greater. There are some fair weather cart tracts in these valleys but they cannot be used for nearly six months during the year owing to rains. On this account the field produce cannot be sent to the Poona market till about the middle of January and it has often to be sold to local dealers at a lower price to raise the necessary cash for the payment of land revenue etc. The forest produce also gets too low a price at the local market in the absence of roads. It is therefore in the interest of the State and the people alike to have roads in these valleys for which the people expressed their readiness to give full co-operation and bear their share in the construction. The roads needed are shown below.

Table showing the new roads required to be constructed.

Name of the valley where a new road is needed	From	To	Miles (approximate)	Remarks
Kundalika	Pali	Kalamboshi	10	Southern boundary of Sudhagad taluka
Mosey	Along the	Mosey river	15	Prachandgad taluka
Tung	Kolwan	Ambegaon	8	Pavanmaval taluka
Rohida	Utrola	Ambavade	6	Vichitragad taluka
Gunjan maval	Gunjan maval	Vele	8	Prachandgad taluka
Velvandi	Mohori	Bhor	25	Prachandgad and Rajgad talukas

The length of all the roads proposed above may come to about 75 miles and taking Rs. 10,000 as the average cost of construction of a mile of metalled road, the total cost may amount to 7½ lakhs of

**Cost of making roads.**

rupees. This is a huge sum and must be spent as a necessary capital by raising loans or contributions from petrol-road-fund. The repairs can be met from toll-taxes on the roads. It is therefore proposed that a road construction programme spread over a period of about fifteen years should be drawn up and a sum of Rs. 50,000 should be provided in the annual budget for road construction.

Most of the rivers in Maval are not fordable during the rainy season and considerable inconvenience is experienced by travellers. Thus the people of Ambegaon in Prachandgad desired to have a cause-way (Saku) on the Ambegaon river near that village. The new department should draw up a programme of construction of causeways and submit it to Government so that through the agency of Local Boards these works can be carried out.

#### Regulated markets.

The markets in the State are unregulated with regard to trade allowances to be charged by commission agents. It is understood that a Weights and Measures Act has been passed by the State but its execution needs greater strictness. The cultivators often get confused in the markets and advantage is taken by Dalals, of their ignorance and indigence, and they lose in a variety of ways. It is therefore necessary to protect the cultivator against mal-practices in the markets by passing the Agricultural Markets Act on the lines of that in the British territory as soon as possible. The Act provides for setting up of Market Committees, protection of carts in the market yards, provision of water and other conveniences to the cultivators in the market yard, regulation of trade allowances, use of correct weights and measures and the daily announcing of prices, prevailing in important markets, on notice boards.

## CHAPTER V

### IMPROVEMENT OF AGRICULTURE (*continued*)

#### Irrigation Farming

Practically the whole of crop production in the State ( 99 per cent, ) is dependent on rainfall and on the moisture conserved in the soil. In Chapter I on page 12 the area shown under irrigated crops is 2270 acres only out of the total cropped area of 175622 acres. Most of the irrigated area happens to be in Khedebare and Shirwal divisions. Irrigated crops are also grown in Deshi-maval tract in scattered places, as at Ambavane and Ranze in Rajgad, Yeoli, Bhor, Sangvi and also along the Rambag stream in Vichitragad. The supply of water for irrigation is derived either from Bandharas ( Patasthal ) or from wells ( Motasthal ). In Shirwal division, the greater portion of irrigation farming is of Motasthal type, while that in Khedebare division and in parts of Deshi-maval tract it is of Patasthal type. In Shirwal division the most important and largely grown crop under irrigation is onion particularly in villages round about Bhade, while round about Shirwal the tendency to grow Mosambi orchards is on an increase. Recently, Mr. Narayan Jagannath Rathi—a Marwari gentleman, has started the planting of grapes in his orchard at Shirwal. In the Khedebare tract there are orchards of mosambi, santra, lemon and figs. There is also considerable area under seasonal vegetable crops as the supply of water in the bandharas is not necessarily of a perennial type.

#### **Patasthal Bagayat.**

Patasthal bagayat is carried on under two types of bandharas, namely :— pucca and katcha bandharas. The Committee tried to get the lists of the two types of bandharas but it does not claim to have obtained complete information about them. The lists prepared are given in the Appendix Nos. IV & V. Water supply in katcha bandharas can be appreciably increased by constructing pucca bandharas. There are also additional

sites where similar bandharas can be constructed in Rajgad, Vichitragad, Pavanmaival and Sudhagad talukas. The names of these sites are shown in the Appendix No. VI.

**Advantages of irrigation farming.** Irrigation farming has several advantages. It provides remunerative work to the cultivator all the year round in his own village and also to a certain number of people who work as labourers in villages. The yields of irrigated crops are generally stable and are much higher than those of rain-fed crops. Dry crops like shalu jowar if given only two to three irrigations are considerably benefited and their yields are nearly doubled thereby. The Committee therefore strongly recommends that the State should give every encouragement to develop irrigation farming.

During the survey of various villages the Committee came across some examples of enterprising cultivators who had started plantations on nearby sources of irrigation but had to stop their efforts even at some loss on account of technical and legal difficulties in obtaining State permission to utilize the water sources.

**Change needed in the outlook of officials.** It is necessary to bring about a change in the outlook of officials in interpreting rules and regulations. Such interpretations must always be in the interest of the cultivator so as to encourage him in his efforts to improve his agricultural practices. In the Bombay Province irrigation farming on rivers is encouraged by allowing the use of water free of any charge in the initial years.

**Sites for pucca bandharas in Sudhagad.** Mr. Athavale of Jambulpada told the Committee that there are five or six rivers (small and large) in Sudhagad taluka which could be harnessed for irrigation purposes by constructing pucca bandharas. Although these may not hold water all the year round, it may suffice for raising short season irrigated crops like the onion, chillies, brinjals, cucurbits, sweet potatoes etc. as is done in Alibag taluka of Kolaba district. If the water is insufficient for

flow irrigation, counterpoise water-lifts known as "Ukti" may be used.

Another site that should be developed for growing irrigated crops is the tract near the village of Kalmaboshi situated close to the northern boundary of Sudhagad taluka. The Kundalika river which carries the tail-water of the Hydro-electric Power House at Bhira in Roha taluka, passes along this village for a length of about three miles. The supply of water is ample and perennial and the lift is not very high. Power could be generated for lifting water by water-turbines or by oil-engines; mots also can be used. Several acres of land could be brought under garden crops or orchards. What is required is propaganda and education of the people in the methods of growing irrigated crops and some initial help also for setting up pumping plants or turbines. There is a good and permanent market at Bhira ( which is about 4 miles from the place ) for milk and vegetables of all kinds. The new Development Department should work out this scheme.

Another tract, where development of irrigation farming could be made without much initial expenditure is along the Nira river which carries the water of the Bhatghar dam upto the Veer dam. The Bombay Irrigation Department seems to favour the use of this water by villagers along the banks of this river. It has set up electrically driven pumping plants at Rajewadi and Wing. The water at Rajewadi has been raised to a height of 100 feet with which about 250 acres could be irrigated. At Wing also the water has been raised to a height of 100 feet and it is sufficient for 350 acres. The people of Shirwal and other villages situated along the bank in that division expressed desire to obtain similar pumping plants and water supplied for irrigation on a large scale. This proposal is worth examining. The only responsibility of the State may be that it will have to be responsible for the collection of water charges. The experience at Wing and at Rajewadi in this regard is not very encouraging. People of the villages who wish to have the advantage of pumping stations

Tail water from  
Hydro-electric  
power House at  
Bhira.

Nira river east  
of Bhatghar  
Dam.

Installing elec-  
tric pumping  
plants.

should be bound by a written agreement that whether they use the water or not they will be responsible for paying the water charges if pumping stations are established at their specific request. If this is agreed to there is considerable scope for extending irrigation farming in the Shirwal division. The people are fully conversant with the methods of growing a variety of irrigated crops including sugarcane and would need very little technical guidance.

Near the Bhatghar dam there exists a huge stone quarry. **Water from the quarry near Bhatghar dam** This holds a large volume of water that could be used for irrigation. Special encouragement should be given to the people of Sangvi and other villages to erect electric pumps for lifting quarry water for irrigation. Similarly the Padmavati Doha of the Nira, situated between the town of Bhor and the Bhatghar dam would provide irrigation water for raising mango and other fruit plantations. People along the right bank *chari* of the Bhatghar dam should be encouraged to use this water, which would suffice for about 100 acres.

The Rambag dam which supplies water to the town of Bhor **Rambag dam near Bhor** has a large quantity of water that is let out as excess water, through the right bank waste-weir during the months of November to March. If this excess water is not wasted in this way but is led by a channel to fields on the other side of the road, it would suffice for irrigating about 300 acres of jowar. Such developments should be undertaken immediately in hand as they would cost little and would show the results from its first year.

The Committee wishes to place on record its appreciation **Example of an industrious cultivator** of a cultivator at Pirangut in Pavanmaval taluka, Mr. Damu Laxman Pavale Patil, who by sheer industry and perseverance has become a prosperous cultivator. In his young life he was in debt like other cultivators. He owned a piece of shallow and stony mal land along the slope of a hillock situated on the bank of the village stream which has perennial springs. He erected a small hut and stayed on the land and steadily prepared fields out of the varkas land and used the stones for damming the stream.



The developed land now measures about 4 acres most of which is irrigated from the stream by flow irrigation. There may be other examples of such enterprise and personal industry and they should be encouraged in every possible way by grant of tagai, prizes and even titles as Krishi-Bhushan. The same stream has been harnessed lower down by the villagers of Lavala village in the British territory where about 100 acres are irrigated with that water.

From the information in the statements in the Appendix showing possible sites for the construction of bandharas in different talukas, it would be clear that there is considerable scope for this development. The number of possible sites shown in that table are nearly 60 and it would need considerable amount of capital to develop them. This is beyond the means of the people. The State should therefore come forward to bring about this development in a planned manner as it involves the questions of (1) settlement of rights of the people to be benefited by the bandharas, (2) technical knowledge of construction and (3) the problem of annual repairs. The investment is of a productive nature and there will be no loss to the State. The people showed great keenness to have such bandharas and showed willingness to pay for the water. Wherever people are willing to give a written agreement to bear the water charges if a bandhara is constructed and water supplied, the site should be surveyed, alignments of water channels determined, areas under command measured and the people given an idea of the amount they will have to pay for the water annually. If they are agreeable, the construction work should be undertaken. If the present laws are inadequate for getting the land for the channels or even for the construction of dams, Government should pass necessary legislation empowering it to acquire necessary land for channels etc. If the State is unable to find the necessary funds from its savings, it may float a loan of about Rs. 50,000/- and draw upon it from time to time as needed. No further amount will be required after this initial out-lay as the annual water charges when recovered may be utilised for the construction of the additional dams. The work should be completed within a period of 15 years.

In some cases as at Pisalwadi and Bajarwadi in Vichitragad taluka, cultivators may come forward to construct dams in their private capacity. Such persons should be given tagai loans on easy terms. They should also be given technical advice free of charge in preparing plans and estimates.

The construction of bandharas requires technical knowledge and the State should entertain special P. W. D. staff for preparing plans and estimates and supervising the construction work. The charge on this account should be debited to each project. The staff should work under the joint authority of the P. W. D. and the Development Officer.

The development of Patasthal irrigation would lead to increase in the economic prosperity of the people by giving them remunerative occupation in their own villages. It will increase the out-put of garden crops and fruit trees and also benefit the Government indirectly.

#### Motasthal irrigation

The number of wells used for irrigation in different talukas is, 400 in Vichitragad taluka and 25 in Rajgad taluka. In the other talukas there is very little irrigation under wells. In Khedebare and Shirwal divisions and also in Pavanmaval taluka where the supply of underground water is fairly certain, people showed great keenness to have wells. What they need is financial help in the form of tagai loans at a low rate of interest and on condition of easy instalments of repayments. Thus in Pavanmaval taluka the cultivators of Kalamboli situated on the bank of the Mula river want to dig wells along its bank for irrigation farming with which they are conversant. The villagers of Kalamboli are Mali by caste and hence they are very keen to have wells (Budakis). What they need is capital and this could be advanced as tagai.

Another site for about 25 to 30 wells is at Harali village in Shirwal division along the village nalla. This project may also be given help in the form of tagai. Similarly in the area known as Bend in the village of Divale in Khedebare division, there is good supply of underground water for wells and people are keen

to dig wells if tagai loans are advanced. In most of the villages in the Khedebare tract, people want to take to the digging of wells for irrigation. At Nayagaon for instance 6 new wells have been constructed. There are good prospects for successful well sinking in the villages of Kusagaon, Velu, Kasurdi, Varvebudruk, Degaon, Nayagaon, Nigde etc. in the Khedebare tract. Similarly in the Mangdari valley in Rajgad, a number of wells could be successfully sunk along the banks of the stream running towards Ambavane which has a perennial supply of water. In the below-ghat taluka of Sudhagad the people of Mahagaon told the Committee that about 12 acres of land could be developed for irrigated crops like onion if wells were dug there. There are good underground water currents in that area.

The State should encourage the digging of wells and should set aside a sum of Rs. 10,000 for issue of tagai loans at the rate of 5 per cent. People should also be given the help of a water-finder expert to locate water so that the chances of success are more assured. Each Local Board should be asked to keep in stock some jumper bars and one boring machine for tapping the lower strata for water in the existing wells.

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## CHAPTER VI

### Horticulture and Sylviculture

#### 1. *Fruit gardens under irrigation.*

In Chapter I, mention has already been made that there are several fruit gardens of mosambi, santra, lemon and fig in the Khedebare division of Rajgad and in Shirwal division of Vichitravad. We noticed the growing tendency amongst the agriculturists of digging wells and establishing fruit gardens at Velu, Nayagaon, Devgaon, Harischandri, Shirwal etc. At Shirwal, a Marwari gentleman has recently started a grape garden under the guidance of an experienced man from Baramati. People have taken to planting of grafted mangoes of Alphonso and Payari varieties in both these divisions and also in Sudhagad taluka. The tendency to grow mangoes of the locally reputed varieties from seeds was also noticeable everywhere throughout the State.

While the Committee appreciates these efforts, it found that two things were essential for the full development of the potentiality for fruit production of the State as a whole. The first difficulty is the paucity of capital for digging wells and for the initial expenditure for planting fruit trees. The second is the lack of adequate technical knowledge with regard to (a) selection of suitable soils for different kinds of fruit trees, (b) methods of plant propagation, (c) selection of budded plants and grafts, (d) optimum distance of planting, (e) pruning of roots and shoots, (f) proper manuring and watering of trees, (g) bringing trees to bear according to the demand of the market, (h) treatment of diseases and pests and (i) grading and packing of fruit for the market etc. We saw some of the mosambi orchards raised on heavy clay soils underlaid with limy subsoil which are unsuited for citrus trees. Further in most of the mosambi orchards trees were spaced as close as 10 to 12 feet apart. With regard to

**Necessity of technical guidance in fruit growing**

manuring, the practice of using bone meal was absent. Die-back, gummosis, fruit fly, lemon caterpillar, root-rot, white ants etc. were noticed in mosambi gardens. Loranthus was very common on mango trees. Most of these pests can be controlled. The white-ant is a very common trouble of fruit trees especially of mango. This tree is also damaged by rats and another rat-like animal known as *adal*, particularly in Maval and Deshi-maval. We also noticed that jack-fruit in Sudhagad was often subject to bleeding disease and damaged by rats and *adal*. In Sudhagad we were told at many places that mango grafts died in large numbers. In the Desh part of the up-ghat country, mango trees cannot be established without watering at least for three years while in Maval and Deshi-maval tracts we saw that they could succeed without watering.

The difficulties of capital and technical advice are easy to surmount. In the Chapter on irrigation farming (Chapter V) we have already recommended that Government should institute a fund for giving tagai loans to cultivators for digging and constructing wells on easy terms. If this is done the first of the two difficulties would be overcome. As regards technical guidance and advice, we propose that two trained *Malis* should be entertained in the new department of Rural Development proposed elsewhere in the report, and they should be stationed at Shirwal and Nasrapur. These *Malis* should give the necessary guidance and advice by personal visits to the gardens of needy people. It may not be possible to get *Malis* with required training easily. It is therefore recommended that two young and enthusiastic sons of farmers owning orchards should be selected from the Shirwal and Khedebare divisions and they should be trained for six months at the Ganeshkhind Fruit Experiment Station, Poona. They should also be given an opportunity to visit centres of fruit cultivation in the Deccan such as Rahuri, Pachora, Erandol, Nasik, Baramati etc. to gain first hand knowledge. After completion of the training they should be stationed at the two places mentioned above. Before employing them they should be asked to give a binding that they would serve the State for a period of ten years at least. Their scale of pay should be Rs. 20— $\frac{1}{2}$ —25.

2. *Utilization of hill-slopes and hills for plantations of fruit trees.*

As already stated in Chapter I, facilities for perennial irrigation exist only in the Desh tract and to some extent in the eastern half of the Deshimaival tract. The rest of the territory of the State is hilly and has very few sites where water supply for perennial irrigation exists. Fruits like mosambi, santra, fig, grape, chiku etc. which require irrigation throughout the year, cannot therefore be grown there. But there are other fruits like the mango, jack-fruit, cashew-nut, jambul, amvla etc. which flourish in those parts without irrigation on the extensive hill sides. All the hills and hill-sides, however, are not suitable for these trees. There are two types of soils underlaid with different types of murum found in this tract. One type of soil lies on murum, which is soft in texture, red in colour and has a great depth. The soil here is red in colour resembling the laterite soil. The other type of soil is brown in colour, thin and coarse and is underlaid with hard type of murum which is not deep. In the latter type the underlying trap rock either out-crops at several places or is almost close to the surface. This type of soil is not suitable for fruit trees mentioned above but can only be used for wild type of forest trees. The former type is most suited for mango, jack-fruit, cashew-nut etc. Such hills and hill-sides with soft and thick murum and red soil are very common in all parts of Maval. We saw in Pavanmaval taluka that all the slopes of Tikona Fort hills have soft red murum and the mango trees planted by some of the villagers had luxuriant growth. The whole of the Tung valley has similar hill-slopes. We also saw that mango, jambul and jack-fruit trees were in flourishing condition on the hill-slopes of the Mulshi valley. Similar soil and subsoil exist in the Muthe-khore in Maval and also in the Kanand Khore and Hirdas Maval. At Parhar khud in Hirdas-Maval the cashew-nut trees planted by a progressive cultivator are in excellent condition. In Sudhagad taluka also some of the low hills at Karje, Amboshi, Natalol, Gondale, Siddheshwar-Khur, Potlaj, Nagov, Gomashi, Pachapur, Nandgaon, Alboli, Kalmboshi, and Tadgaon Pathar etc. have red soil with soft and deep red murum where mango, cashew-nut, Kokam, jack-fruit etc. would flourish. At Gomashi particularly there are several

jack-fruit trees in excellent condition. The hills at Siddheshwar to the south of Pali have plantations of mango, jack-fruit, jambul and lemon. Our survey indicates beyond doubt that the hill-slopes with red, soft and deep murum are well suited for these trees and if they are developed by raising large plantations of these fruit trees they would add considerably to the resources of the people and the State alike. This is particularly of importance to Maval and Sudhagad where agriculture is restricted to the kharif season and the people are in need of additional sources of income. Mango plantations can also be raised along the sides of streams in the Deshi-maval and Khedebare tracts as several of these have underground moisture.

We have already shown in Chapter I that the area for crop-production in Maval is very limited and people are required to use hill-slopes for growing hill-milletts. This use of hill-slopes is of a destructive nature as within two to three years of cropping most of the surface soil is lost by erosion and the cultivation is then shifted to the neighbouring land. In this way a large part of the hill-sides is subjected to such deteriorating process periodically. In the past, when every small tract was required to be self-sufficient with regard to the supply of food-grains the use of the hill-slopes for crop production might have been justifiable. But now, when food grains from excess tracts can be transported to deficiency tracts with ease and rapidity and at reasonably cheap rates, the use of hill-slopes in such a destructive manner must be put a stop to, as soon as possible. The slopes in Maval, Deshi-maval and Sudhagad have a much greater potentiality than periodical crop production. If put under tree plantations, not only the surface soil but also the subsoil and murum upto several feet in depth are utilised for the development of tree growth and the resulting produce—be it of fruit, timber or any other part of the trees,—is manifold in value as compared to the yield of crops. What the annual crops feed upon is the shallow surface layer of the soil. Trees send their roots vertically downwards to varying depths as also laterally to varying distances. They, therefore, bring up large volumes of plant-food and moisture from the various layers of the substrata and therefore the yield of trees is several times greater than that of crops. Trees have a binding effect on

The potentiality  
of hill-slopes

Advantages of  
tree growth on  
hill-slopes

the soil and they are indirectly helpful in increasing underground supply of water to feed springs. The rain water enters the soil and subsoil along the whole expanse of the root systems and thus percolates to lower layers and is held there for future use by trees. Trees also improve the soil underneath them by shedding leaves, twigs etc. annually which increase the organic matter in the soil. Finally, the income derived from tree plantations would be much more than from annual crops and it can be utilised for purchase of food-grains and also to meet the deficit in other items of expenditure of the family of the cultivator. Tree planting would also reduce the number of cattle that a cultivator is required to maintain when the hill-slopes are used for crop production. *All these considerations clearly point out that the natural, rational and economical way of utilising the hill slopes is to put them under tree growth.* The types of trees to be grown would vary according to the soil and climatic conditions.

In our opinion the hill slopes having red, soft and deep murum should be brought under mango plantations. Pits should be dug of the dimensions of 3' x 3' x 3' and these should be filled with fine soil mixed with decomposed organic matter and pieces of bones. The pits should be filled to a height of one foot above the level of the ground. These should be spaced 40 feet apart both ways so that there would be 25 pits per acre. Mango stones should be sown at the commencement of the monsoon in June in these pits. The stones should be fully developed, fresh, large and plump. They may be collected from any mango tree. There should be two seeds sown at each dibble and at the close of the rainy season only one plant per dibble should be left. The seedlings should be protected against strong winds and also stray cattle by erecting three rows of thorny fencing. The fence should be provided until the tree grows to a height of 6 feet. When the seedling is 2 to 3 years of age, it should be budded or side-grafted with scions of Alphonso, Payari or any other locally reputed variety so that it would bear fruit of the grafted variety. It is absolutely necessary if the plantation is to fetch the maximum return, to grow them with standard varieties which are in demand in the market.

Preparatory operations for mango planting

After care of young plants



Different varieties should be selected for table use, for juice, for pickle, jam and as far as possible the fruit should be of lasting quality and should stand transport to long distances. Mango is a very paying fruit. The tree when old can also be used as a timber tree and particularly its planks have a good market. Crooked stems and branches would yield good charcoal. Devoting the hill-slopes to mango plantation is therefore a very valuable method of utilising them. The *Malis* recommended to be appointed should teach the people the arts of grafting and budding mango. Cashew-nut and jack-fruit are other fruit trees that should be grown in plantations like the mango mentioned so far.

Fruit tree plantations should occupy the area on hillslopes which is at present annually under varkas land **Income from tree plantations.** crops of nagli, vari, sawa, kathal, nigerseed etc. The total area under these crops is roughly 86000 acres in the five talukas. It is possible that this much area could be found on hill slopes having red, soft and deep murum. The trees would begin to bear from about the 10th year of planting. During the first five years of planting, intercrops of nagli, vari etc. may be taken. From the 11th to the 15th year, the income per tree is estimated to be on an average annas eight but from the 16th year it would be about rupee one per tree. There would be 25 trees per acre. Hence the average annual income for several years say about 50 years would be Rs. 25 per acre. The remaining area of hill slopes would be necessary for grass for the cattle and for rab and other purposes and hence it may not be possible to develop it with tree plantations.

Successful development of hill-slopes with tree plantations would need constant attention to the protection **Protection for trees.** of the trees from damage by some of the wild and domestic animals. For this purpose, Government should assist the people by declaring the areas under plantations as closed for grazing even though they may happen to be in Malki numbers. The owner should erect a live thorny fence all round the plantation and he should also fence individual trees with a three row fence. No watering seems essential. The only other treatment required is the manuring of the trees with bones which can be collected locally.

Government should encourage the raising of mango plantations by giving grant-in-aid. Thus if a cultivator raises a plantation successfully he may be given a grant of annas four per tree of six feet height i. e. when the trees have grown sufficiently high as not to be damaged by stray cattle. If people are educated about the advantages of developing hill slopes with fruit trees and if they co-operate, it may take about 10 to 15 years to bring the whole area of 86000 acres under tree plantations and the grant-in-aid which is to be paid only once for each plantation will be spread over 10 to 15 years and hence would not be a great burden on Government, It would be advisable to consult the people regarding the concessions that would induce them to take to the scheme of mango plantations.

*III. Economic utilisation of Government lands by planned and systematic afforestation.*

We have already said before that the Government forests have received very little attention in the past regarding systematic planting of trees which would bring the maximum return from the forests. In our opinion, the Government forests are capable of yielding a far greater return if they are planted with trees of economic value, which can flourish under the soil and climatic conditions obtained in the various parts of the State. The Committee is of the opinion that the forest areas of Maval should be developed by a systematic plan of raising Hirda (Myrobalan) plantations. The forest area of Deshi-maval tract should be developed by planting chandan (sandal-wood) trees, teak, ain and other timber trees like shisoo, mohogany etc. The forests of Sudhagad should be developed by planting teak, ain and other timber trees. There is a considerable number of trees that can make good charcoal. Such trees are khair, dhavada, hivar, beheda, jambul and the like which can be grown in areas unsuited for other trees.

Maval seems to be the natural habitat of Hirda tree. The State should attempt to raise Hirda plantations according to the scheme proposed elsewhere (See Appendix No. VIII). The advantages of that scheme are that the present Kumari cultivation which is a harmful method of land use would be stopped and in its place people would get much

**Hirda Plantations.**

greater income from the Hirda plantations. Government would also be benefited by increased revenue from its share of Hirda fruit and from royalty.

Chandan grows well in the Deshi-maval and in Khedabare tracts of Rajgad. The estate of Mr. Liptrott on the two hills close to the town of Nasrapur is a standing demonstration of how best to develop the hills in the Deshi-maval tract. When we visited that estate during our tour, there were at a rough estimate about a thousand chandan (sandal-wood) trees of various ages. Extension of these trees has taken place by natural spread of seeds of chandan dropped from trees originally planted some 30 years back. The trees are in excellent and healthy condition. There is also a chandan plantation on the northern side of the hill near the village of Ambavane in Rajgad taluka. Chandan trees in a scattered manner are also found in the Shiwganga valley. Chandan is a tree which grows on the root systems of other trees. It grows luxuriantly on host trees of nimb, karanj, babul and other leguminous and ever-green trees. The host plants at Ambavane are *tantani* (Lantana), but the growth of chandan trees there is not very luxuriant. Chandan is a very valuable tree and fetches a large income every 35 years or so. To illustrate, a plantation of chandan in a Deccan State consisting of 600 trees with girth varying from 18" to 30" was sold for Rs. 15000.

In the Desh parts and in Sudhagad, seedlings of teak, ain etc. should be raised and planted systematically at proper distances in the forest area. If all the forests are developed in this way the revenue from the forests would increase manyfold and people would also get work during the slack season.

We therefore recommend that the new department should pay special attention to the development of forests in a systematic way and raise Hirda, chandan, teak, ain, shisoo etc., plantations in them. For this purpose the subordinate staff of the Forest department should be sent for training in the adjoining British districts and they should learn the methods of raising seedlings, planting and care of protected forests.

## CHAPTER VII

### Cattle.

Cattle are a necessary adjunct of agriculture as they provide the draught power for the plough and the cart. Besides, cattle give the cultivator some milk for his children and the fertility of his fields is partly maintained by the application of cattle dung. Most of the cultivators, therefore, keep cattle, the number depending on the availability of fodder and grazing land and supply of drinking water. The number of different kinds of cattle in the five talukas of the State is shown in the following table.

Taluka	Bullocks	Cows	Young ones	He-buffaloes	She-buffaloes	Total
Prachandgad	5387	5732	5482	860	3436	20897
Pavanmaval	6054	4070	2826	278	2943	16171
Vichitragad	9000	6147	5301	3394	4942	28784
Rajgad	6971	5376	3074	433	3987	21841
Sudhagad	5432	5356	4715	1257	1800	18560
<b>Total</b>	<b>32844</b>	<b>26681</b>	<b>21398</b>	<b>6222</b>	<b>17108</b>	<b>106255</b>

### Relation of cattle to human population

Taluka	Human population	Human density per sq. mile	Cattle population	number of all kinds of cattle per family of the cultivator	Number of plough cattle per family of the cultivator ( bullocks and he-buffaloes )
Prachandgad	22985	114	20897	4.54	1.35
Pavanmaval	26554	177	16171	3.44	1.19
Vichitragad	47037	220	28784	3.05	1.31
Rajgad	29724	165	21841	3.67	1.25
Sudhagad	29776	180	18560	1.8	1.12
<b>Total</b>	<b>156076</b>		<b>106253</b>		

This figure includes the number of young ones of buffaloes.

There are no professional cattle breeders in the State but most of the cultivators keep cows for breeding. They also keep she-buffaloes for milk, wherever supply of drinking water and grass or fodder is ample. In Maval, Konkan and Deshi-maval tracts he-buffaloes are used as draught animals. The cattle do not belong to any pure breed but are of mixed breed. In Maval and Konkan the cattle are very small in size. In Desh tract they are of the average size of the Deccani cattle. In the Deshi-maval tract the cattle are of intermediate size. The condition of the cattle in the Desh tract is fairly satisfactory as there is some irrigation farming in that tract and the quality of fodder (Jowar kadbi) is superior to that available in Maval. As the locally bred cattle are rather weak, being of mixed kind, a certain number of plough bullocks is purchased annually by the cultivators from outside the State. This is done especially in Desh tract and to some extent in Deshi-maval tract. Local conditions in some parts of the State are, however, generally favourable for cattle breeding and for eventual improvement of the breed. If this is done not only no cattle will have to be purchased from outside, but people may also be able to sell some cattle to outsiders and thus earn some additional income. The various measures to improve the cattle in the State may now be considered.

The usual methods of improving the cattle are by (1) proper feeding, (2) proper breeding and (3) control of diseases. The first is the most important line as no substantial improvement in the breeding is possible until cattle can be fed better. We shall therefore first consider if and how the feeding of the cattle could be improved.

### (1) Improvement of cattle feeding

The chief source of feeding the cattle over the greater part of the State is what the cattle can find on the grazing lands, private grass lands and kurans, crop residues in cultivated fields after harvest of crops and in Government and private forest areas open to grazing. In the case of work cattle and animals in milk, grazing is supplemented with straw of all the cereal crops and with some concentrated feeds like bhusa of

pulse crops, oil cakes, cotton seed, grain and pulses according to their availability. The areas available for grazing and for grass cutting, Government and private forest lands and other waste lands and the area under crops which provide fodder are shown in the following table.

Taluka	Area under crops acres.	Area under Government forests acres	Area under private forests, grass and waste land and the rest of the land acres	Area available per head of cattle in acres			
				Cropped land	Govt. forests	Rest	Total of columns 6 & 7
1	2	3	4	5	6	7	8
Prachandgad	26140	29123	66805	1.25	1.39	3.20	4.59
Pavanmaaval	24631	9872	56042	1.52	0.61	3.46	4.07
Vichitragad	51471	18600	58645	1.78	0.64	2.03	2.67
Rajgad	44836	15246	48692	2.05	0.70	2.23	2.93
Sudhagad	28544	36584	34581	1.53	0.90	1.86	2.76
		109425					

All the area under Government Forest is not open to grazing. Half of it may be taken as available for grazing. Under the column "rest" are included all lands along hill slopes, grass and grazing land, culturable waste, un-assessed waste and the like. A large quantity of grass is annually required for 'rab' burning and for thatching. A certain quantity is also pressed into bales and sold. From the unassessed area very little is useful for grazing, similar to that under the steep slopes of mountains, rocky portions and inaccessible parts. Hence it is reasonable to consider that only half the area of the "rest" class is available to the cattle at one time or the other of the year. In the Deshimaval tract the hill-sides have been infested with lantana bushes and the grazing available in such cases is meagre. Dividing the figures in the last column by 2, the area available for grazing in Prachandgad per head of

cattle is 2.30 acres, in Pavanmaval 2.03 acres, in Vichitragad 1.34 acres, in Rajgad 1.49 acres and in Sudhagad 1.38 acres.

From the grazing experiments carried out by the Bombay Agricultural Department near Poona, it is known that to keep the cattle in fair condition on grazing alone, three acres of grazing land is necessary per head of cattle. According to this standard, nowhere in the State there is adequate land for grazing. The grass in Maval and Konkan is generally unpalatable and coarse and is of low nutritive value. In the Deshi-maval and Deshi tracts the quality of grass is superior but the area per cattle is small and a large quantity of jowar kadbi ( fodder ) is sent for sale to the Poona market. We were told that at Pirangut in Pavanmaval ( about 12 miles from Poona ) most of the area under bajri has been replaced by jowar during the last 20 years, as jowar fodder fetches good price in the Poona market. The local cattle are thus deprived of their valuable fodder. Fodder is exported to Poona from the State territory from long distances even of over 30 miles.

In Maval and in Sudhagad the cattle get enough green and later on, dry grass for grazing in common grazing lands, grass lands, kurans and forests for nearly seven months of the year, from July to January. From February to the middle of June the amount of grazing available is scanty and the cattle often remain half starved and get emaciated. Their suffering is further aggravated by the shortage of drinking water during summer months when the cattle are required to be paraded twice a day to long distance for watering. The work cattle are however fed with some grass and straw in the stall to keep them fit for hard field work in the monsoon months of June and July. Cows and buffaloes in milk and the calves are given green leaves from forest trees. The feeding of the cattle is thus irregular in quantity and in quality and therefore unsatisfactory.

Passing towards the Desh tract through the Deshi-maval tract, the area available for grazing on the common ground and in Government and private forest lands and grass lands steadily declines; but the quality of the grass and of the fodder is much better than in

Maval and Konkan tracts. The supply on the whole, however, is inadequate in several localities.

The problem of improving the feeding of the cattle is not an easy one. In some villages in the Deshi tract, the areas available for grazing are very small and the demand of the people there is that Government should give them more grass land for grazing. Thus in the Khedebare tract of Rajgad, the villagers of Velu, Varve, Kasurdi etc. brought to the notice of the Committee the inadequacy of grazing land. This handicap is also common to several other villages in Desh tract and when the new department is started it should go into the question of the grazing lands and see if relief could be given to the villagers. Thus the villagers of Velu think that grazing and grass kurans from the neighbouring village of Sasewadi, which has excess of such land, could be made available to them for which they are prepared to pay average price of the annual auction sales. If the problem is approached sympathetically, some way could be found out and relief given to many villages by adjustments with the neighbouring villages where grass and grazing lands may be in excess.

In Maval and Konkan tracts the question is not so much of inadequacy of grazing or grass land. Here on account of hilly nature of the country considerable quantity of grass is available but it is coarse and of inferior type from nutrition point of view. The problem of improving the feeding of the cattle in these tracts is not how to make up the inadequacy of grass but of how to make the coarse and inferior grass palatable and more nourishing. There are at least two methods by which this could be done, namely (1) preparation of silage and (2) chopping the dry coarse grass and mixing it with salt, gul-molasses and a small quantity of powdered oil-cake.

The principle underlying silage making is easy to understand. It is generally known that grass in green condition is highly nutritious and once it forms seeds, all the nutritive sap is transferred from the stem and leaves to the seed and the stems become and less nutritious. If



therefore, the nutritive value is to be maintained in the grass it must be cut before the seeds begin to develop, i. e. soon after the flowering stage and dried. From practical considerations, however, grass cutting and drying when in the flowering stage is not possible in Maval and Konkan as there is generally no sunshine at this time of the year and the rains are likely to spoil the cut grass.

In Western countries the succulence of the green grass and its high nutritive value is maintained by cutting and storing the green grass in pits which are generally lined with brick and mortar. The grass while filling in the pit is well packed and finally weighted so as to remove all air from the intervening spaces. The more complete the expulsion of the air from the mass of the grass, the better it keeps without decomposition. During the dry months when scarcity of nutritious fodder occurs, the pits known as "silos" are opened, and the grass is taken out in required quantities every day and fed to the cattle. The pitted grass is known as silage. It develops an aroma which the cattle never forget and relish the grass very much. All nutritive material present in the green grass when cut for pitting is retained in the silage, hence it is very valuable for feeding.

In India after making several experiments it has been found that silage could be made from grass and fed to cattle with great advantage. The most relieving feature of silage making resulting from these experiments is that it is not absolutely necessary to have pukka-built silos. Green grass can be ensilaged in kacha pits also equally well, provided the pits are not made in waterlogged land and are situated in well drained land or on high lying lands. In this connection it is best to quote from as high an authority as the Report of the Royal Commission on Agriculture in India ( 1928 ) page 207.

" The experiments made in all parts of the country show that, except where the soil is waterlogged, the cheapest form of silo viz, the earthen pit, is also the type best suited for cultivators. When properly constructed, filled and weighted, it keeps silage as well as, if not better than, the tower silo built of brick

Experiments  
made in India.

Kacha pit  
silos.

Observations of  
the Royal Com-  
mission on Agri-  
culture in India.

or concrete, and though there are objections to pits when silage in large quantities is made, these objections are of little account when silage on the scale needed by cultivators is the object. If the cultivator wishes to store his fodder, therefore, there is no initial outlay; he has merely to dig a pit of suitable dimensions. Experiments made in Bombay show that, for each foot of its length, a pit dug eight feet wide at the surface, seven feet wide at the bottom, and eight feet deep would hold about one ton of green fodder and produce about five sixths of a ton of good silage. Thus, a pit with the above cross section and ten feet long would hold all the silage that a cultivator, owning three or four cattle would be likely to need for the purpose of bringing his stock through the hot season in good condition."

It would be thus clear that the difficulty of inadequacy of nutritious grass during the hot season could be overcome in Maval, Sudhagad and to a large extent in Deshi-maval tracts by resorting to the method of silage making from grass which is available in plenty in these tracts. The method is simple and no cash expenditure is involved. What is needed is the will and industry on the part of the cultivator. He can find time to cut and pit grass in situ in grass lands or in forest areas by opening pits of suitable dimensions and filling them with cut grass before the harvest season of his kharif crops begins, i. e. in the month of September. Occurrence of rains while the pit is in the process of filling does not spoil the grass.

In the Desh tract where lands under grass and grazing are limited, there may not be enough surplus grass for **Rotational grazing.** silage making. Here, a better plan is to resort to what is known as rotational grazing. The principle underlying this is to divide the grass land into compartments and graze the cattle in one compartment at a time in turns in regular rotation so that the grass in other compartments gets time to grow untampered. Generally the land is divided into four compartments and a suitable number of cattle is grazed in three of them by turns of a fortnight or three weeks. The fourth compartment is set aside for allowing the grass to mature and seed. In this method of rotational grazing, grass is not trampled under the feet of the cattle all over the land for all the time during the grazing season as happens in the present method of unregulated

grazing. When cattle roam about on the whole of the grazing land, they pick up only the good quality grass and allow the coarse types to grow untampered and form seeds. Thus, steadily the good grasses never come to maturity and only the seeds of coarse grass shed on the ground and germinate. In course of time the land thus gets covered with coarse grasses like the spear grass and is rendered useless for grazing.

By rotational grazing, all the grass in each compartment is grazed evenly and there are two compartments each time under rest. The grass thus gets time to grow well and this means more grass for grazing. The same area therefore is able to sustain larger number of cattle for a comparatively longer time. When the new department begins working, it should introduce rotational grazing in the Desh tract and the adjoining portion of the Deshi-maval tract. It should also undertake planting of good quality grasses to replace coarse ones wherever possible.

A method of saving some fodder and thus making it available for use in the dry period is to chaff the jowar **Method of saving fodder.** kadbi before feeding it to cattle. It is estimated that from 20 to 25 percent of the kadbi is wasted under the feet of the cattle when fed uncut. Educative propaganda in this connection should be undertaken.

In the Desh and Deshi-maval tracts wherever irrigation facilities are available, guinea-grass should be introduced to provide green fodder to cattle. This should be planted along all water channels and protected from stray cattle. The growing of lucerne grass should also be encouraged in this tract.

In Maval and Sudhagad, where the quality of the grass is poor and the grass is coarse, the palatability and nutritive value should be improved by chaffing the grass and treating it with salt water, gul-molasses and powdered oil-cake. Such processing would not cost much but it would be of considerable benefit to the cattle for feeding in the hot season.

In Sudhagad, comparatively a large portion of the rice **Tagai for tiling the houses.** straw produced annually is wasted by using it for thatching houses. This is done at the cost of the cattle which are in great need of the straw for feeding. It is

desirable to encourage people to use tiles for the houses by giving them tagai loans for the purpose. Houses thatched with straw or grass are always in danger of fires and in Sudhagad taluka we were told that two to three villages are lost by wholesale house burning each year. It is a serious problem and if solved in the manner proposed above, it would not only release the straw for the cattle but at the same time minimise the danger of fires wiping out entire villages. The Government instead of helping the people in re-building the houses as they do at present should grant tagai for tiling the houses.

in maval, Deshi-maval and Konkan tracts the supply of nutritious feeding could also be increased to an appreciable extent by encouraging the planting of fodder trees on varkas lands and on hills and in Government forests. A list of such trees is given in the Appendix No. VII. It should form a part of the planting programme of the Forest Department to plant a certain number of fodder trees. People should also be encouraged to plant these trees in private lands. Several of these trees put forth foliage during the hot season and are therefore very valuable. Some of the professional stock-keepers like the Dhangars and some industrious cultivators owning herds of cattle in this tract do feed their stock with leaves of fodder trees in the summer months. What is needed is the extension of fodder trees.

In the Desh tract wherever enclosed grass lands and kurans are available, it is best to introduce superior kinds of grasses in them, by sowing their seeds in hand-made furrows or by planting suckers. One of such grasses recently introduced in Bombay from Mysore at the suggestion of the Hon. Mr. B. G. Kher, the former Premier of Bombay Province, is the Napier grass. This grass is propagated by raising seedlings and transplanting them in the rainy season on mal lands. It takes root soon and grows under dry conditions. Three cuttings of green grass are obtained from it each year. For detailed account reference is invited to pages 140-144 of September 1941 issue of the Shetki and Shetkari Magazine.

## (2) Improvement of the Cattle by breeding.

It has already been stated in the preceding pages that the cattle found all over the State are of a mixed type. Encouragement to cattle breeding The people do not seem to have made special efforts to introduce any pure breed of cattle or to improve the existing cattle by grading them up by proper breeding. Very little care seems to have been taken in mating the cows with selected bulls and the present type is the result of promiscuous breeding on the common grazing ground. The result is that a large number of bullocks are imported annually especially in the tract where stronger animals are required for farm work. This state of affairs ought to be modified by educating the people in the principles of breeding and grading up the animals, so that, the State would not only be self-sufficient with regard to the supply of draught cattle but (if the work is followed up systematically) it may also be able to supply well-bred animals to the neighbouring tracts. There are favourable tracts in the State where cattle breeding could be carried on in a profitable manner. If facilities for supply of drinking water are provided in suitable localities, the cattle of Maval and Sudhagad tracts also could be improved as there is a great possibility of feeding the stock adequately by taking to silage making by making coarse grass more palatable and by the use of green leaves of fodder trees during the scarcity months of the summer. Wherever the problem of water deficiency in the summer does not present difficulties as at Angaon, Jated, Muthe, Kothur etc. in the Mutha valley, or in villages of Kalamboli, Mugavade etc. in Valki valley along the banks of the Mula river, or in villages on the banks of the Velvandi, Gunjavani and Nira, where there are deep pools of water and where water becomes available throughout the year, improvement of cattle by grading up can take place with greater ease. In the Deshi-maval tract also, there are several suitable villages for cattle breeding as in the Utroli, Khanapur, Nere, Hatnoshi valley, the Ambvade valley, the Mangdari valley, and the Shiwaganga valley etc. as the grass there is of a superior quality and there are some natural springs which provide drinking water all the year round. The same is true of the Khedebare tract of Rajgad taluka. In both these tracts, in addition to the superior kinds of grasses, nutritious fodder of jowar is available.

Before proceeding to describe the measures to be adopted to promote cattle breeding, it is necessary to define the characters required in the cattle for the different tracts of the State. In Maval and Sudhagad tracts, the climatic, topographical and agricultural conditions require that the animals should be hardy to withstand the heavy rainfall and should be able to work under wet conditions in rice fields. They should also be good and swift climbers of hills where cultivation of hill-millet is carried on to great heights and where they have to go every day for grazing. The wooden plough is very small and its draught is light. Heavy cattle are not therefore necessary nor suited for the hilly tract. Such characters are found combined in the breed known as "Dangi" the home of which is in the Maval tract of Ahmednagar district in Akola taluka and the adjoining parts of Sinnar and Igatpuri talukas of Nasik district. Having their home in Maval tract with climatic conditions more or less similar to those obtained in the Maval tract of Bhor State, the Dangi breed seems to be admirably suited both for Maval and the Sudhagad tracts. There are professional breeders of this Dangi breed known as "Kanade". The cattle of this breed are characterised by black and white spots of large size on their body with short and curved horns. They are well-built and hardy animals. The only defect in them is long sheath and in selecting the bulls for breeding, care will have to be taken to select those with short sheath. The character of higher milk yield can be developed in the cows of this breed to some extent by selection. Young male calves of this breed are sold by the breeders and bulls of 3 to 4 years of age are available with the garden cultivators of Nasik-road, Deolali and the surrounding villages. The Bombay Agricultural Department recommends this breed for the Konkan and Maval tracts and it has introduced several bulls in villages there.

For the Desh tract of Khedebare and Shirwal divisions, where rainfall is light and dry crops are grown, the characters required in the cattle are that they should be strong, swift and hardy. Here the main fodder is jowar kadbi and bajri straw. The supply of drinking water is generally adequate and conditions for cattle rearing are generally favourable. The people prefer the Khillari breed. Although

herdsmen from Malwa and Central India have sold the Malvi bullocks in large numbers in the past, the present tendency is for the Khillari, as the Khillari bullock is superior to the Malvi in every respect. It is a swift, well-built, fairly tall and hardy animal. Its home is the famine and scarcity tract of the Deccan (Sholapur district) and it is easier to get the bulls with ease from this tract in the various cattle fairs held at Sholapur, Pandharpur, Chinchali, Mhaswad, Nagoba etc. Excellent bulls and bullocks come for sale in numbers in these fairs and there is a large field for selection.

*Measures for improving the local cattle by breeding.*

There are two ways of improving the cattle. One is to bring pure bred cows and bulls of the Dangi and the Khillari breeds and distribute them in the tract for pure line breeding and the other is to purchase and distribute bulls only of these breeds and use them for grading up the local cattle. Both these methods may be resorted to. It is advisable not to attempt to improve the cattle of the whole tract simultaneously. Every one is not gifted with the art of tending cattle. The professional cattle breeders have special knowledge of cattle breeding and of rearing of young ones handed down to them from generations and they are thus most suited for this work. In parts of the State there are certain local tribes—Dhangars and Thakurs—who carry on the business of dairying and cattle breeding on a small scale as also some individuals among the cultivators who have natural gift and liking for cattle breeding and rearing. In the initial years therefore such tribesmen and individual cultivators should be encouraged to improve their stocks to form the nuclei from where to procure cows and bulls for the improvement of the cattle at large by the method of grading up village cattle. When therefore the new department is started, it should prepare a list of all the Dhangars engaged in dairying and cattle breeding and also individual cultivators who have good herds of fine cattle and who possess the necessary skill in cattle management. These Dhangars and cultivators should be given all the facilities required by them either for breeding pure animals of Dangi and Khillari breeds or for grad-

Encouragement  
to persons own-  
ing good herds  
of cattle.

ing up their herds with bulls of these breeds. They should also be given additional grazing lands from the State and special facilities of grazing and removal of green leaves from fodder trees from the State forests. Pure bred cows and bulls or at least bulls should be purchased by the State and given free to these special men for pure line breeding or for grading up their herds. They should be asked to take good care of feeding and rearing the animals given to them. The bulls should be changed from herd to herd every three years to avoid in-breeding but after the age of 9 they should be castrated and should be retained by the herdsmen as their property. For pure line breeding, each of herdsmen should be given three cows. For this purpose, the rich men among traders who have the tradition of cow protection should be approached for donating pure bred cows of the Dangri and Khillari breeds to the various herdsmen while the purchase price of bulls to be donated should be borne by the State. The trading community should be induced to divert the Dharmadaya fund with them towards cattle improvement in this way. If this is done there will be a regular supply of funds for the purchase of pure bred cows and bulls, and the activities would progress rapidly if carried out in a systematic manner in this way. Herdsmen and individual cultivators with liking for the cattle would be glad to undertake to feed and rear the donated cows and bulls. They may be given additional grazing lands and other concessions according to local conditions. They may also be assisted in improving the supply of drinking water for the herds. The State may set aside a sum of Rs. 2000 in its annual budget for purchase of bulls to be given to deserving people in the aforesaid manner. This amount should be supplemented from grants from the Dharmadaya fund collected in different markets and also from charities of moneyed people who like to give cows in memory of their departed elders.

The initial work of improving the foundation stocks of the Dhangars and individual cultivators in the manner described above should be carried out for ten years before the question of the general improvement of the village cattle by grading up is taken up. Inspection of bulls and cows donated should be carried out at stated periods

Foundation  
stocks.



and care should be taken to see that the animals are well cared for and the breeding is going on systematically and that the herd is improving. The existence of a number of such herds all over the State would naturally result in increasing the demand for pedigree animals from local cultivators and this would ultimately lead to the reduction in the number of bullocks imported from outside the State and thus retain a fairly large amount of money annually within the State, that is at present lost in the purchase of bullocks from outside.

Interest in the subject of improvement of cattle should be created by holding cattle shows and fairs at two or three centres in the State where all the herds from the improvement scheme should be brought and shown to the visitors along with the good cattle of individual cultivators. Sales of bulls and bullocks should be encouraged at the time of these shows and prizes should be given to the best animals. A sum of Rs. 500 should be set aside annually in the budget of the new department for the prizes.

### (3) Treatment and control of cattle diseases.

The various diseases of cattle occurring in the State take a large toll of cattle annually and in the case of certain diseases the health and vigour of the animals is considerably affected. During its itinerary the Committee learnt from the people that the most common disease of cattle occurring annually practically all over the State is the Foot and Mouth disease locally known as Khurkut or Payalag. Although it is not a fatal disease, it causes great suffering to the animal for a number of days and at times even for months and only in extreme cases the animal succumbs. This disease is curable. What is needed is the provision of the necessary advice and medicines and also preventive measures like medical dips. The cattle become disabled and cultivation work suffers if the disease appears in the working season. People expressed the desirability of assistance from the State with regard to the treatment of this disease.

Next in importance to the Foot and Mouth disease, is Rinderpest. This is a deadly disease and appears in an epidemic form periodically. In some years the virulence of the disease is so much that most of the

cattle of the affected village are completely wiped out. Although remedial measures are not known, preventive inoculations if carried out as soon as the first case occurs, the spread of the disease is checked. The deadly disease can thus be controlled and the heavy loss can be effectively stopped. Other diseases occurring are Anthrax or *Goal*, Haemorrhagic septicemia or *Avari*, cholera etc and a number of other minor diseases.

There is no arrangement for veterinary aid in the State and in view of the great suffering caused to animals by the various diseases and also the loss of cattle in epidemics, it is necessary to render some help to the people. The Committee recommends that a Veterinary dispensary with a qualified veterinary surgeon should be established at Nasrapur—the central place for three talukas. Besides, trained assistants should be appointed one in each taluka. These assistants should be given a special course in the practical methods of treatment of the most commonly occurring diseases of cattle and in the methods of inoculating against deadly diseases like the Rinderpest. They should also be trained in the art of castrating bulls by the latest method. The assistants should keep stocks of common medicines and also the necessary apparatus for inoculation and castration. If on account of financial difficulties a veterinary dispensary cannot be started, it may suffice for some years if trained assistants could be appointed for the five talukas and given the necessary stock of medicines and provision for purchasing vaccines. The pay of these assistants should be Rs. 20- $\frac{1}{2}$ -25 and budget provision of Rs 400 for each should be made annually. The initial provision of apparatus etc. may cost about Rs. 500 for each taluka.

Necessity of  
veterinary aid.

## CHAPTER VIII

### Other essential conditions for a higher and happier rural life.

We have considered so far the various ways of improvement of agriculture and development of rural areas and made suggestions for improving the economic condition of the cultivator. In this chapter it is proposed to discuss other essential aspects of a higher and happier rural life. The cultivator has been conducting his agriculture by methods which by past experience are known to give him a certain average return with his equipment, capital and physical environments. Before he thinks of taking to new things he wants to be sure that the new thing or improvement gears well with his economic condition and does not dislocate it and create new problems. His experience has been that advantage of his ignorance, indigence and helplessness is always taken by the more fortunate neighbours in his own village, by middlemen in the market and by those employed in Government service for rural administration and the benefit of his new enterprise and industry is often lost to him and he finds himself again where he was before. He has, therefore, grown very suspicious about every suggestion and is generally passive. It is not therefore enough to merely suggest methods of increasing the out-turns of crops or the resources by other ways. This help must be followed up to its logical conclusion to enable the cultivator to realise the fullest benefit. For, in his present condition he has neither the means nor the mental equipment and grasp of environment. The State will have therefore to carry on a lot of spade work to educate the cultivator on a broad basis. He must not only be made literate but must also be educated in the laws of health and nourishment and in the proper use of wealth leading to higher and happier standard of life. While introducing every improvement the various difficulties that are likely to arise and the disabilities of the cultivator will have to be thought of and provided against. He will have also to be protected against exploitation by enacting necessary laws and by sympathetic administration. The various steps to be taken in these directions may now be briefly stated :—

**(1) Education.****(a) Primary Education.**

As education is the basis of stability of all improvements the State should declare its intention of introducing compulsory education of all children of school going age within a period of 8 to 10 years. The final goal should be to have a primary school in each village with the population of 300 and above or for a group of villages with a total population of about 300 to 400.

**(b) Adult education.**

This can be better done by means of visual instruction with the help of cinema films, magic lantern slides, posters, charts, demonstrations and lectures for which special instructors should be appointed. The subjects should be such as have a direct bearing on village life in its social, economic and public aspects so as to improve the general knowledge of the cultivator.

**(c) Village libraries.**

With the object of avoiding loss of achieved literacy for want of opportunities, it is desirable to open village libraries in large villages and to establish circulating libraries for smaller villages.

**(d) Technical education.**

The State should establish certain scholarships for promising students for technical education in poultry, dairying, bee-keeping, horticulture, sylviculture, mechanics and in village arts and crafts so that progress and improvement in these various occupations would reach rural areas. The students on return should be given facilities like capital, equipment and marketing of finished products to enable them to use their acquired knowledge with advantage. About 25 such scholarships tenable for one to two years according to the subject should be awarded each year.

**(2) Sanitation and Health****(a) Drinking water.**

We have already alluded to the scarcity and pollution of drinking water all over the State and particularly in Maval and

Sudhagad. The State should make a plan to provide adequate supply of water to each village with a well or a tank within a period of ten years as water is the first necessity of life. Efforts should be made to keep the water supply pure as very often water is a carrier of disease organisms of cholera, guinea-worm, typhoid etc.

In connection with the provision of drinking water it is necessary to note that the problem is not so easy to solve. In Maval and Sudhagad where hard sheet rock is close to the ground-level it is difficult to strike water even if a well is dug deep into the rock. The new department should therefore purchase a Water-finding Machine and use it for locating under-ground currents of water before attempting to dig a well. The State should also purchase a power-boring machine for taking bores at places indicated by the water-finding machine. If water is struck it may not be necessary in the case of small villages to dig a well there as the water in the bore may prove adequate enough to meet the wants of the villagers if a hand-pump is fitted up on the bore. This would also have the advantage of keeping the water free from pollution. We know of small villages in Konkan where the people get enough water from such bores. In larger villages wells should be constructed where bores are successful. Jumper bars should be stocked in each taluka for improving the water supply in the existing wells where they go dry in the hot season. New wells should always be draw-wells and the steps in old wells should be closed under State orders to prevent pollution of water especially as guinea-worm is rampant all over the State.

Mr. S. V. Tilak, B. Ag. or Nagotnana who as President of the District Local Board, Kolaba, has made a critical study of the water problem of villages in that district. His observations are equally applicable to Sudhagad where conditions are similar to those of Kolaba. In his note supplied to us he says that the best way to solve the water problem in Kolaba is to provide a tank or a pond for each village to feed a well in it or close by lower down. During our tour in Sudhagad we came across village tanks at Nadsur, Dondse, Chive, Siddheswar, Bharje, Asare, Wafeghar, Udhar, Ghotawade, Jambulpada,

Thanks as one of the solutions of water problem in villages.

Parali etc. and found that Mr. Tilak's suggestion was sound and should therefore be applied to other villages. The suggestion of tanks would also be applicable to Maval and Western Deshi-maval where topographical conditions are similar to those in Sudhagad. In course of time the tanks get silted up as has happened at Ghotavade, Jambulpada, Parali, Nadsur etc. The new department should survey the existing village tanks and assist the people in the removal of silt.

Our impression from talks with villagers is that they would contribute willingly towards the cost of digging wells and tanks in the form of labour and also some cash as the water problem is very pressing.

Subsidy to  
villagers.

The State will have to survey sites with a water-finder and take bores. In the case of successful bores the villagers may be reasonably asked to meet the cost of boring and the pump, up to 50 percent and also of constructing a well where necessary. The cost of all unsuccessful bores should be borne by the Government.

(b) *Balanced Diet.*

The Medical Department of the State should advise the village population on the subject of balanced diet with the produce available in the State. Production of more eggs from hens by the introduction of improved breeds and milk from cows and buffaloes should be encouraged. Pregnant women and infants should receive such nourishing articles of food.

(c) *Diseases.*

The most common diseases in the State are malaria and guinea-worm. There are State dispensaries at the five taluka head-quarters and they should distribute quinine against malaria free to villagers through village Patils or school teachers. As regards guinea-worm there is no known remedy. It can however be controlled successfully by preventive measures. These lie in the direction of keeping the sources of drinking water uncontaminated and their periodical disinfection. As already stated in the programme of water supply of villages prevention and eradication of guinea-worm should be concomitant items. Special subsidies should be given to close the steps in existing wells.

*(d) Village Sanitation*

As a preventive measure against diseases the sanitation of villages should be improved. The school children should be trained to take part in cleaning villages and water-places once a month on fixed days. Use of beds and banks of streams and rivers for foul purposes as at present should be prohibited under penalty. This will have however to be preceded by a widespread educative propaganda. Trench latrines should be introduced with the two-fold object of maintaining sanitation and preparing poudrette manure.

A beginning in Maternity and Child welfare activities should be made by attaching Mid-wives to all the taluka dispensaries and by training village Dais in the modern methods of mid-wifery.

**(3) Organization.**

With the object of educating the people in self-help and discipline of corporate life in villages and also <sup>Village</sup> Panchayats. with the object of having local agencies for the introduction and spread of the various improvements, village Panchayats should be established. They should be given the necessary Statutory powers from time to time to manage their own affairs with regard to sanitation, education, crop-protection and other items of public interest if two thirds of the people are in favour of adopting a reform.

**(4) Provision of crop finance and establishing grain depots.**

As the returns from agriculture and other sources of income fluctuate from year to year, the economic condition of the cultivator oscillates likewise. He is therefore often in a straightened condition with regard to money and food grains. The needy cultivator is therefore required to borrow them for which he has to pay high and often exorbitant rates of interest. It is desirable that the State should assist the cultivator in providing short term crop finances. For this purpose provision of a fund <sup>Tagai loans for</sup> <sub>crop finance.</sub> to be known as "crop-finance fund" should be made from which to give small tagai loans on usual terms repayable at the harvest of the crop. A sum of Rs. 5000 may be provided for each taluka. As regards the provision of grains, the State should start grain-depots on the

“Thana model” in all villages with a population of 300 and above and also for groups of villages with a total population of 300 to 400. Such depots were started in Wada and Mokhada Petas of Thana district several years ago by the Bombay Government and they have been found to work successfully. Recently during the last 3 years a number of new depots have been started by the Bombay Government in the districts of Thana, Kolaba, Ratnagiri, Belgaum, Nasik and Poona and they have been reported to be working satisfactorily. In some villages in those districts people have also started their own grain depots on co-operative lines. During our tour in Pavanmaval taluka we saw such depots at Ghevande and Kadav started last year. The villagers of Ghevande have collected by subscription a stock of  $2\frac{1}{2}$  Khandis of grain and loans in small quantities are issued from it at the rate of 25 per cent. interest in kind. Later, this rate can be reduced to  $12\frac{1}{2}$  per cent, as in Wada and Mokhada as sufficient stock to meet all the demands accumulates. The State should give half the initial stock which can be recouped in 10 years in annual instalments from the interest collected. The State will thus not be put to any loss. This activity on the part of the State would prove of material benefit to the people. It would also educate the people in co-operative management.

**(5) Protection against exploitation by enacting necessary laws.**

We have already stated that being illiterate, needy and helpless, the cultivator is often exploited by his more fortunate neighbours, middlemen in the markets, men in public service and the like. He is therefore unable to realise the full benefit of his industry. The State should therefore protect the cultivator against exploitation by passing laws like the Regulated Markets Act, Land Development Act, Debt Conciliation Act, Money-Lenders Act, Crop Protection Act, etc. These Acts have been in operation in the Bombay Province.

Legislative measures to protect the cultivator.



## CHAPTER IX

### Organization to carry out the suggestions and recommendations for the improvement of rural areas.

The object of the survey, we were entrusted with, was to examine the existing practices of agriculture and the conditions under which the agriculturist works and suggest lines of agricultural improvement and rural development. We have described these practices and conditions in Chapters I and II. In Chapter III the problems emerging from the first two chapters have been set out. Suggestions for the improvement and development of agriculture have been given in detail in Chapters IV to VII. In Chapter VIII other essential conditions for a higher and happier rural life have been discussed and it has been shown that mere improvement of yields of crops and increase of other income would not lead to progress for a fuller life and achieve lasting results. It has been made clear there that simultaneously with them other conditions essential for efficient and happier life, such as health, general education and sense of corporate life must also be developed. As improvement of economic condition and thereby of the standard of living and improvement of physical and cultural conditions are more or less inter-dependent, in any attempt of rural development both these aspects must be tackled simultaneously. The central figure is the villager himself and if the scheme of rural development is to achieve the expected results within reasonable period, efforts must be mainly directed to improving his outlook. Emphasis should therefore be laid, in our programme, on the education of the villager so as to inculcate a keen desire for self up-lift. He would then make full use of the help the State may offer. How important and necessary this is, has been brought out in unequivocal terms in the concluding chapter of the Report of the Royal Commission on Agriculture (1928). On page 672, it says:

“Throughout our Report, we have endeavoured to make plain our conviction that no substantial improvement in agriculture can be effected unless the cultivator has the will to achieve a better standard of living and the capacity, in terms of mental

equipment and of physical health, to take advantage of the opportunities which science, wise laws and good administration may place at his disposal. Of all the factors making for prosperous agriculture, by far the most important is the outlook of the peasant himself."

"This, in the main, is determined by his environment and it follows, therefore, that the success of all measures designed for the advancement of agriculture must depend upon the creation of conditions favourable to progress. If this conclusion is accepted, the improvement of village life in all directions assumes at once a new importance as the first and essential step in a comprehensive policy designed to promote the prosperity of the whole population and to enhance the national income at the source. The demand for a better life can, in our opinion, be stimulated only by deliberate and concerted effort to improve the general conditions of the country-side, and we have no hesitation in affirming that *the responsibility for initiating the steps required to effect this improvement rests with Government.*"\*

We are aware of the personal interest taken by His Highness The Rajasaheb of Bhor in the welfare of his people and of his anxiety to do every thing practicable to improve their condition and redress their grievances. This is seen from his various speeches and reforms introduced by him from time to time since his accession to the Gadi in the year 1922. These reforms deal with the betterment of general administration, grant of several concessions and privileges to the people, abolition of certain taxes, introduction of political reforms, uplift of depressed classes etc. A detailed account of these is given in the Life of His Highness written in Marathi by Mr. V. N. Joshi, Retired Shaladhikari of the State in 1939. Even the appointment of this Committee to report on the measures that should be taken to improve agriculture and the condition of the agriculturists is another proof of the Rajasaheb's genuine anxiety for the welfare of his subjects. We feel confident that no time will be lost in launching the comprehensive scheme of rural development detailed in this report.

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\* The italics is ours.

**The organisation to carry out the suggestions and recommendations.**

The agencies to carry out the comprehensive programme of rural development must be both official and non-official. As to official agency it is recommended that a new department of Rural Development be started which should be responsible for carrying out the various suggestions made in this report. But the success of this new department will depend upon the co-ordination and help forthcoming from other departments like the Revenue, Education, Forest, Medical, Public Works etc., which are concerned with the various aspects of rural life. The principle of *Service of the people* must be inculcated in the minds of the officers—high and low—in each department and the whole administration must be benevolent and helpful in outlook. This change must come from above and the Ministers in charge of these departments will have to see from time to time that the spirit of administration is so changed, that co-ordination of all the departments with the new department of Rural Development is brought about. Rural Development should be an obligatory duty of each department, as far as that department is concerned. If this change in the outlook of administration of the various departments is successfully brought about the success of the comprehensive plan of the Rural Development Department could be guaranteed. We earnestly request that H. H. the Rajasaheb may be pleased to take personal interest and see how best to bring about this change effectively.

The Rural Development Department should have four sections namely, (1) Agriculture, (2) Forestry, (3) Veterinary and (4) Village Panchayats and other aspects of village life. The present Forest Department should be amalgamated with this new department and a new section of Veterinary Service should be started and put under this department. Other departments of Government should co-operate with the Rural Development Department and render technical advice and carry out the programmes concerned.

**Organisation of the new Rural Development Department.**

The Head of this new department should be designated as "Development Officer." He should be directly responsible to the Minister in charge and should be an officer of the grade and position of Assistant Collector. He should preferably be drawn from the Revenue department of the Bhor State with a service of not less than ten years of which 5 should be in the capacity of the Mamlatdar. He should as far as possible be from the permanent members of that department and should be a subject of the State and should have still a period of service of at least 10 years before him so that he may have sufficiently long time to have continuity of policy and to achieve results. What is needed in the officer in addition to the academic qualifications is broad outlook, progressive views, strong optimism and a keen sense of service of the people. The reason why we propose the appointment of an administrator for the post of the head of the new department is that in carrying out the various recommendations of the Committee such as the construction of bandharas and tanks, granting of tagai loans for wells; land development, opening new land for cultivation, development of forests, improvement of drinking water supply and sanitation of villages, construction of roads and approach roads and the like, knowledge of State administration and particularly Revenue administration is needed, so that, time would not be wasted in unnecessary correspondence and thereby the execution of the various schemes might not be delayed in the usual official procedure. This Officer, being of the rank of the Assistant Collector, will be senior to the Mamlatdars and he will thus be able to get things inquired into and points of doubts settled by personal inquiry on spot. He can also approach the various departments concerned such as the Public Works, Education, Medical etc. direct for technical assistance from time to time in order to expedite matters.

The Development Officer should have the usual office establishment and peons. On the technical side he should have an Agricultural (Graduate) Assistant, two malis and two Khalashis (Agricultural labourers especially trained in the use of improved implements, seed selection, control of pests and diseases etc.) For higher technical guidance in agriculture, horticulture, forest development etc.

Qualifications  
of the Head of  
the new Department.

Agricultural  
staff.

the State may also take advantage of the experts of the Bombay Provincial Departments of Agriculture, Forest etc. It may also be able to find out some public spirited retired officials of the Agricultural and other Departments or Associations at Poona to assist the new department in an honorary capacity. The assistants of various sections of the new department should be sent from time to time to the neighbouring British districts to refresh their knowledge and to attend shows, conferences etc. in their respective subjects. Technical assistance with regard to construction works should be provided by the State department of Public Works and for education and health by the departments concerned.

The following is the outline of financial provision for the new department:—

<b>Financial provision.</b>	Recurring. Rs.	Non-recurring. Rs.
<b>Pay of the Officer.</b>		
Pay of the Development Officer.		...
Grade 100-150.	1200	...
T. A. of the Officer.	300	...
<b>Pay of Establishment. Office.</b>		
Senior Clerk (Grade 25-40)	300	...
Junior Clerk (Grade 15-30)	180	...
Two peons, (Grade 10-15)	240	...
T. A. of peons.	60	...
<i>(a) Agricultural Section.</i>		
Pay of Agricultural Assistant (Grade 60-5-75)	720	...
T. A. of the Agricultural Assistant	200	...
Two Malis (Grade 20- $\frac{1}{2}$ -30)	480	...
T. A. of Malis.	240	...
Pay of two Khalashis (Grade 12- $\frac{1}{2}$ -20)	288	...
T. A. of Khalashis.	180	...
<i>(b) Forest Section.</i>		
Pay of Range Forest Officer @ Rs. 50.	600	...
T. A. „ „	200	...

	Recurring. Rs.	Non-recurring. Rs.
Peon (Rs. 10- $\frac{1}{2}$ -15)	120	...
T. A. of the peon.	60	...
<i>(c) Veterinary Section.</i>		
Pay of Veterinary Surgeon @ Rs. 50.	600	...
T. A. " "	200	...
Peon @ Rs. 10- $\frac{1}{2}$ -15	120	...
T. A. of the peon.	50	...
Pay of 5 Assistants for five Talukas @ Rs. 20 each P. M.	1200	...
<i>(d) Section for other essential aspects of Rural Development.</i>		
Pay of officer of the grade of an Aval-karkun to be in-charge of the Section. @ Rs. 40-2-60.	480	...
T. A. " "	200	...
Pay of peon @ Rs. 10- $\frac{1}{2}$ -15	120	...
T. A. " "	50	...
<b>Total establishment</b>	<b>8388</b>	...
<b>Contingencies</b>		
Stationery and Postage.	500	...
Initial office equipment.		500
<i>(a) Agricultural Section.</i>		
Demonstrational equipment of Agri- cultural Section including implements, insecticides, fungicides, appliances, books, printing of leaflets etc.		1000
Cattle shows and prizes.	500	...
Subsidy to 5 Taluka Development Boards	750	...
Encouragement to individual farmers	100	...
Stationing of breeding bulls.	1000	...
Subsidy to gun-clubs	250	...
Encouragement for tree-planting.	250	...

	Recurring. Rs.	Non-recurring. Rs.
<i>(b) Forest Section.</i>		
Raising hirda, chandan, teak, ain and other tree plantations.	1000	...
<i>(c) Veterinary Section.</i>		
Initial equipment of dispensary. Medicines, Vaccines, tools and appliances.	2000	2500
<i>(d) Section for other essential aspects.</i>		
Guinea-worm control.	1000	...
Miscellaneous.	150	...
Total contingencies.	<u>6600</u>	
General Total.	<u>14988</u>	<u>4000</u>

N. B.—(Budget for other activities like education, water supply etc. will have to be framed later).

## Additional Provision for Development Works.

Item for which provision is needed	Amounts required		Remarks
	Those that are recoverable fully	For capital expenditure and non-recoverable	
	Rs.		
Tagai for construction of talas, bunding and levelling of fields and annual repairs ...	20,000		
Tagai for seeds ...	25,000		
Tagai for wells ...	10,000		
Construction of Bandharas ...	50,000		
Tagai for crop finance ...	25,000		
Grain depots ...	50,000		
Personal Ledger Account for Taluka Development Boards ...	10,000		
Roads ...	...	50,000	annually
Drinking water supply ...	...	25,000	annually
Primary schools ...	...	...	
Adult education ...	...	...	These budgets will have to be prepared by the Educational Department
Village libraries ...	...	...	
Technical scholarships ...	...	...	
Total ...	1,90,000	75,000	



## *Duties and functions of the Rural Development Department.*

The duties and functions of each of the four sections of the Rural Development Department and those of other departments of Government concerned with rural life may now be described.

### (1) Agricultural Section.

**Duties of the Agricultural section.** This section will have an Agricultural (graduate) Assistant, two Malis and two Khalashis. Their duties should be to establish demonstration farms on holding of private agriculturists in different agricultural tracts of each taluka. On the demonstration farm all the improvements of agriculture enumerated in Chapter IV as may be applicable to the tract should be adopted on holding scale so that it becomes a centre for demonstrating the various improvements to cultivators of the tract. It may not be possible to demonstrate all the improvements at one and the same time as different improvements will have to be shown as they are in a stage to show at different times of the year. To illustrate, the improvement of green manuring, or compost making will have to be demonstrated in two stages, namely (1) preparation of the manure and (2) effect of the applied manure on the crop. Similar is also the case with the use of insecticides and fungicides. In the case of an improved variety of a crop it would be enough to show it in a comparative manner when the crop is ready. On these demonstration farms some comparative plots of the new and the old method should be laid out. The owner of the farm should be given a small subsidy for the inconvenience that may be caused to him. The same farm should be used for multiplying seeds of improved varieties in the pedigree stage.

The Agricultural Section should make arrangements to stock improved seeds, manures, insecticides, fungicides, appliances and implements in the depot of the Taluka Development Board in each tract. Its policy of work should be to cover up the whole tract suitable for each improvement within a period of five to ten years according to the nature of the improvement.

Repairs to old Government bandharas, irrigation projects of new bandharas, Nira Irrigation scheme, tagai advances for new wells, surveying of fields in Shirwal and Pirangut valleys for bunding, hill-side tree plantations, establishment of regulated markets, allocation of breeding bulls, holding cattle shows, organising gun clubs for hunting wild pigs and Rohis, extension of wal and gram in Sudhagad, demonstrating silage making etc. should be the other duties.

The Agricultural section should reprint with the permission of the Bombay Agricultural Department and Veterinary Department such of the leaflets (List given in the Appendix Nos. IX to XI) on subjects as are applicable to Bhor territory. It should also subscribe for 50 copies of Shetki and Shetkari Magazine and distribute them free. It should award scholarships for agricultural and technical education,

### (2) Forest Section.

A Forest Ranger should be in charge of this section and his duties should be, with the help of the existing staff and such of the new staff as may be found necessary, to prepare a working plan of raising seedlings of teak, ain etc., raising Hirda plantations as shown in the scheme included in the Appendix, raising Chandan plantations in the Deshi-Maval and Desh tracts, teak, ain, shisoo, plantations in Sudhagad and Desh parts, and developing the forests and making them productive.

### (3) Veterinary Section.

There should be a Veterinary Surgeon in charge and he should have his dispensary at Nasrapur. He, with the help of the five Taluka Assistants, should provide medical and surgical treatments to cattle and carry on vaccinations as preventive measures. Besides, it should also carry on castrations by the painless method with Burdizzo castrator as an important improvement over the present method of *mulling* which is a cruel method causing intense pain to the animal.

### (4) Section for establishment of Village Panchayats and other aspects of rural development.

This section with the help of the Educational, Public Works, Medical and Revenue Departments and Taluka De:

velopment Boards, should prepare plans and carry them out for the development of primary and adult education, village libraries, construction of roads, dams, tanks and ponds, supply of drinking water to villages, repairs to bandharas and village tanks, prevention of guinea-worm and control of malaria sanitation, setting up village organisations, and grain depots etc. It should establish Village Panchayats to educate the villagers in co-operative action and in the discipline of corporate life. One post of the grade of an Aval-karkun should be created and one peon attached to it.

**The non-Official Agency.  
Taluka Development Boards.**

The present Taluka Local Boards should be designated as Taluka Development Boards and they should be extended by electing three additional members for rural development. These bodies should provide all the non-official help required for rural development. They should make suggestions from time to time to the Rural Development Department and carry out the various works decided upon by them and by the Rural Development Department. They should enlist membership and collect about Rs. 500 per year by way of fees of membership, donations etc. to meet their expenditure. In addition, Government should place at the disposal of these bodies all the Local fund cess and grants-in-aid for various rural development activities and a subsidy of Rs. 150 each per year for entertainment of staff. The functions and duties of these Boards should be as under :—

**Functions and duties of the Taluka Development Boards.**

These should be :—(1) establishing demonstration farms on private holdings of progressive cultivators and organising demonstrations on them from time to time, (2) multiplying improved seeds sufficient for distribution to village seed growers of each crop, (3) organising seed multiplication and stocking of improved seeds in each group of villages through private agencies, (4) opening depots for improved and pure seeds, insecticides, fungicides and appliances and improved implements for hire. They should also establish a nursery in each tract for the preparation of budded plants of fruit trees, mango grafts,

mango budded plants etc. The owner of the demonstration farm and of the nursery should be given a small subsidy. The State should place at the disposal of these bodies a sum of Rs. 2000 each as advance for the stocking of seeds, insecticides, fungicides, implements etc. without any interest. The recoveries made should be credited to this advance account by them for its perpetual use.

For other aspects of rural development the T. D. Boards should submit proposals from time to time to the Department and assist the department in carrying out the plans with popular support. They should enlist the assistance of village Panchayats for carrying out propaganda and education of the people. They should also place the grievances and difficulties of the people before the Government through the new department. The Mamlatdars should be the Presidents of these Boards for the first five years.

The Agricultural budget of these Boards should approximately be as under.

		Rs.
Pay of the Kamgar	... ..	120
Subsidy to seed farm, nursery and demonstration farms.	... ..	150
Demonstration and propaganda	... ..	150
Office and miscellaneous expenses	... ..	70
Implement depot.	... ..	100
Unforeseen	... ..	60
	Total Rs. ... ..	650

The Taluka Development Boards should organise tree planting weeks, village cleaning day once a month, weeks for campaign against Loranthus on mango, digging of white-ant hills, and days or weeks for carrying out certain improvements once a year throughout its jurisdiction.

The establishment of grain depots and running them with the support of the Revenue Department, in matters of collection of grain given out as loan, should be an important function of these bodies.

These Boards should have permanent Museums and Libraries of their own.

K. V. JOSHI

V. K. KOGKAR

H. P. PARANJPYE

APPENDIX No. I

Statement showing the names of villages and other places of Agricultural importance visited by the Committee.

Name of Taluka	Names of villages and other places of agricultural importance	Date of visit	Remarks
Vichitragad	Bhor	17-2-1942	Bhide's dairy near Bhor was visited
"	Sangvi (Tarf-Bhor) Alande and Uttroli	18-2-1942	The Rambag Bandhara near Bhor was visited
"	Dhamoshi ( Hirdas Maval), and Shirgaon	19-2-1942	
"	Natambe Ambavade	20-2-1942	
"	Kajewadi, Yewali and Pargaon	21-2-1942	
"	Shirwal, (Sonawari Odha Dam) Phulmalla and Bhade	22-2-1942	
"	Shirwal	23-2-1942	Citrus & grape gardens under well irrigation round about Shirwal were visited.
Sudhagad	Pali	24-2-1942	
"	Siddeshwar Khurd, Dapoda (near Pali), Khandpoli	25-2-1942	At Dapoda the estate of Mr. R. N. Potdar on the bank of Amba river was visited
"	Fauson, Managaon	26-2-1942	
"	Pali	27-2-1942	
"	Zap, Siddeshwar (Bk.) and Nadsur	28-2-1942	Visit to the area round about Amba river
"	Jambulpada, Asare, Navaghar, Parali	1-3-1942	

## Appendix No. 1 (continued)

Name of Taluka	Names of villages and other places of agricultural importance	Date of visit	Remarks
Prachandgad	Vele	8-3-1942 9-3-1942	Round about area
"	Gopalghar, Kodapur	10-3-1942	The Deorahati at Gopalghar was visited
"	Bamanghar, Dapode	11-3-1942	
Rajgad	Nasrapur, Nayagaon, Varve-Khurd, Varve Budruk, Kanjale, and Kelavade Bandhara	12-3-1942	
"	Jambhali, Ambavane, Mangdari, Manganga-Nalla, Gayawal estate	13-3-1942	The estate and fruit garden of Mr. Gayawal an enterprising agriculturist of Nasrapur was visited
"	Kapurvahal, Dhanga-wade Diwali, and Mission estate at Nasrapur	14-3-1942	
"	Adoli, Sardar Natu's garden at Nasrapur, Velu	15-3-1942	
Pavanmaaval	Chale, Kolwan and Chikhalthahal	1-4-1942	The Deorahati at Chikhalthahal was visited
"	Kashig, Tikona, Ghevande Kadav, Wageswari	2-4-1942	
"	Pirangut, Sambe (near Mulsi Dam)	3-4-1942	
"	Muthe, Uravade and Bandhara near Pirangut	4-4-1942	The Bandhara near Pirangut village meant for Lavale village in the British territory was visited

*N. B.*—One of the members of the Committee Mr. H. P. Paranjpye was unable to visit the Vichitragad Taluka.

APPENDIX No. II

Statement showing the names of centres where meetings were held.

Name of Taluka	Name of Village of the meetings	Date	Approximate No. of persons attending the meeting	Remarks
Vichitragad	Bhor	Feb. 1942 18	200	
"	Alande	18	60	
"	Dhamoshi	19	250	
"	Bhor	19	6	Some of the members of the Legislative Assembly and leaders.
"	Natambe	19	50	
"	Ambavade	20	200	
"	Pargaon	21	100	
"	Shirval	21	10	Local leaders.
"	Bhade	22	200	
"	Shirval	22	25	Leading cultivators.
Sudhagad	Pali	24	50	
"	Pali	25	30	Mostly Talatis in the Taluka.
"	Khandpoli	25	25	
"	Mahagaon	26	100	
"	Pali	27	25	Members of the Samaj Seva Sangh at Pali.
"	Zap	28	20	
"	Siddheswar Budruk	28	25	
"	Nadsur	28	100	
"	Jambulpada	March 1942 1	25	
Prachandgad	Vele	8	100	Cultivators from Kanad Khore.

## Appendix No. II—(continued)

Name of Taluka	Name of village of the meetings	Date	Approximate No. of persons attending the meeting	Remarks
Prachandgad	Vele	March 1942 9	100	Cultivators from Gunjan Maval, Mose Khore, Ambegaon Khore.
"	Kodapur	10	50	
"	Vele	10	50	Cultivators from Mose Khore and Ambegaon Khore.
"	Vele	11	50	Cultivators from Mose Khore.
"	Dapode	11	100	
Rajgad	Nasarapur	12	50	Gunjan Maval cultivators.
"	Varve Budk.	12	50	
"	Kanjale	12	100	
"	Mangadari	13	25	
"	Kapur Vahal	14	50	
"	Dhangavade	14	50	Cultivators from Nigade Kasundi & Talavade were also present.
"	Diwali	14	50	
"	Nasarapur	15	10	Bagayat cultivators from Adoli Malegaon, Nidhan and Sangavi were present.
"	Velu	15	50	
Pavanmaval	Chale	April 1942 1	150	Cultivators from the villages of Mugawade, Kalamboli Savargaon, Kule, Nanegaon. Darvane were present.
"	Kadav	2	75	Cultivators from Tungkhore (Shilimb, Wageswar, Ajavli, Jovan, Kadav, Ghevand and from 18 villages) were present.
"	Pirangut	3	100	
"	Muthe	4	100	
"	Uravade	4	10	
Total ...	39		2821	



APPENDIX No. III

Table showing names of pests and diseases of crops  
and remedial measures

Name of crop or fruit tree	Name of tract	Agent causing damage	Remedial measures
Rice	Konkan, Maval, and Deshi-maval tracts	Crab	Fumigation of burrows with chilli gas or cynogas, or poison baits with barium carbonate or lead arsenate  Shooting  Removing affected ear- heads and removing and burning stubble of the crop
		Rat	
		Wild pig	
		Caterpillar damag- ing ear-heads	
		Stem borer	
Nagli	Do. Do.	Rat	Fumigation of burrows or poison ba its  Shooting  Shooting
		Wild pig	
		Rohi	
		Black caterpillar on leaf and earhead	
		Stem borer	
Bajri	Khedebare and Shirwal divisions	Blister beetle	As in rice  Light trap

## Appendix No- III—(continued)

Name of crop or fruit tree	Name of tract	Agent causing damage	Remedial measures
Shalu jowar	Deshi-maval and Desh tracts	Shoot caterpillar	
		Smut	Sulphur dusting of seed
		Wild pig	Shooting
Wheat	Do. Do.	Rust	Rust resisting variety
Peas	Do. Do.	Powdery mildew	Sulphur dusting
		Aphides	Tobacco decoction
		Pod caterpillar	Sodium Fluo-sylicate
Vegetable Crops	Do. Do.	Aphides	(1) Tobacco decoction (2) Fish oil rosin soap
Mosambi Santra Lemon Pomalo	Khedebare and Shirwal divisions	Lemon caterpillar	Sodium Flue sylicate. But the most practicable remedy is hand-picking
		Fruit fly	Covering fruits by paper bags
		Fruit moths	Hand picking at night
		Gummosis	Creosote
		Die-back (Sal)	Drainage of fields Irrigation with bitter-oil cake or crude oil
		White ants	Killing of queen ants
		Aphides	Tobacco decoction
		Fig	Khedebare
		Rust	Sulphur dusting

## Appendix No. III—(continued)

Name of crop or fruit tree	Name of tract	Agent causing damage	Remedial measures
Mango	All over the State	Stem borer	Removal by hook or by hand
		Loranthus	Cutting down the affected branches.
		White ant	Killing queen ants
		Rat and Adal	Fumigation of burrows and poison baits
		Hoppers & Mildew	Sulphur dusting
Jack fruit	Maval and Konkan	Rulumb	Crude oil emulsion
			Collection of grubs by stirring soil
		Rat and Adal	Fumigation of burrows
		Bleeding Organism	The affected parts should be removed and creosote followed by coal-tar should be applied to the wound. This disease is not found in Maval
		White ants	Killing of queen ants

APPENDIX No. IV

**Table showing the names of Pucka Bandharas**

Taluka	Name of village	Name of river or stream dammed	Name of Bandhara	Remarks
Rajgad	Kelvade	Shivaganga river	Baneshwar dam	Area of Nasrapur irrigated
Rajgad	Ambavane	Mangdari odha	Ambavane dam	
Rajgad	Kusagaon	Shivaganga	Kusagaon Bandhara	
Rajgad	Ranze	" "		
Pawanmaval	Wageswari	Nalla near Wageswari	Wageswari Bandhara	The Dharan requires repairing. The cost will be about Rs. 350/-
Sudhagad	Jambulpada	Amba river	Dharan	
Vichitragad	Bhor	Rambag stream	Rambag	
Vichitragad	Shirwal	Sonavare odha	Dharan	
Vichitragad	Wing	Stream at Wing	Wing	

APPENDIX No. V

Table showing the names of Kaccha Bandharas

Taluka	Village	Name of river or stream	Name of Bandhara	Approximate area irrigated	Crops grown
Rajgad	Kapurvahal	Nalla	Katna Bandhara or Dharan		Rabi crops of wheat, jowar etc.
Do.	Nasrapur	Manganga nalla	Shedgyacha Bandhara	5 to 10 acres of one cultivator	Do. Do.
Do.	Nigade	Nalla	Shivechya odh-yache dharan S. No. 29	1 bigha	Ghevada, onions, chillies brinjals
Do.	Do.	Do.	Malayiche dharan S. No. 15	1 bigha	Shalu, gram groundnut
Do.	Do.	Do.	Madhale odh-yache dharan S. No. 27	2 bighas	Rice
Do.	Do.	Do.	S. No. 22 "	8½ bighas	Do.
Do.	Do.	Do.	S. No. 26 "	10 bighas	Do.
Do.	Kapurvahal	Do.	Hivalyache shivevar S. No. 17 to 19	14¼ bighas	Shalu
Do.	Do.	Do.	Ganadchache dharan S. No. 72 to 85	70 to 80 bighas	Do.
Do.	Do.	Do.	Khubaddariche dharan S. No. 73 pot No. 3 to 5	4 bighas	Do.

## Appendix No. V—(continued)

Taluka	Village	Name of river or stream	Name of Bandhara	Approximate area irrigated	Crops grown
Rajgad	Kapurvahal	Nalla	Ghotlinga dhohache dharan S. No. 59-66 in parts Kekare jai	15 to 16 bighas	Shalu
Do.	Do.	Do.	Inamache dharan S. No. 63, 64, 81	5 to 6 bighas	Do.
Do.	Do.	Do.	Salobachya odhyas dharan S. No. 45 to 47	9 to 10 bighas	Do.
Do.	Haris-chandra	Do.	Shireche odhyas dharan	8 to 9 bighas	Do.
Do.	Adavali	Shivganga	Adavali	76 acres	Shalu and other crops
Do.	Dhangarvadi	Nalla	Gavathanatil odhyas dharan S. No. 65 to 70	35 bighas	Shalu, rice Vegetable crops
Do.	Do.	Do.	Shiveche dharan S. No. 66, 67, 76	6 bighas	Shalu, rice
Do.	Do.	Do.	Manaichya odhyache dharan S. No. 57	8 bighas	Do. Do.
Do.	Do.	Do.	Manaiche dharan (Malaiche) S. No. 58	7 bighas	Do. Do.
Do.	Do.	Do.	Manaiche dharan S. No. 61	8 bighas	Do. Do.
Do.	Kasurdi	Do.	Kaccha bandhara		

APPENDIX No. VI

Table showing names of sites suitable for construction of Bandharas

Taluka	Village	River or stream	Name of site	Approximate area that may be irrigated in acres	Crops that may be irrigated	Remarks
Rajgad	Kanjale	Shivganga	Near dhangar tukada field	200	Vegetable and Rabi crops	
"	Kapurvahal	Nalla	S. No. 60, 61		" "	
"	"	"	S. No. 42, 43		" "	
"	"	"	S. No. 19		" "	
"	"	Lendicha odha	S. No. 80, 81			
"	Nasrapur	Manganga Nalla	Shedge bandhara	75—100		There is a katcha bandhara. This should be made pacca
"	Divale	Deulejaicha Odha	Gan Doh	45		
"	"	"	Bal Doh			
"	"	"	Dhavaticha Mhasobacha Doh S. No. 97	25	" "	Height 15 ft.
"	Adoli	Shivganga	Salubaicha	200		300 ft. long and 10 ft. high
"	Nigade	Nalla	Shivecha Odha	40 bighas		30 ft. length 3 ft. high

## Appendix No. VI—(continued)

Taluka	Village	River or stream	Name of site	Approximate area that may be irrigated in acres	Crops that may be irrigated	Remarks
Rajgad	Kusgaon	Nalla	Zar Odha Kalakicha Odha	75 bighas		
"	Mangdari	"	Sthangurkhi Odha	100—150 acres		
"	Telavadi	Guniavan river	Near Mohari village	100—125 acres		
"	Ketka- vani	Nalla	Sthal Gurkhi Ghamandi	100—150 acres		
"	Velu	Nallas 2	Not mentioned	50 bighas		
"	Kasurdi	Nalla	Where there is a katcha Bandhara	30 to 35 bighas		The katcha Bandhara to be made pacca
"	Varye Bk.	Shivganga river	Not mentioned	100 acres		
"	Varye Kh.	Nalla	"	60 to 70 bighas		
Vichit- ragad	Nere	Nalla of the village	"	50 acres		
"	Shind	Nand odha	"	all the area of Shind village		
"	Parhe Kh	Nalla		25 acres		
"	Hirdoshi	"		25 acres		
"	Salar	Nira river	Pump to be installed	25 acres		



## Appendix No. VI—(continued)

Taluka	Village	River or stream	Name of site	Approximate area that may be irrigated in acres	Crops that may be irrigated	Remarks
Vichitragad	Rayari	Nalla	Pump to be installed	20 acres		
"	Venupuri	"		25 acres		
"	Hatnoshi or Nilkanth Nere	"	Rambag odha	1275 bighas		Rs. 6000 cost
"	"	"	Pakka Dharan S. No. 92	150 bighas		Rs. 1094 cost
"	"	"	" " S. No, 91	75 bighas		Rs. 2000 cost
"	"	"	Pakka Dharan on Banganga odha S. No. 66	125 "		Rs. 2500 cost
"	"	"	Banganga odha Sakalpani in S. No. 38	25 "		Rs. 500
"	Bhor	"		300 "		Rs. 500
"	Pisalvadi	"	Rambag odha	50 acres		
"	Morve	"				
"	"	"	Nalla from Harali hills			
"	Bazarvadi	Stream	Near Harali village			
"	Bhade	"	Bhade kuran			
Pavan-maval	Gangadevi	River Walki	Doh near Gangadevi	40 acres		
"	Mugavade	Nalla	Chambharzara	150 "		

## Appendix No. VI—(continued)

Taluka	Village	River or stream	Name of site	Approximate area that may be irrigated in acres	Crops to be irrigated	Remarks
Pavan-maval	Kalam-boli	River	Sangam of Mulla & Valki	150 acres		15 Budakhis can be made. Each will cost about Rs. 300
"	Kule	"	Valki	Areas of Kule		
"	Laval	Nalla	Ajmali nalla			
(Tung valley)	Wageswari	"	Near Jovan village	Area of Jovan		
"	Morve	"				
Muthe Khore	Lavarde	River	Mutha			
"		Nalla	Gavanjche use	50 acres		
"	Vadegaon	"				
"	Vatundegaon	"	Ghodyacha Odha			
"	Uravade	"	Paritkicha Odha			
"	"	"	Kavathicha Odha			
"	"	"	Bandhara near Ambegaon			
Sudhagad	Pali	River	Kulkarni Doh			
"	Padsare	Nalla	Near Padsare village			
"	Kalam-boshi	River	Tail water from Bhira power house	100—125	Vegetables	
"	Padsare	Nalla	Not known	50 acres	"	

APPENDIX No. VII

List of some fodder trees and shrubs suitable for Bhor territory.

Scientific name	Local name	Suitable for what part of the State
<i>Actinodaphne Hookerii</i> , Laurinae	Pisa	Hills of high altitudes. 2500 ft, and more
<i>Adina cordifolia</i> , Rubiaceae	Hedu	Konkan and Deshi-maval
<i>Adhatoda vasica</i> , Acanthaceae	Adulsa	All over
<i>Aegle Marmelos</i> , Rutaceae	Bel	All over
<i>Albizia procera</i> , Legumino- seae	Kinai	Konkan
<i>Anogesius latifolia</i> , Combretaceae	Dhavda	Konkan
<i>Anthocephalus cadamba</i> , Rubiaceae	Niv	Konkan
<i>Argyreia speciosa</i> , Convolvulaceae	Samudrashok	All over
<i>Artocarpus integrifolia</i> , Urticaceae	Phanas	Konkan and Deshi-maval
<i>Artocarpus Lackoocha</i> , Urticaceae	Lav, Otamb	Konkan and Deshi-maval
<i>Bassia latifolia</i> , Sapotaceae	Mohva	Deshi-maval
<i>Bauhinia racemosa</i> , Legumi- nosea	Apta	All over
<i>Mombax malabaricum</i> , Malvaceae	Savar	Konkan
<i>Buchanania latifolia</i> , Anacardiaceae	Char	Konkan and Deshi-maval
<i>Butea frondosa</i> , Leguminosae	Palas	

## Appendix No. VII—(continued)

Scientific name	Local name	Suitable for what part of the State
<i>Dalbergia lanceolaria</i> , Leguminosae	Dandus	Deshi-maval
<i>Dalbergia sissoo</i> , Leguminosae	Shisoo	Konkan
<i>Dendrocalmus strictus</i> , Graminae	Bamboo	All over
<i>Erythrina indica</i> , Leguminosae	Pangara	All over
<i>Eugenia jambolana</i> , Myrtaceae	Jambul	All over near water
<i>Ficus glomerata</i> , Urticaceae	Umber	All over
<i>Ficus infectoria</i> , Urticaceae	Pimpri	All over
<i>Ficus religiosa</i> , Urticaceae	Pimpal	All over
<i>Guruga pinnata</i> , Burseraceae	Kakad	Konkan and Deshi-maval
<i>Gmelina arborea</i> , Verbinaceae	Shivan	All over
<i>Grewia tiliae-folia</i> , Tiliaceae	Dhaman	Konkan and Deshi-maval
<i>Grewia laevigata</i>	Karvi	Konkan and Deshi-maval
<i>Hardwickia binnata</i> , Leguminosea	Anjan	Deshi-maval
<i>Helianthus tuberosa</i> , Compositae	Suryaphul	Cultivated
<i>Helicteris isora</i> , Sterculiaceae	Murudsheng	Konkan and Deshi-maval
<i>Heterophragma Roxburghii</i> , Bignoniaceae	Varas	All over
<i>Hiptage madablota</i> , Malpighiaceae	Madhumalati	Konkan and Deshi-maval
<i>Holarrhena antidysentexica</i> , Apocynaceae	Kuda	Konkan and Deshi-maval

Table No. VII—(continued)

Scientific name	Local name	Suitable for what part of the State
<i>Holoptelia integrifolia</i> , Urticaceae	Vavla	All over
<i>Ixora parviflora</i> , Rubiaceae	Raykuda	Konkan and Deshi-maval
<i>Kydia calycina</i> , Sterculiaceae	Varang	Konkan
<i>Lagerstreamia flos-reginae</i> , Lythraceae	Tamhan	Konkan and Deshi-maval
<i>Leucaea glauca</i> , Leguminosae	Kubabhal	Deshi-maval
<i>Mallotue philipiensis</i> , Suphorbiaceae	Shendri	Konkan and Deshi-maval
<i>Mangifera indica</i> , Anacardiaceae	Amba	All over
<i>Morinda tinctoria</i> , Rubiaceae	Bartondi	Deshi-maval
<i>Morus indica</i> , Urticaceae	Tut	All over
<i>Nyctanthus arborea tristis</i> , Oleaceae	Parijatak	All over
<i>Odina wodier</i> , Anacardiaceae	Shemat	Konkan and Deshi-maval
<i>Ougenia dalbergioides</i> , Leguminosae	Tivas	Deshi-maval
<i>Paveta indica</i> , Rubiaceae	Phapat	All over
<i>Pithecolobium dulce</i> , Leguminosae	Vilayati chinch	Konkan
<i>Pithecolobium samen</i>	Motha Takla Saman	Konkan
<i>Pongamia glabra</i> , Leguminosae	Karanj	All over near water
<i>Pterocarpus marsupium</i> , Leguminosae	Bibla	Konkan and Deshi-maval

Table No. VII—(continued)

cientific name	Local name	Suitable for what part of the State
Putranjiva Roxburghii, Euphorbiaceae	Putravanti	All over.
Santalum album, Santalaceae	Chandan	Konkan
Schleicheria trijuga, Sapindaceae	Koshimb	Konkan
Sesbania aegyptiaca, Leguminosae	Shevri	Konkan
Sesbania grandiflora, Leguminosae	Hadga, Agasta	All Over
Spondias mangifera, Anacardiaceae	Ambada	Konkan and Deshi-maval
Terminalia tomentosa; Combretaceae	Ain	Konkan and Deshi-maval
Thespesia populnea, Malvaceae	Bhond	Konkan and Deshi-maval

N. B.—It may be remembered that cattle eat leaves of the above trees under certain conditions such as famine or shortage of fodder. They are not eaten with as much relish as kadbi, lucerne etc. Cattle of certain parts eat leaves more or less promiscuously but those from other parts do not even touch them. For instance, cattle of Sudbagad and Konkan eat a variety of leaves but cattle of Desh tract do not. However, the list is given of such trees as the leaves of which are known to be eaten by cattle in one part or another.

## APPENDIX No. VIII

### The problem of "Kumri" cultivation in Bhor State

"Kumri" is a shifting type of cultivation in which hillmillets are grown in forest lands on hill slopes. For this purpose the forest area to be cultivated is cleared by felling all trees, shrubs etc. and burning the same on spot. The ashes are mixed with the soil by stirring the land with a *kudali* and a crop of *nachani* is taken during the monsoon. In the succeeding year, *vari* or *sawa* is grown. The land is then fallowed for a period of eight to ten years for recuperation of soil and regeneration of jungle growth. The cultivation is then shifted to a new area. In this way the area of cultivation goes on changing until the old area again becomes fit for cultivation, after the period of rest. Thus a considerable portion of forest land is utilised periodically in turn in this process of shifting cultivation.

In Bhor State, Kumri cultivation is common in Maval tract. This tract is extremely hilly with narrow valleys and steep slopes. The land available for cultivation in the valleys is very limited. Slopes of hills are therefore required to be utilised for cultivation of hill-millets. The lower and flatter slopes are generally terraced and made into permanent fields by bunding and levelling for growing hill-millets every year. But a far greater area under hill-millets lies on higher slopes which are not protected against erosion by bunding. The surface soil of such unprotected hill-slopes when brought under cultivation, gets heavily eroded under conditions of heavy rainfall of this tract and within two to three years becomes unfit for further cultivation. The land is therefore required to be left fallow for a period of six to eight years and cultivation is required to be taken to adjacent land. Thus even in private land or *Malki* numbers only a part of hill-slopes becomes available for cultivation each year. On this account cultivators in parts of Maval complain about shortage of land for cultivation and demand additional land from State Forest area for *Kumri* cultivation.

The utilisation of hill-slopes for cultivation of crops, whether in private land or in State Forest, is a wasteful practice, in as much as the fertile surface soil is lost by erosion during the two

or three years of cropping under the heavy rains. In the case of *Kumri* cultivation there is the additional loss of all forest growth by cutting and burning (except myrobalan which is preserved) every ten to twelve years. It may therefore be considered whether such wasteful practice can be stopped and the hill-slopes and especially the forest land can be utilised for a rational and more remunerative purpose.

In the past, when every locality or tract was required to be self sufficient with regard to food, it was natural that food-crops were given priority over all other considerations. Now with the development of cheap and quick transport facilities, deficiency of food in any locality can be made good at reasonable cost from surplus localities if money is available. It may therefore be considered whether all types of land should be primarily utilised for the growing of food crops as in the past. The present view is that each type of land should be used for such production as would bring in the maximum money return without deteriorating the land. Considered from this point of view, utilising the hill-slopes for cultivation is definitely uneconomic and wasteful. With the development of industries a variety of raw materials, which had formerly no market, is in demand at lucrative prices. Some of the raw materials that are produced in Maval tract are myrobalans, mango, jack-fruit, bamboo etc. All of these can be raised as permanent plantations without involving annual cultivation of the land; on the other hand the vegetation cover protects the surface soil against erosion and increase the organic matter in the soil by the annual fall of leaves and fruits. The most rational use of the slopes of hills in Maval under heavy rainfall conditions would be to devote them to permanent plantations of trees of economic value.

Of the variety of trees that grow luxuriently under conditions of Maval, Hirda (myrobalans) seems to be the most paying as the fruit is always in demand for the preparation of tannin. Besides, once the tree begins to bear, it gives more or less steady yield every year for a number of years, and thus forms a regular source of income. Further, Hirda is a monopoly of the Maval tract and is not likely to suffer from over-production. We may therefore compare the economics of Hirda plantation with those of hill-millets.



An acre of hill-slope may carry 20 trees on an average. Inquiries in Maval point out that the tree begins to bear from about the 10th year and reaches full bearing in the 15th year. They also show that the yield of fruit per tree steadily increases from one maund in the 11th year to  $2\frac{1}{2}$  maunds in the 15th year. On the basis of this information, the economics work out as under.

In working out the economics of any plantation, it is necessary to take a long period into account. As the Hirda tree comes to normal bearing by about the 15th year, a period of thirty six years is taken for calculation, In this period according to Kumri cultivation there would be three turns of cropping giving in all six crops of nachani and vari at intervals of ten years of fallow. First taking Hirda the returns would be as follows:—

It is assumed that on an average an area of one acre would carry twenty fully bearing trees. The price of Hirda fruit is calculated at Rs. 8/- per khandi of 20 maunds, which is the lowest price.

#### Returns from 20 Hirda trees in an acre.

		Value in Rs.
11th year at 1 maund per tree	20 mds.	8
12th year at $1\frac{1}{4}$ " "	25 "	10
13th year at $1\frac{3}{4}$ " "	35 "	14
14th year at 2 maunds " "	40 "	16
15th year at $2\frac{1}{2}$ " "	50 "	20
16th to 36th year at $2\frac{1}{2}$ maunds per tree per year i. e. 21 years' income at 50 mds. per year		420

Total Rs. four hundred and eighty-eight 488

This total income when distributed over the whole period of 36 years, gives an average return per year of about Rs. 14/- per acre

The value of six crops of hill-milletts grown under Kumri cultivation during the period of 36 years would be as under:—

Three crops of nachani at 8 mds. per acre. 24 mds. Rs. 96/-  
 Three crops of vari at 4 mds. per acre. 12 mds. Rs. 48/-

The total value of the six crops works out to Rs. 144/- If this amount is spread over 36 years the annual return comes to Rs. 4/- only.

It is clear from these figures that the hill-slopes in forest area would be more remunerative if used for Hirda plantation. Besides, such a plantation provides protective cover against soil erosion. If this view is accepted a programme of Hirda planting spread over a period of 10 to 12 years will have to be carried out. The procedure should not involve loss of the annual income to the cultivator from Kumri cultivation until the plantation begins to yield. Nor should it involve heavy work requiring the employment of outside labour.

It is proposed that the work of establishing the Hirda plantation in areas allotted for Kumri cultivation at present should be entrusted to the cultivators concerned. In granting land for Kumri cultivation, the following conditions should be imposed: (1) the land should be cleared of the tree growth including roots as far as possible so that they will not sprout and compete with the Hirda seedlings to be established, (2) soon after the sowing of nagli in the Kumri plot, Hirda seeds should be sown in it in dibbles 33 feet apart each way. Four to five seeds should be sown at each dibble as the seed is difficult to germinate, (3) the cultivator should take care of the seedlings and protect them against damage by cattle or forest animals by fencing individual groups of seedlings with thorny twigs. Watering of plants does not seem necessary. In the second year after the close of the monsoon the seedlings should be thinned to two per dibble and only twenty dibbles be retained in an acre. After this the Forest Department should take charge of the plantation and declare the area as "Protected Forest." In the third year the cultivator should shift the Kumri cultivation to a fresh area. In granting the new plot the same conditions and procedure should be adopted. In this way in a period of 12 years the whole of the forest area available for Kumri cultivation would get established under Hirda plantation with plants of varying ages.

In the eleventh year of the project it is expected that the area planted with Hirda in the first year, would begin to bear. After 12 years there will be no land available for Kumri cultivation. But according to this project, it is proposed that the cultivator should be given the right to collect Hirda fruit from all the area planted by him during 12 years. It is necessary to point out that in the beginning all the plantations will not be in

bearing stage, but from the time the first plantation begins to bear, the succeeding ones would come to bearing after every two years. The calculated income from the sale of fruit would go on rising for twelve years as shown below. Thereafter it is expected to remain steady at that figure.

**Table showing the value of Hirda fruit in different years from an area of 1 acre after the plantations begin to bear.**

Year from the date of planting	Income in rupees from plantations of one acre each.						
	First plantation	Second plantation	Third plantation	Fourth plantation	Fifth plantation	Sixth plantation	Total
11th year ...	Rs. 8						Rs. 8
12th year ...	10						10
13th year ...	12	8					20
14th year ...	16	10					26
15th year ...	20	12	8				40
16th year ...	20	16	10				46
17th year ...	20	20	12	8			60
18th year ...	20	20	16	10			66
19th year ...	20	20	20	12	8		80
20th year ...	20	20	20	16	10		86
21st year ...	20	20	20	20	12	8	100
22nd year ...	20	20	20	20	16	10	106
23rd year ...	20	20	20	20	20	12	112
24th year ...	20	20	20	20	20	16	116
25th year ...	20	20	20	20	20	20	120
Grand Total ...							<u>996</u>

Add to this the income of the succeeding 11 years

1320

Thus the income for the whole period of 36 years is

Rs. 2316

If the present system of Kumri cultivation is continued without resorting to Hirda plantation, the cultivator would get on an average an income of Rs. 24/- per year from an area of one acre. (8 mds. of Nachani in the first year and 4 mds. of vari in the second year, the average yield being 6 mds. per year valued at Rs. 24). Taking for granted that on an average a family of cultivators in Maval takes an acre of land for Kumri cultivation, his income from this source remains steady at Rs. 24/- per year. If the land is used for Hirda plantation in the manner described above, the cultivator would be able in course of time to get income from 6 acres every year instead of from only one acre as in Kumri cultivation. For, the land has to be kept fallow for ten years in the latter case.

From the figures given in the table above, it will be clear that the cultivator would get Rs. 8 and 10 in the 11th and 12th year respectively in addition to his income from the Kumri plot. He ceases to get any income from Kumri cultivation from the 13th year and gets Rs. 20 from Hirda fruit in that year. The income however goes on increasing rapidly from the 15th year until it reaches the maximum in the 25th year of Rs. 120/- per year. This is five times his average income from Kumri cultivation.

As the Forest area which is proposed to be converted into Hirda plantations, belongs to the State, it is natural that it should get a share in the income from these plantations. Such a share cannot be reasonably recommended until the cultivator's income from Hirda plantations exceeds that from his Kumri plot. Such a stage comes from the fifteenth year onwards. In view of the part taken by the cultivator in establishing the plantations and the necessity of having some additional source of income to him, it is recommended that from the 15th to 18th year the cultivator should be given two-thirds of the income from Hirda plantations and the State should receive one third. From the 19th year onwards, the income should be divided half and half between the cultivator and the State. In giving effect to this project care will have to be taken to see that all families of cultivators in the village receive the benefit of the scheme on equitable basis.

The total area given for Kumri cultivation in Maval tract in the Fasli year of 1351 was 5660 acres. Equal area in a new place is required to be given every third year. Thus in 12 years' period, a total area of 33960 or roughly 34000 acres will have to be given for Kumri cultivation from Forest lands. In the new project all this would come under Hirda in the period of 12 years.

Regarding the revenue of the State from forest area, it may be pointed out that there will be no change in the income of the State during the first 12 years of the project. In the 13th and 14th years, however, the State will have to waive its land assessment on an area of 5660 acres. But this loss will be amply compensated by the far greater incomes accruing from the 15th year onwards. The total income of the State from the newly planted Hirda plantations in lands given out for Kumri would be as under :—

Year from the commencement of the project	Total annual income from the Hirda plantations in Kumri lands that the State would get as additional income over the present income
	Rs.
15th year	73,658
16th year	83,990
17th year	1,13,320
18th year	1,24,652
19th year	2,26,640
20th year	2,43,638
21st year	2,83,300
22nd year	3,00,296
23rd year	3,17,296
24th year	3,28,628
25th year	3,39,960

From the 25th year onwards the income of the State would be steady at the figure of Rs. 339960/-per year. This would accrue from the total area of 34000 acres in round numbers only, out of the total area of 72840 acres under forests in the four up-ghat talukas of the State. This means that nearly 46 per cent of the Forest area would come under this project and the remaining would be available for the usual uses like grazing, firewood, grass, rabbing material etc. In course of time when the Hirda plantations are fully established some grass would become available even in the Hirda plantation.

As these large amounts shown above would be additional income to the State largely resulting from the industry and co-operation of the people, it is but natural that a substantial part of this income should be utilised for the development of the Maval tract by constructing roads in all valleys, providing adequate supply of drinking water to all the villages, medical relief, schools, electric lighting of villages and such other amenities of life which would contribute to raising the standard of life of the rural population from the present standard of bare subsistence. So far as people are concerned their income would also be increased substantially which should enable them to improve their standard of living on their own account.

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## APPENDIX No. IX

## List of Leaflets of the Bombay Agricultural Department.

Useful for Bhor State.

Subject	Number of leaflet	Year of publication
<b>(1) Implements and Machinery.</b>		
1 Water-finding machine	20	1929
2 Iron Mhot for raising water	7	1927
3 Chaff cutters	4	1927
4 More economic water lifts in the Konkan	22	1927
5 Iron plough	7	1933
6 Implements recommended by the Agricultural Department, for Konkan	2	1927
7 Agricultural Machinery and Agricultural Engineering.	8	1927
<b>(2) Cultivation of Crops.</b>		
1 Onion cultivation in Konkan	4	1920
2 Rabi cultivation of chillies in the Konkan	11	1930
3 Sweet-potato cultivation in Konkan	2 (E) (Revised in 1937)	1923
4 Important hints on the cultivation of sugarcane	4	1922
5 Transplanting of permanent crops	5	1917
6 Cultivation of tobacco	3	1911
7 Cultivation of chillies	9	1929
8 Dry Farming in the Deccan.	25	1927
<b>(3) Manures and Manuring.</b>		
1 Manure for onions	4	1921

Appendix No. IX—( *Continued* )

Subject	Number of leaflet	Year of publication
2 Manure for potatoes	15	1929
3 Economic manures for garden crops in the North Konkan ( Applicable to Sudhagad Taluka )	8	1930
4 Green manuring with san	2	1911
5 Compost making	4	1936
6 Preservation of cattle urine as manure	6	1932
7 Poudrette as a valuable manure for sugarcane	17	1927
8 Pachat as manure for sugarcane	10	1937
9 A practical system of storing farm yard manure	10	1932
10 Sulphate of Ammonia as a field manure for rice crop	19	1927
11 Preparation of manure from sugarcane trash ( Pachat )	1	1939
12 The use of poudrette and town sweepings as manure for dry crops	10	1928
13 Use of crude nightsoil as manure	10	1915
14 Groundnut cake ( a valuable and cheap manure for sugarcane )	Special pamphlet No. 1	
15 Groundnut cake ( a cheap and effective manure for the rice crop )	Special pamphlet No. 2	
<b>(4) Improved seeds, seed selection and preservation.</b>		
1 Improved strains of Kolamba rice	9	1931
2 Improved Nagli varieties	11	1932



Appendix No. IX—( *Continued* )

Subject	No. of Leaflet	Year of publication
3 Pusa wheat	2	1935
4 Selection of Jowar seed	6	1936
5 Improved strains of wheat of the Bombay Presidency	2	1937
6 Improved strains of rice	1 (A)	1937
7 Sugarcane varieties for Deccan Canals	3 (E)	1940
8 Preservation of seed.	7	1929
<b>(5) Fruit cultivation.</b>		
1 Hints on fig cultivation	4	1929
2 How to grow papaya	1	1932
3 Treatment of wounds and cavities of old mango trees	4	1918
4 Selection of site for an orange orchard	5	1931
5 Treatment of the roots of fruit trees	9	1912
6 Method of field and orchard irrigation	3	1931
7 Useful hints for fruit growers in the Bombay Province	3	1941
8 Grafted and budded plants, their trans-planting and after-care	1	1938
9 Hints on grafting	4	1912
10 Improvement of lemon crop by budding	26	1927
11 Bor budding	2	1936
12 Plantain cultivation	3	1915
13 Coconut cultivation	14	1932
14 Pomegranate cultivation	2	1912

Appendix No. IX—( *Continued* )

Subject	No. of Leaflet	Year of publication
15 Treatment of mango plantation	14	1915
16 Grading of mangoes	1	1931
17 Cultivation of pine apples	8	1936
18 Home canning of fruits	4	1928
19 Bomboo baskets versus wooden cases for packing the mangoes	2	1930
<b>(6) Insect pests, diseases, small and large animals damaging crops</b>		
1 Smut on jowar	7	1937
2 Control of powdery mildew of peas	5	1933
3 Tambara disease of potato	2	1931
4 Bangadi disease of potato	8	1918
5 Potato worm and its control	1	1917
6 Beetles on vegetable vines	9	1930
7 Green fly or Aphis on plants	5	1932
8 Mango hoppers and mildew and their control	6	1930
9 Control of citrus gummosis	7	1931
10 Loranthus	4	1931
11 Some insecticides, fungicides and appliances	3	1933
12 Protection of crops from wild animals	5	1937
13 Pig killing to decrease damage to crops	12	1927
14 Devi disease on santra and Mosambi	2	1939
15 Destruction of field rats	1	1939

Appendix No. IX—( *Continued* )

Subject	No. of Leaflet	Year of publication
16 Control of powdery mildew of grape	6	1927
17 Control of Anthracnose of grape	1	1928
18 Economic method of controlling the pomegranate caterpillar	23	1927
19 Grape diseases in the Bombay Presidency	8	1931
<b>(7) Fodder and fodder crops</b>		
1 Guinea grass	5	1929
2 Silage making	2	1938
3 Lucerne: A valuable green fodder	14	1929
4 Hay its making and the use of mowing machine	9	1928
5 Chaffing karbee before storing	2	1918
<b>(8) Cattle, poultry and sheep</b>		
1 Feeding of poultry	19	1932
2 Importance of pure-bred bulls for breeding	4	1935
3 Sheep breeding and wool improvement	5	1940
4 Grading up of cattle	4	1941
5 General principles of cattle breeding	Third edition (Veterinary Department Leaflet)	
6 Castration of bulls	Second edition (Veterinary Department Leaflet)	

Appendix No. IX—( *Continued* )

Subject	No. of Leaflet	Year of publication
7 The tick proof perch ( for poultry )	11	1928
8 Groundnut cake ( a cheap and useful concentrated food for live stock )	Special Pamphlet No. 4	
9 How to feed cattle when at work	16	1932
10 How to feed cattle when in milk	17	1932
11 How to feed cattle when at rest	18	1932
<b>(9) Agricultural Education</b>		
1 Agricultural School ( Dhulia )	21	1926
2 Practical training in Horticulture at the Ganeshkhind Fruit Experiment Station, Kirkee	4	1937

## APPENDIX No. X

### List of Leaflets of the Bombay Veterinary Department on Diseases of Animals.

- 1 Rinder pest
- 2 Prevention of rinderpest by inoculation
- 3 Haemorrhagic Septicaemia, malignant sour throat  
(Galsuji, Galphula and Naradpe in Deccan)
- 4 Foot and mouth disease, Aphthous fever, Aphtha Epizootica  
(Lalkhurkut - Payalag - in Deccan)
- 5 Fracture of the horn
- 6 Black quarter, Black leg, Charbon symptomatic  
(Dhavara, Ghatya, Farva in Deccan)
- 7 Ring worm
- 8 Diarrhoea
- 9 Anthrax
- 10 Tympanites Hoven
- 11 Constipation
- 12 Ticks
- 13 Chocking
- 14 Maggots in wounds
- 15 Lice
- 16 Surra
- 17 Coccidiosis
- 18 Chicken Pox
- 19 Lice on birds
- 20 Ranikhet disease
- 21 Fowl cholera
- 22 Spirochaetosis
- 23 Nites
- 24 Ticks on poultry
- 25 Fleas
- 26 Roup
- 27 Internal parasites

## APPENDIX No. XI

### List of Leaflets of the Department of Public Health

- 1 Village sanitation
- 2 Guinea worm
- 3 Cholera

## जादा गॅसेट

वर्ष १२ वें ] भोर, ता. ३१ माहे जानेवारी सन १९४२ इसवी [ अंक २१ वा  
हु. मु. द. ठ. नं. १५

### दसरी ठराव

भोर संस्थानचा सर्व प्रदेश ब्रिटिश अंमलाखाली असलेल्या मुलुखानें वेष्टिलेला असून, ब्रिटिश हद्दीत ( मुंबई इलाख्यांत ) शेती सुधारलेल्या पद्धतीने करण्याचा उपक्रम शेतकरी-खात्याकडून होत असून, त्याचा फायदा तिकडील रयतेस होत आहे. संस्थानच्या शेतकऱ्यांसही अशा योजनेचा फायदा घेतां यावा म्हणून, संस्थानांतील सर्व तालुक्यांतील शेतीची परिस्थिति कशी आहे, याची पाहाणी करण्याकरितां त्या खात्यांतील तज्ज्ञ इसमाची नेमणूक केल्यास, परिस्थिति कळून कोणत्या योजना करतां येण्यासारख्या आहेत हें समजून येणार आहे.

शेती सुधारणें या विषयांत खालील गोष्टींचा अंतर्भाव होतो:-

- १ जमिनी सुधारणें
- २ जमिनी सुपीक कशा बनतील ?
- ३ सुधारलेल्या पद्धतीने व कमी मजुरीने शेती करणें
- ४ सुधारलेल्या पद्धतीने नांगरणी वगैरे करणें
- ५ सुधारलेल्या वेगवेगळ्या धान्यांच्या जातींचे उपयोग करणें.
- ६ पिकांवर कीड व रोग न होऊं देणें.
- ७ रानटी जनावरांपासून पिकांचें संरक्षण करणें.
- ८ बाजार-भावासंबंधी नियमितपणा.
- ९ जनावरांची सुधारणा व इतर घरगुती धंदे ( ग्रामोद्योगाच्या केन्द्रापैकीं ).

वर दर्शविलेल्या गोष्टींपैकीं कांहीं गोष्टी शेतकरी करित असले, तरी पद्धतशीरपणें त्या होत नसल्याने त्यांचा फायदा शेतकऱ्यांस मिळूं शकत नाहीं. अशी परिस्थिति असल्याने शेतकरी नाउमेद होऊन शेतीपासून त्यास मिळणारें उत्पन्नास तो पारखा होतो. ही परिस्थिति दूर व्हावी व शेतकऱ्यांस पद्धतशीरपणें शेतीचें शिक्षण मिळावें व सुधारलेल्या पद्धतीने त्यास शेती करितां येऊन योग्य तऱ्हेने फायदा मिळावा या हेतूने सर्व संस्थानची पाहाणी केल्यास, योग्य त्या योजना आखतां येऊन, शेती सुधारणा करितां येईल असें दिसत असल्यामुळे ही पाहाणी करण्याचें ठराविण्यांत येत आहे.

ही पाहाणी ( Survey ) करण्याचें मि. के. व्ही जोशी, एम्. एजी., रिटायर्ड डेप्युटी डायरेक्टर ऑफ रूरल डेव्हलपमेंट, पुणे, यांनीं आपले दोन सहकारी यांसह, दरवारचे विनंतीस मान देऊन, मोठ्या आनंदानें कबूल केलें आहे. तेव्हां वर दर्शविल्याप्रमाणें संबंध संस्थानची पाहाणी करण्याकरितां खाली लिहिलेल्या तज्ज्ञ सद्गृहस्थांची एक कमिटी नेमण्यांत येत आहे :

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वरील सर्व सदृगृहस्थ मुंबई इलाखा शेतकी खात्यांत काम करून रिटायर झाले असून त्यांना शेतकी खात्याचे पूर्ण ज्ञान व अनुभव आहे. ही कमिटी ता. १६ फेब्रुवारी सन १९४२ इ. चे सुमारास संस्थानांत पाहणी करण्याकरितां आपला दौरा सुरू करील. प्रत्येक तालुक्यांत सहा ६ दिवस याप्रमाणें, पांचही तालुक्यांत जाऊन पाहणी करून, एक महिन्यांत काम संपवील; व त्यानंतर कमिटीने शिफारसीचा रिपोर्ट करणेचा आहे. कमिटीचा रिपोर्ट ( १ ) शेती सुधारणा व ( २ ) ग्रामोद्धार ( Rural Development ) या दोन्हीबाबत असावा; व केलेल्या सूचना अमलांत आणण्याकरितां संस्थानचे परिस्थितीप्रमाणें खात्याची आंखणी सुरुवातीस कशी करावी याबद्दल रिपोर्टांत खुलासा असावा.

पाहणी होऊन कमिटीचा रिपोर्ट आल्यानंतर पुढील जरूर ती योजना आंखण्यांत येईल.

श्री. रा. रा. जोशा याच सूचनप्रमाण पाहणांचे कामी जरूर त्या पुढील तजविजी कराव्या व जरूर ते हुकूम द्यावे.

येणेप्रमाणें ठराविणेंत येत आहे. श्रीमंत सरकार राजे पंतसचिव भार संस्थान ता. ३१ जानेवारी १९४२ इ.

V. G. Ranade  
कौंसिलर

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दिवाण, सं. भोर

## प्रश्न-पत्रिका

अनुभविक शेतकरी व संस्थानच्या प्रगतीच्या दृष्टीने विचार केलेल्या सद्गृहस्थांनी उत्तरं द्यावीं.

१ तुमचे भागांत दरसाल पिकांना आणि फळझाडांना कोणकोणते किडे, रोग व उंदीर, खेकडे, रानडुकरें वगैरे त्रास देऊन नुकसानी करितात, ही माहिती पीकवार व फळझाडवार द्या. शक्य तर किड्यांचे व रोगाचे नमुने पाठवा.

२ भातशेतीत रब्बी हंगामांत वाल, हरबरा, मूग वगैरे कडधान्यांचीं पिकें काढतां काय ? जर नसाल, तर कां? हीं पिकें करण्याकरितां तुम्हांला कांहीं सोयी व मदत पाहिजे आहे काय ? रोही ( रुई ) व रानडुकरांपासून या पीकांना त्रास होतो काय ?

३ तुमच्या भागांत नदी अगर नाल्यांना फायदेशीर बंधारे अगर धरणें बांधण्या-सारखीं ठिकाणें आहेत काय? अशा धरणापासून किती एकर जमिनींत बागायती पिकें होऊं शकतील?

४ सालोसाल जमिनीचें किती फूल व मळी पावसानें वाहून जाते याचीं तुम्हांला कल्पना आहे काय ? ही वाहून जाणारी मातीची धूप थांबविण्याकरितां लोकांनीं काय उपाय योजिले आहेत? सार्वत्रिक बांधबंधण्या व ताली बांधण्याकरितां तुम्हांला कोणती व कशी मदत केली असतां हें काम होऊं शकेल?

५ रानडुकरांपासून तुमचे भागांत पिकांचें किती नुकसान होतें? व तीं पिकें कोणतीं? तसेंच, रोही कोणत्या पिकांची नासाडी करतात ?

६ विहिरींना मुबलक पाणी लागेल असे कांहीं भाग अगर ठिकाणें तुमच्या माहितीत आहेत काय ? अशा भागांतून विहिरी खणून बांधण्याकरितां तुम्हांला काय सोयी अगर मदत पाहिजे आहे ?

७ तुमच्या भागांत लोखंडी नांगराचा प्रसार झाला आहे काय? असे नांगर वापरून इच्छिणाऱ्यांना नांगर मिळावे म्हणून काय सोयी केल्या पाहिजेत ?

८ तुमच्या भागांत कोणतीं नवीं पिकें अगर फळझाडे होण्यासारखीं आहेत ? आणि त्याकरितां काय मदत पाहिजे ? सध्यां तुम्ही जीं पिकें लावतां त्यांपैकीं एकाद्या पिकाचें क्षेत्र वाढवावें असें तुम्हांला वाटतें काय ? व त्याकरितां कोणत्या सोयी व मदत पाहिजे ?



९ तुमच्या भागांत सर्वसाधारणपणे गुरांना कोणते रोग होतात ? व त्यावर तुम्ही काय इलाज करिता ?

१० शेतीचे कोणकोणते जोडधंदे शेतकरी लोक करितात ? उदाहरणे:—कोंबड्या पाळणे, दुमतीं जनावरे ठेवणे, दोर व टोपल्या करणे, रानांतून लांकडे वाहणे वगैरे.

११ शेजारच्या ब्रिटिश हद्दींत शेतकी खात्याने पिकांच्या ज्या सुधारलेल्या जातींचा फैलाव केलेला आहे, त्या जाती तुमचे भागांत लोकांनी लावून पाहिल्या आहेत काय ? आणि त्या फायदेशीर आहेत असे तुम्हांला वाटते काय ?

१२ तुमचे भागांतील शेतकरी सरासरीने किती जमीन लावतो ?

१३ भाटघर येथील इलेक्ट्रिक पॉवर हॉऊसमधून टाकण्यांत आलेले इलेक्ट्रिक लायनीस जोडून वीज मिळू शकेल. सबब, त्या भागांतील व शिरवळ प्रांतांतीलही शेतकऱ्यांस त्याचा फायदा शेती व इतर जोडधंद्याकडे करून घेतां येणार आहे. सदर बाबतींत कोणत्या योजना करतां येण्यासारख्या आहेत ?

## APPENDIX No. XIII

### Information to be furnished by each Taluka Officer.

- 1 Area in square miles of the taluka.
- 2 Number of villages including hamlets.
- 3 Areas under crops, uncultivated waste, assessed but not cultivated land, grass land, land under private forests and land under Government forests.
- 4 Areas under each of the different crops in the taluka.
- 5 Average rainfall, division of the taluka according to rainfall, crops and general topographical conditions.
- 6 Classification of cultivated area into lands of good, medium and poor soil. This information can be based on rates of land assessment.
- 7 Number of irrigation wells, drinking water wells, tanks, bandharas and deep water localities in rivers for irrigation.
- 8 What agricultural produce is exported outside the State?
- 9 What forest produce is exported out of the State?
- 10 Human population, males and females.
- 11 Average size of holdings and crops grown in the holding.
- 12 Number of cattle: plough bullocks, cows, she and he buffaloes, sheep and goats, poultry etc.
- 13 What is the number of carts in the taluka.
- 14 What is approximately the percentage of land owned by the cultivator himself and by the moneylender or absentee land-lord in the taluka.
- 15 What economic trees exist in the taluka like the mango, jambul, tamarind, sour lemon, avala etc. What fruit-gardens exist in the taluka and the areas under each; give names of important villages having fruit gardens.
- 16 What are the secondary occupations in the taluka followed by the agriculturists?
- 17 According to your general observations what particular developments of agriculture could be profitably encouraged in your taluka?

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