

Chapter VI - Recommendations to Achieve the target of  
Production of some major crops.

- Jowar.
- Bajra.
- Rice.
- Wheat.
- Pulses.
- Groundnut and other oil seeds.
- Sugarcane.
- Cotton.
- Forage Crops.
- Fruits and Vegetables.

Recommendations -

From the above conditions it is evident that the agricultural situation of even a well developed state as Maharashtra is far from satisfactory. Increase in agricultural production and productivity crucial key to the upliftment of the rural masses in Maharashtra. In addition regional unbalances in growth too can be reduced by development of the agricultural sector. Increased allocation for irrigation, development of appropriate only from Technology, and introduction of local HY variety seeds are the major areas where state Government can take positive measures. In addition we recommend the following crop-wise programmes which, if properly implemented will go a large way in increasing agricultural productivity in Maharashtra. Increase in area has limitations, therefore productivity per will have to be increased.

1) Jowar -

Both kharif and rabi jowar crops are grown under rainfed and water stress conditions and as such early, drought tolerant varieties would be desirable. Similarly appropriate production technology will have to be developed to stabilize high yield levels. The released hybride varieties are susceptible to some of the pests like shootfly, midge and diseases like charcoal rot, downy mildew and certain leaf spots. These diseases are posing problems for rapid

spread of these cultivars. It is therefore, necessary to develop new hybrid varieties that are resistant/tolerant to these pests and diseases. Work on grain quality aspects also needs to be considered in view of the importance of this crop in the common man's diet.

It is clear that the total jowar production is a function of two seasons, unlike other crops like wheat and gram which are restricted to one season. So the production of this crop will go up, if both these seasons are favourable.

Though the kharif area is low as compared to rabi, the kharif per hectare yields are nearly 1.5 times more than that of rabi; at present the spread high yielding varieties in kharif is only 20 percent and total kharif production is around 1.4 million tonnes. This kharif production can be considerably stepped up if 50 to 60 percent area is brought under high yielding varieties in the next few years. If this is done the per hectare yields can be raised by 2-3 times in this area, resulting in 0.7 to 0.8 million tonnes net increased in kharif production.

In the case of rabi, the coverage under high yielding varieties is very meagre. This was mainly due to the susceptibility of these varieties to pests and diseases. However with carbofuron seed treatment and minimum fertilization at planting (40 Kg N/hect.) time is now

possible to increase the area in rabi season also. So if 0.3 million hectares are brought under this treatment in areas where irrigation is possible and also an additional rainfed area of 0.3 to 0.4 million hectares under these hybrids it is possible to increase rabi production by 0.4 to 0.5 million tonnes so that rabi production can be stabilized at 1.8 to 1.9 million tonnes.

Black soil constitute the predominant class in which jowars are cultivated in Maharashtra. The soils and rainfall in this area have traditionally sustained single 150 days. Kharif or rabi jowar. A shift towards 100 days varieties in kharif or rabi opens up opportunities for better land use. More over in a year of sub-normal rain fall, early varieties provide insurance against drought and assure at least one successful crop. If rains are good a kharif crop could be ratooned or followed up with crops like safflower, sunflower, linseed etc. Similarly a rabi crop can be preceded by pulses like mung, urid etc. Double cropping is possible in command areas where kharif jowar could be followed by rabi wheat. A total varietal transformation has therefore, to be a first step to furnish the infra structure on which further increase and stability of production, avoidance of pests and opportunities for better use could be built up.

## 2) Bajra -

Since bajra is grown on medium to light soils under erratic monsoon conditions, a suitable production technology

would help in increasing the per hectare yields. Similarly the introduction and development of new early maturing hybrids possessing resistance/tolerance to the downy mildew and ergot diseases would go long way in increasing the yield levels of this crop.

The spread of bajra hybrids was also rapid but due to heavy incidence of downy mildew there was a temporary setback to their spread. This is also due to popularization and spread of only hybrids. It is therefore, necessary to have sufficient genetic diversity in the hybrids. So that they released for general cultivation. Two to three hybrids and similar number of synthetic would be desirable instead of relying up on just one or few hybrids. In view of this NHB-4; NHB-5 and hybrid combinations with 5054 A; 5141 A, 126 D2 A and L-111-A will have to be tested and suitable hybrid combination will have to be developed.

Since this crop is grown on marginal to medium soils under rainfed conditions the emphasis on early maturing (85-90 days) would be preferred.

Majority of the farmers cultivating bajra belong to the low income group which need credit facilities for purchasing inputs like seeds, fertilizers and insecticides. These will have to be provided well before the onset of rains. It will be convenient if such centres are opened in a group of 3-4 villages within the radius of 5 miles. If these inputs are provided in time and farmers are advised to plant

suitable varieties at the proper time with the basal fertilization of "N" it should not be very difficult to achieve the targetted production since farmers reaction to these hybrids is quite favourable.

### 3) Rice -

Despite the fact that first dwarf high yielding variety T(N)1 was introduced about a decade ago, followed by plethora of varieties developed under the All India Co-ordinated Rice Improvement-Programme the area covered under the new dwarf varieties in the state has not exceeded even 25 percent of total area under rice.

Even after a decade of trial of wide range of dwarf high yielding varieties in the state the farmers, the extension workers and the people still carry misconception that these varieties require large doses of fertilizers, special management and are more susceptible to pests and diseases.

Ample evidence is now available within and outside the country about the superior yield response of new dwarf rice compared to traditional tall varieties at all levels of fertilization within the dry and wet seasons.

Compared to the tall, the new varieties, due to their ability to utilise nitrogen more efficiently give nearly twice as many kilograms of grains for each Kg of

nitrogen applied even at moderate level of nitrogen. The straw production also runs almost parallel to the grain production in these high yielding varieties.

Rice is the most responsive and productive crop. Similarly rice cultivation is labour intensive and efforts to increase the area under paddy cultivation particularly in non-traditional areas where water is available by wells, tanks and canals as well as under the new command areas would positively ensure higher level of man power utilization for larger period with substantial increase in rice production.

#### 4) Wheat -

The food consumption pattern in Maharashtra shows that the state population of 5 crores requires 9.0 million tonnes of cereals of which wheat accounts for about 1.15 million tonnes. Thus the deficit of wheat as it exists today amounts to about 0.7 million tonnes. The requirement of wheat during the next 15 years based on the probable increase in the population and improvement in dietary habits is expected to be of the order of 2.04 million tonnes. To meet these increasing requirements we have to make stupendous efforts as follows -

a) Breeding - The major objectives before the plant breeder will be to develop varieties that have a more stable resistance for the rusts. It is therefore desirable to breed for horizontal resistance and develop varieties which combine resistance from diverse sources. There is a need to

increase the number of H.Y.V. of wheat, so that large areas are not saturated with single variety. The old traditional varieties grown for quality with lower yield and high susceptibility to rust must be eliminated. The notion that only durum have good grain quality and drought resistance is not quite correct. Since some aestivum varieties like N1 5643 produce very good grain and varieties like N1 747-19 and N1 5639 are suitable for rainfed areas, these should be popularised.

Varieties suitable for rainfed areas need to be developed by undertaking programme in wheat X Rye and spring whear X winter wheat.

b) Cropping pattern -

There is a considerable scope for bringing new area under wheat cultivation in Thane, Kulaba, Ratnagiri, Chandrapur and Bhandara districts after paddy in place of Legumes. Rainfed wheat does not pay especially in the absence of late rains in the months of September-October. In such cases the vacated wheat area can be brought under crops like safflower or sunflower.

c) Loan and Credit Facilities -

Though the technological advances are important, they alone cannot solve many of our agricultural problems. Agriculture alone cannot be viewed in isolation from our overall economic growth, which has important implication for



the purchasing power of our people and also the price that the farmer gets for his produce. Loans should, therefore be extended for needy wheat growers and his produce should be purchased at a reasonable price so that he can repay the loans.

5) Pulses -

As a result of earlier work done Arhar (tur) varieties N-84; No-148; C-11; Kanpur-132; P.T.-301; N.290-21; and N-282-7 have been released for different regions. However, these varieties have failed to make adequate impact on total production because of their low productivity and susceptibility to wilt diseases. With the enlargement in gene pool, however, material with higher productivity and high harvest index have been developed and are available. The varieties such as Pusa agati; Prabhat are early with synchronous flowering. Low yield of pulses in Maharashtra can be attributed to the following causes.

- 1) Lack of early maturing high yielding varieties.
- 2) Narrow genetic base with which the earlier research work was carried out.
- 3) Limited use of inputs.
- 4) Absence of improved package of practices.
- 5) Inadequate control of pests and disease and absence of resistant varieties.
- 6) Growing pulses on marginal and sub marginal land.

To overcome these and to increase the production of pulses we have to observe the following-

1) Growing of gram under irrigation in the command area of new projects will bring a substantial increase in its production.

2) Few early varieties of tur with synchronous flowering are available. These varieties would also fit well in multiple cropping pattern.

3) Cultivation of summer moong with suitable varieties needs to be increased.

6) Groundnut and other oilseeds -

In the past bunchy type varieties i.e. Kopergaon-3; AK-12-24; SB-11; and Semispreading varieties Kopergaon-1; AK-10 and spreading variety Karad 4-11 were evolved and are popular within the farmers in Maharashtra.

TMV-10 and M-13 semispreading types and spreading types respectively are likely to be released to replace Kopergaon 7, and Karad 4-11 respectively in the near future.

For getting maximum per hectare yield it is essential to ensure the non-cash inputs likely timely sowing, optimum plant population in addition to cash inputs like fertilizers especially phosphate lately use of bacterial cultures has shown promise.

The erratic seasonal conditions such as late onset of monsoon, long dry spell varying from 3 to 6 weeks, affect both the area under crop and yield per unit area. Therefore it is necessary to bring some of the area under major, medium and minor irrigation projects. Well irrigation and lift irrigation schemes could also be used for growing groundnut as a light irrigated crop.

One or two protective irrigations during long dry spell at the time of flowering and peg formation stages would save the crop and increase the yields to extent of 50 percent. Pre-monsoon sowing of spreading types in the first week of June with a presoaking irrigation is also advantageous and yield increases of 50 to 60 percent.

The multiplication factor in groundnut is very low (about 8) due to which spread of improved varieties has not been rapid. Therefore; in order to bring about a rapid spread of these varieties it is necessary to plan and execute a systematic seed production procurement and distribution programme in the state.

It may be possible to take groundnut as a mixed crop with Sorghum in Kharif and also in summer as a irrigated crop under canals or well irrigation would help in bringing more area under the crop with increased production.

Rainfed wheat is a high risk low yield crop while safflower is a low risk high yield crop. It is therefore,

logical to make attempts to replace rainfed wheat by safflower since the water requirement of safflower reduces as the crop advances in growth. In contrast in the case of wheat the water requirement increases as the crop advances in growth.

At present, the all India percapita perday consumption of vegetable oil is 10 grams, while it is 14 grams in Maharashtra. Production of vegetable oil can be increased by 0.29 million tonnes during the year 1980-90 by adopting the following measures.

- 1) Bringing more area under summer groundnut.
- 2) Using high yielding and high oil containing improved varieties.
- 3) Replacing wheat gradually by safflower.
- 4) Following package of improved practices.
- 5) Crushing 75 percent of cotton seeds in the state with 16 percent recovery of oil.
- 6) Exploring the possibility of growing African oil palm along with western coast.
- 7) Bringing about 50,000 hectares under sunflower.
- 8) Replacing rice hullers by sheller hullers and utilizing the quality rice bran for extracting edible oil with 15 percent recovery.
- 9) Exploring the possibility of growing on large scale other oilseed crops such as rape and mustard.

In addition to above measures non edible oils of forest trees like Mahwa, (Madhuca indica); Neem (Azadirachta indica); Karanji (Pongamia pinnata); Kokam (Garcinia indica); Sal (Shorea robusta); Undi (Calophyllum inophyllum) etc. which can very well replace part of the edible oil like groundnut oil for industrial uses in the production of soap and cosmetics.

#### 7) Sugarcane -

An intensive system of cropping is being adopted in Deccan canal area. The main system of cropping is Adkali while only one variety CO 740 covers more than 90 percent of area under cane in Deccan canal Area. Even though very high yield reports have been established for this region, the average sugarcane yield per hectare in DCA does not exceed 100 tonnes per hectare. It is possible to rise this to 150 tonnes per hectare within 5 to 10 years to meet the growing demand of new established sugar factories.

With the completion of new irrigation projects in the state new areas are being brought under sugarcane cultivation. In the past only plant cane was being grown without reference to the variety. Time has come to introduce Adkali system of planting in these regions also and test simultaneously new varieties which have shown promise. The average sugarcane yield in some parts of the state does not exceed 70 tonnes/ha. It is necessary to raise this level to 90 to 100 M.T./ha.

during next few years by growing a suitable varieties and adopting improved package of practices.

In the Kolhapur region, the soil and climate are very favourable for cane growth and cultivators mostly depend on lift irrigation. For a short period the plant crop remains submerged in flood water. It is necessary to evolve varieties which have less water requirement and at the same time which can with stand flood conditions. The yield potential in Kolhapur region is quite high and with proper use resources available the average yield level can be easily raised from 100 to 150 MT./ha.

There is a scope for raising the average recovery level to 12 percent by adopting suitable management practices, maturity harvest and varietal planting. This is feasible that Maharashtra can produce 2.00 tonnes of sugar even from the existing land.

CO-740 covers nearly goy area in DcA. It is highly susceptible to smut disease resulting in reduction in yield by 15 to 20 percent. Use of the disease free seed (hot water treated) and iminidate roughing in the field can help in avoiding this loss considerably.

Irrigation on the basis of pan evaporation factor and use of mulch increases the possibility of raising sugarcane crop with minimum water.

Due to the prohibitive cost of manuring, majority of the people resort only on the nitrogenous manuring. Blanced use of NPK fertilizers with adoption of new technology can not only reduce the cost of manuring but raise the sugarcane and sugar yield considerably.

The use of healthy vigorous seed contributes nearly 40 to 50 percent towards better production. At present primary seed nurseries are inadequate which must be raised to meet the demands of the sugarcane growers at large from each region.

Few varieties have been identified as resistant to smut. Even though they are comparatively lower in their tonnage yield potential is compared with CO 740 in the long run, they give higher tonnage due to low disease incidence.

Drying at cane after harvest before crushing induces adverse effects. Quick transport and demarkation of zones for each factory with due rigidity will go a long way in reducing the loss in cane weight and sugar recovery at the factory.

#### 8) Cotton -

The reasons of low yields of cotton are -

- 1) Nearly 98 percent area is grown in rainfed conditions
- 2) About 33 percent of rainfed cotton is grown on marginal and sub-marginal soil. Therefore, the contribution to the production is negligible.

3) Lack of short duration high yielding varieties of cotton with deep root system suitable for rainfed area.

4) Inadequate plant protection measures. Due to meagre control of pests and diseases, the full benefits of timely rainfall and use of other inputs are not often achieved.

5) Low plant population due to poor quality seeds and seedling mortality.

6) Heavy weeds infestation reduces the yield.

7) Inadequate fertilizer application.

8) Insufficient water management and poor drainage in heavy soils.

9) Reddening of leaves due to various causes.

In such situation following measures will be helpful to increase the production and productivity of cotton in Maharashtra.

A) Area under irrigated cotton can easily be increased to about 0.35 million hectares during ensuing ten years. This additional hectareage will add about 0.55 million bales. With the development of shorter duration varieties it is possible to grow a crop of wheat following irrigated cotton. One more advantage is that nearly double the area of irrigated cotton or 0.4 million hectares under rainfed cotton could probably be shifted to crops like safflower, sunflower and bajara thereby increasing food and oil seed production.



B) Organisation of well planned varietal improvement programmes for the different agroclimatic zones.

C) To formulate suitable package of practices for better crop production.

D) Organising efficient seed production, processing and distribution programmes.

E) Research on post harvest technology of cotton.

9) Forage -

With the present limitations of the livestock dispersed over the vast area of the state and limited land available for grazing and forage production it would be unwise to diffuse the efforts of livestock improvement practice over a scattered area. It is therefore, desirable to concentrate on the package improvement practice for livestock development in suitable selected areas. These would serve as nuclei for further improvement of livestock industry in state.

Marginal lands which are fallow and such other lands which are used for non-remunerative crops such as bajra could be diverted with advantage for forage production. In these areas mixed farming would help in turn to improve the status of soil fertility.

10) Fruits and Vegetables -

Fruits and vegetables not only play an important role in human diet but their per hectare production of economic returns and nutritional values are also high. Maharashtra is one of the ideal states in the peninsular India for the cultivation of number of fruits and vegetables. Unfortunately, the available Potential for fruit culture provided by nature has not been exploited to the fullest extent in the state. This consequently resulted into low fruit production and eventually the cost of fruits and vegetables are high in the market. Reviewing the present figures of fruit export from the country, it is seen that in the year 1972-73 the tropical and sub-tropical fruits fetched a foreign exchange equivalent to Rs.70 crores as against Rs.3 crores from temperate fruits. This clearly indicates that there is a great scope for future development in this group of crops.

Maharashtra's soils and climate are the greatest assets for fruits and vegetable culture. Since workas land of Konkan region, are ideal for new orchyards of mango and Cashewnut, large areas under this crop can be brought under cultivation. The technique of veneer grafting of grafting in situ, standardised at Dapoli will certainly expedite facilitate the establishment of new mango orchyard on workas lands of Konkan. Similarly, in Konkan region there is considerable scope for extension of areas in fruit crops such as pineapple, coconut arecanut and spice crops.

Maharashtra is one of the leading states in country in acreage and production of grapes and bananas. Establishment of wine resin and banana powder industries will definitely provide the impetus for extension of areas under these crops. The state is very famous for the production of quality citrus fruit crops. Mandari oranges from Nagpur are famous all over the world.

There is a great scope for extending production of these crops in the nearer regions of western Maharashtra and Marathwada under the command of new irrigation projects. Guava is extensively grown in Maharashtra. Its cultivation more or less is distributed around the cities. The crop being very adaptable, its cultivation could be extended to suitable areas in the state. Chiku is another fruit crop whose cultivation can be extended both in Konkan as well as in suitable pockets in the state. The plant gives the heavy fruit yield and its economic life is quite high. Although a variety of vegetable crops can be grown in Maharashtra, the cultivation is restricted on account of unorganised marketing system, lack of suitable and quick transport. Vegetables such as onions, tomato, pea etc. can be grown in newer areas under the command of new irrigation projects. Onion and tomato have a great commercial potential as the climate of the state is very suitable for their heavy yields under intensive cultivation. A variety of beans which are very rich in proteins can be introduced in newer regions, since they not only contribute proteins

proteins at a higher rate but also enrich the soil.

In marginal and sub marginal areas of drier regions, fruit crops such as amla, phalsa, annonas, karwand, jambul, ber, tamarind can be successfully introduced. Similarly, vegetables such as chillies gower and some leafy vegetables can be grown in these areas.

A very congenial climate for the cultivation of variety of floricultural crops exists in the state, Flowers such as rose crysanthemum, thberose, jasmine, lilies, carnations, crossandra, gardania and magnolia can be grown in the state. Mahabaleshwar and Lonawala areas possess tremendous scope for growing a variety of roses; orchyards, carnations and gladiolus.

Market and marketing for fruits and vegetable is one of the important constraints. Absence of regulated markets leads to instability of market prices. Which discourage the growers from involving themselves in programme of fruit and vegetable production . Price incentive and price guarantee is a must for boosting the horticultural production.

It is well known that for increased production in horticultural crops, adequate and timely irrigation is a must. Irrigation schedules as laid down by the irrigation department are not compatible to the irrigation requirements of horticultural crops. It is therefore suggested that the irrigation schedule ofor horticultural crops should be fixed

by taking in consideration the water requirements of the crops.

Transport is another bottleneck. If production centres are to be extended in the interior pockets a quick and regular transport is necessary. A sense of a network of all weather roads in rural areas, act as a great handicap for agricultural production in general and in the production of horticultural crops in particular.

Processing industries engaged in preservation of fruits and vegetables are too inadequate in the state. In view of heavy demand of processed fruits and vegetables in the foreign market, establishment of processing industries in the production centres will go a long way in boosting the horticultural production and productivity.

This will help in earning foreign exchange and also will provide the preserved fruits and vegetables in off season for domestic markets.

Most of the horticultural crops being perishable need specialized storage facilities until the produce is sent to the market. For this a large number of cold storage in the production centres are to be established. It is just possible that the services of cold storage facilities will not be utilised to the fullest extent in the bearing. But presence of such facilities will encourage the growers to take up the production programme in the horticultural crops.



General Suggestions -

1) Success of the intensive cultivation and H.Y.V. programme depends mainly on the timely supply of inputs in adequate qualities. The rate of H.Y.V. in wheat is encouraging while in other crops this speed is rather low and coverage of area is limited. In most of the crops, such H.Y.V./hybrids are now available and efforts are under way to remove intrinsic weaknesses in these v/hybrids. It is therefore absolutely essential to increase the speed of adoption of these H.Y.V. so that at least 55 to 60 percent of the area under crop is covered within the next few years.

2) In spite of advanced crop production technology available to the farmers in Maharashtra to-day the implementation of the improved technology is impeded due to socioeconomic conditions of majority of the farming community. In addition the land under cultivation which forms the very basis of all these improvements needs development. For this purpose we may cite the example of advanced countries like Japan where farmers have organised multipurpose service co-operatives. These agencies provide the farmers with the equipment necessary right from land shaping, preparatory tillage, plant protection upto post harvest processing machinery. Such a network has to be initiated and nourished so that the production of all agricultural crops is boosted up steadily and stabilised.

3) In the tropics, due to favourable temperature and ample sunshine climatic conditions are congenial for a round year farming. By the same token the conditions for the built up of pests and diseases are favourable posing a threat to productivity of majority of crops.

With the introduction of hybrids and H.Y.V.S. of important crops like wheat, rice, jowar, bajra, cotton, groundnut etc. involving optimum input intensives management under the round cultivation, changed plant architect and crop geometry, the pest disease and weed problem has become very formidable. It is, absolute necessary to establish pest and disease servillance organisation on. Priority basis so that farmers get assured on the spot remedial measures. Such a forecasting advice for undertaking prophylatic measures have definite advantage over preventive measures.

4) An estimated 66 percent of the farming community in the state belongs to the small and marginal holding category. These farmers can neither afford nor plan undertaking of timely plant protection for the crop. This is a serious lacuna and in all such cases a custom service to provide plant protection on community basis over contignous area at the state expense merits consideration. Such a community approach is absolutely necessary since pests and diseases spread from plot in a crop community.

5) The present mechanism for effective transfer of available technology to the small and marginal farmers is not effective. The right knowledge should reach the right type of people at the appropriate time and place. The personnel involved in extension should be capable of identifying the local problem that can promote co-operative efforts in the area. These personnel need periodical training with a view to keeping them abreast with the latest knowledge of production technology. In addition farm extension services of the agricultural universities should be reoriented so that they reach the small and middle farmers.

6) In an advanced state like Punjab the ratio of farmers and extension workers is much narrower as compared to Maharashtra. This has a direct bearing on the transfer of improved production technology to the farmers. It is therefore essential to increase the personnel and to streamline the extension organisation so that latest research findings in agriculture are quickly and readily passed on to the farming community.



Agricultural Planning -

Prof. V. M. Dandekar has pointed out that planning for agricultural production in India based on centrally planned targets was unrealistic. This is so, because decisions in agricultural production are, in final analysis, taken by millions of farmers scattered far and wide. Further, with highly diversified and variable agroclimatic conditions, it is not possible to lay down a set of rules for instant adoption, by all farmers, although such a procedure may hold good under conditions where all the variables including the use of land is controlled by a central planning authority. In the absence of this, target oriented approach fails, as it has in India.

Therefore it is suggested that-

- 1) An all out effort be made to create an environment congenial for furthering agricultural growth. These measures include the availability of high-pay-off- inputs, creating a adequate infrastructure, adoption of favourably price policy etc.
- 2) Educating the farmer so that he can aequire adequate skills for adopting modern technology.
- 3) More emphasis be given in evolving efficient methods for motivating the farmers for wider adoption of improved technology.
- 4) Where crop production is risky under dry land farming, crop insurance may be considered.