



Maharashtra State

**MAHARASHTRA WATER SECTOR
IMPROVEMENT PROJECT**

**PROPOSAL FOR
AGRICULTURAL SUPPORT SERVICES COMPONENT**



DEPARTMENT OF AGRICULTURE,
MAHARASHTRA STATE

NOV 5,2004

INDEX

Sr.No	Title	Page
1	Background	3-18
2	Lesson learnt from ongoing and previous project	18-20
3	Agricultural support services component	21-22
4	Component Activities	22-27
5	Organizational implementation arrangements	27-33
6	Design features	33-45
7	Sub component and estimated cost	45-62
8	Annexures	
	1) List and location of irrigation schemes and their cultivable command areas	63-68
	2) List of irrigation projects to be taken for agriculture demonstrations	69-70
	3-4) Composition and terms and reference of Village Support Group and Krishi Vigyan Mandal	71-72
	5) Districtwise area in existing and proposed ATAMA district	73
	6-7) Agricultural Technology Management Agency (ATMA) Governing Board and Management committee.	74-77
	8) Compositions and term of references of the state Policy Support Group (PSG)	78
	9) Financial statements for	
	a) Establishment of Village Support Group (VSG)	79-80
	b) Training of manpower with line departments, extension service providers and farmers	81-22
	c) Demonstration of improved technologies	83-84
	d) Strengthening of Agro polyclinics, SAEMTI and RAEMTI	85-86
	e) Mainstreaming of ATMA model for agricultural support services	87-88
	f) Agro entrepreneurship development through implementation of innovative project.	89-90
	g) Project Co-ordination Unit (PCU)	91-92
	h) Summary of estimated component cost	93
	i) Yearwise estimated cost	94
	j) Implementation arrangements chart	95
	k) Flow of funds chart	96
	l) Yearwise / quarterwise shedule for completion of different activities	97-101

PROPOSAL
FOR
MAHARASHTRA WATER SECTOR IMPROVEMENT PROJECT
AGRICULTURAL SUPPORT SERVICES COMPONENT

A. BACKGROUND

The agricultural sector remains an important contributor to the gross domestic product of Maharashtra, and irrigation is increasingly becoming a critical factor for increased crop production. Significant increase of agricultural productivity, farm income and rural employment would contribute to poverty reduction in rural areas of the state, where the vast majority of the poor reside.

The Bank's Country Assistance Strategy (CAS) for India places high priority on providing comprehensive support to institutional reforms, poverty alleviation, social and environmental improvement and the promotion of private sector development. For the rural sector in particular, the CAS supports institutional reforms and related programmes that will foster sustainable agricultural growth and rural development, thus enabling the sector to contribute more effectively to economic growth and reduction of poverty in rural areas.

The government's strategy highlights the need for a comprehensive development programme, which would require long-term commitment by the government and financial agencies. The proposed agriculture component aims at strengthening this strategy by addressing in a comprehensive manner the weaknesses of agricultural support services in irrigated areas. In introducing an innovative institutional arrangement for service delivery, the component would attempt to break the sector's vicious cycle of poor performance, low productivity and insufficient farm income.

Agriculture in Maharashtra. Agriculture plays an important role in the state's economy since more than 65% of the population depend on it for their livelihood. In recent years the relative contribution of agriculture to the State's GDP has decreased with consequent increase in rural poverty and migration of landless individuals from villages to towns and cities.

In 1998/99, the area under cultivation (17.8 million ha) occupied 58% of the total physical area of the state (30.8 million ha). In the same year the total irrigated area in Maharashtra (3.9 million ha) was only 18% of the gross cultivated area (21.6 million ha), while the potential area suitable for irrigation was estimated at 9.7 million ha. The average cropping intensity in the state is about 121%. Food crops, including cereals and

pulses, occupy 13.4 million ha (62 % of the gross cultivated area), while sugarcane and cotton occupy 3.8 million ha (18% of gross cropped area). The most important kharif crops are sorghum, millets and rice among the cereals, and grams and pigeon pea within the pulses. Wheat is the major cereal crop grown in the rabi season, while grams are the most important pulse crops. Oil seed crops such as soybean, groundnut, sesame and mustard occupy large areas during kharif season, while sunflower is a common oil seed crop in the rabi season.

The agricultural productivity of Maharashtra is generally low as compared to the national averages of various crops. This can be attributed to limited area under irrigation, low natural fertility of soils, large extend of degraded land, large areas prone to recurrent drought, and low rate of adoption of improved soil and crop management practices. There is weak coordination between canal operation schedule and agricultural production plans in the irrigated areas. Farmers have a low rate of participation in the planning and management of the irrigation systems. Delivery of support services for water use and crop production is generally inadequate. On the other hand, the State has outstanding agricultural education and research institutions both in the private and public sectors, as well as diverse agro-ecological conditions. Experience shows that agricultural progress provides the best safety net against hunger and poverty. Rapid progress can be made to improve productivity, profitability and sustainability of farming systems, if technology development is complemented by proper agricultural policies

Growth in agriculture should be based on firm agro-ecological foundations through sustainable use of natural resources and agro-diversity, promotion and improvement of traditional agricultural knowledge, efficient use of farm residues, maintenance and improvement of watersheds, efficient water harvesting methods, and proper on-farm water management. These objectives would only be achieved with concerted efforts of farming communities and relevant development agencies.

In December 2002 the Agriculture Department of Maharashtra established a high level committee to prepare an action plan for development of agriculture in the State. The committee has proposed that a labour intensive agriculture development should be the basis for the State's increased economic growth, provided that institutional structures are developed to support small producers in the production and post-harvest phases. Agricultural development can be accelerated if there is a systems approach to production with due attention to marketing. The committee has reported a number of cases of progressive farmers that may be scaled up to larger areas. They concluded that future development of agriculture in Maharashtra would be based on innovations that would assure increased productivity, enforce norms that promote high quality and proper standards, protect the environment, and lead to financial profitability and sustainability of farm operations.

The committee envisaged that significant gain in productivity would be achieved through optimum utilization of water, introduction of new high yielding hybrid varieties, adoption of IPM and INM technologies, increased efficiency in the use of production inputs, and effective production and dissemination of improved crop management practices. The sustainability and expansion of gains in productivity and profitability would come about as a result of the effective integration between producers, consumers, processors and exporters.

Location. Maharashtra is the third largest state in India, occupying approximately 9.4% of the geographical area of the country with a rural population of more than 52 million inhabitants (58% of the total population). It is bounded by the Arabian Sea in the West, Gujarat in the Northwest, Madhya Pradesh in the North, Andhra Pradesh in the Southeast, and Karnataka and Goa in the South. The state is divided in six main regions (Konkan, Pune, Nashik, Amravati, Aurangabad and Nagpur), 33 Districts, 326 Talukas (Tehsils), and 42,778 villages, of which approximately 7,000 are located in command areas of irrigation schemes.

Topography. The topography of Maharashtra is characterized by a narrow coastal plain that separates the Arabian Sea from the Western Ghat Mountains. On the eastern side of the mountains the climate is drier and the topography is characterized by a large plateau formed by a series of table-lands that occupy most of the central part of the state. The State is divided into nine agro-climatic zones differentiated mostly by the rainfall, soil and cropping patterns. The western coastal plains have high rainfall, followed eastward by the ghat mountain zone, the transition zone, and the drought prone zones. The eastern zones are again characterized by moderate to high rainfall patterns.

Climate. The rainfall patterns in Maharashtra vary considerably. The area west of the Ghat Mountains receives very heavy monsoon rains with an annual average of more than 3,000 mm. However, just 150 km to the east, in the rain shadow of the mountain range, or the drought prone area (DPAP), only 500-700 mm/year will fall, and long dry spells are common occurrence. Average annual rainfall in the state is 1,181 mm and 75% of it is received during the southwest monsoon in June-September.

There are three distinct cropping seasons in Maharashtra: Summer season (March to mid of June); Rainy (kharif) season (middle June to September); and Winter (rabi) season (October to February). The southwest monsoon usually begins in the last week of June and lasts till mid September. Pre-monsoon showers begin towards the middle of June and post monsoon rains occasionally occur in October. The highest average monthly rainfall is during July and August. In the winter season there maybe a little rainfall associated with western winds over the region. In recent years, decreased rainfall has been observed in the southwest monsoon and increased rainfall in the post monsoon season, which has determined changes in the normal

planting time of kharif crops. Proper crop planning should consider the differences in agro-climatic zones and relevant contingency plans should be developed for various moisture availability scenarios.

Temperature. Marked variation in diurnal and seasonal range of temperatures occurs in the state. The month of March marks the beginning of the summer and the temperature rises steadily until June, when the monsoon starts. In the central plains summer temperatures will vary between 40-45 degrees Celsius. May is usually the warmest and January the coldest months of the year. The winter season lasts until February with lower temperatures occurring in December and January.

Soils : The major soils of Maharashtra are classified in the following types: (i) light black coarse shallow soils occurring in central high elevations; (ii) medium black soils occurring in central plateaus; (iii) deep black soils occurring in central river valleys; (iv) reddish brown soils occurring in western hill slopes; (v) alluvial soils occurring in western coastal areas; (vi) yellowish brown soils of mixed origin occurring in high elevations in the east; (vii) yellowish brown soils occurring in eastern plateaus; (viii) lateritic soils occurring in western coastal areas; and (ix) saline soils occurring in the western Konkan region.

Agro-climatic zones: The state has been divided into nine agro-climatic zones on the basis of geographical location, rainfall pattern, soil types, and cropping patterns (**Table 1**).

Crop varieties. There are a large number of recommended varieties of major crops available for cultivation in all agro-ecological regions of Maharashtra. Some varieties are adapted to a range of environments, while others perform better under specific conditions. In the rabi season, under irrigation, recommended varieties of wheat are: Kalyansona, Sonalika and Malavika; for rabi sorghum, recommended varieties are: M35-1 and CVS7R. Under rainfed conditions with supplementary irrigation in the kharif season, recommended varieties of rice are: Jaya, Sona, Ratna, Masuri, IR8, and HMT-Sona for sorghum, common hybrids are: CSH-9, CSH-11 and hybrids from private sector; for pearl millet, recommended varieties are: ICTP-8203, Shraddha, Saburi & from private sector; common varieties of black gram are: T-9, and TAU-1. Due to several years of reseeded, without proper selection, some of these varieties have become less adapted to specific environmental conditions and

less tolerant to pests and diseases and should be replaced. New varieties are constantly being produced by the state research institutions, and are released after being tested in farmers fields

Table 1. Characteristics of the main agro-climatic zones of Maharashtra.

Zone	Districts	Characteristics
North Kokan	Thane, Raigad	Very high rainfall in excess of 3,000 mm/year. High humidity in rainy season. Temperatures range between 22 – 30 degrees Celsius. Coarse

coastal plain		alluvial non-lateritic soils poor in phosphorus and potassium. Rice is major crop. Vegetables and pulses also important. Small forest cover remains.
South Kokan coastal plain	Ratnagiri, Sindhudurg	Very high rainfall in excess of 3,000 mm/year. Precipitation dictated by S-W monsoon from June to September. Temperatures range from 20-30 degrees Celsius. May is the hottest month. Coastal alluvial lateritic soils rich in nitrogen and potassium and poor in phosphorus. Rice is major crop. Fruit trees also important.
Western Ghat mountain zone	Kolhapur, Satara, Pune, Ahmednagar, Nasik, Sindhudurg	Very narrow strip of highlands extending from North to South along the crest of the Sahyadri mountain range. Altitude varies from 1,000 to 2,000 masl. Very high rainfall in some areas in excess of 4,000 mm/year. Daily temperatures range from 30 to 40 degrees Celsius. Lateritic reddish brown soils low in phosphorus and potassium. About 25% area is under forest. Rice, sorghum, groundnut and fruit trees are important crops.
Sub-mountain transition zone I	Nasik, Pune, Satara, Sangli, Kolhapur	Narrow strip of lower elevation located in the eastern side of the Sahyadri range. Very wide range of rainfall varying from 700 to 2,500 mm/year dictated by the S-W monsoon. Day temperatures vary from 28 to 35 degrees Celsius. Soils are reddish brown to black, rich in nitrogen and poor in phosphorus. Important crops are kharif cereals, groundnut, sugarcane, vegetables, chillies and fruit trees.
Western plain transition zone II	Dhule, Ahmednagar, Sangli, Nasik, Pune, Satara, Kolhapur	Mostly a plain strip running North-South parallel to the eastern side of Transition zone I. Rainfall varies from 700 to 1,200 mm/year well distributed during the S-W monsoon. Maximum temperature will reach 40 degrees Celsius in the summer. Soils are generally light black, fair levels of NPK, well drained and suited for irrigation. Major crops are sorghum, millet, groundnut, wheat and sugarcane.
Western drought prone area	Dhule, Nasik, Aurangabad, Ahmednagar, Pune, Satara, Solapur, Sangli	Characterized by low and unpredictable rainfall of 500 to 700 mm/year in 40-45 days. Common dry spells will last from 2 to 10 weeks. Delayed onset and early cessation of S-W monsoon is very common. Summer temperatures will reach above 42 degrees Celsius. Soils are medium black vertisoils, coarse, shallow, poor in nitrogen and phosphorus. Common crops are millet, sorghum, groundnut and pulses. Yields are low.
Central	Aurangabad,	Large plateau covering the central part of the state. Well distributed

plateau assured rainfall	Jalna, Beed, Osmanabad, Parbhani, Nanded, Buldhana, Akola, Amravati, Jalgaon, Dhule, Solapur	rainfall of 700 to 900 mm/year dictated by the S-W monsoon. Summer temperature will reach about 40 degrees Celsius. Soils are vertisoils and entisoils varying from medium black to reddish brown. Sorghum is the most important crop, but cotton, oilseeds, millet, groundnut, pulses and sugarcane occupy significant areas.
Central Vidarbha moderate rainfall	Wardha, Nagpur, Yavatmal, Chandrapur, Aurangabad, Jalna, Parbhani, Nanded,	Rainfall of 1,200 mm/year well distributed within the S-W monsoon months. Maximum temperatures of 35-40 degrees Celsius in the summer. Humidity of about 75% in the rainy season. Soils are black derived from basalt rock, medium to heavy texture, and generally fertile. Cropping patterns involve cotton, sorghum, pulses, wheat and oilseeds.
Eastern Vidarbha high rainfall	Bhandara, Gadchiroli, Chandrapur, Nagpur, Gonfia	Soils derived from parent materials of mixed origin are reddish brown. Almost 50% of the area under forest cover. Rainfall vary from 1,300 to 1,800 mm, well distributed in the monsoon months. Summer temperature will reach about 37 degrees Celsius. Humidity is about 75% in the rainy season. Rice, pulses, sorghum and oilseeds are important crops.

Source: Agricultural Statistical Information. Department of Agriculture. Maharashtra State. Part II, 2002. 267p.

Crop yields. Yields of major crops planted in the districts to be covered by the project are presented in **Table 2**. Yields of rice range from 2.7 t/ha in the Konkan coastal zone to 0.6 t/ha in the drought prone areas of Ahmednagar and Jalgaon. There is substantial scope to increase the yields of rice through the development of high yielding varieties and improved cultural practices. Yields of wheat vary from 1.8 t/ha in Satara to 0.7 t/ha in the eastern Vidharba high rainfall zone. There is scope to increase the yields of wheat with use of improved cultural practices. Yields of sorghum varied from 1.5 t/ha in Satara to 0.7 t/ha in Solapur and Ahmednagar, but target yields of 2 t/ha could be obtained through effective use of high yielding genotypes, mechanized farm operations, high quality seed and proper soil fertilization. Development of hybrid rabi sorghum with resistance to biotic and abiotic stresses could increase yields significantly. Millets are normally planted under rainfed conditions and in light soils, which results in low yields that vary from 0.9 t/ha in Dhule to 0.3 /ha in Nanded. Significantly higher yields of millet could be obtained through the development of hybrids and varieties adapted to local conditions. Higher yields of gram are observed in Jalgaon (0.9 t/ha), whereas low productivity is obtained in Gondia (0.5 t/ha). The productivity of gram could be increased significantly by the development of varieties with higher yield potential, resistant to pests and diseases, and better crop and irrigation management practices, especially IPM. The present productivity of lint cotton of 180 kg/ha may be significantly increased in the future with wider use of Bt and IPM technologies.

Maize is still grown in small areas, but it has a great potential to become an important industrial crop for production of starch and animal feed. There are significant potentials for crop rotation between soybean in the kharif and sunflower in the rabi season under irrigation. Similarly, safflower could be intercropped with rabi sorghum to improve the efficiency of land use. Yields of sugarcane can be increased significantly with development of high yielding varieties resistant to pest and diseases, improved ratooning management, as well as improvement in irrigation.

Table 2. Average yields (kg/ha) of major crops grown in the districts covered by the MWSIP.

Districts	Crop yields (kg/ha)						
	Rice	Wheat	Sorghum	Millet	Gram	G.nut	Cotton
Thane	2448	-	-	-	504	642	-
Raigad	2669	-	-	-	504	642	-
Ratnagiri	2671	-	-	-	-	642	-
Sindhudurg	2511	-	-	-	-	642	-
Pune	1462	1701	696	776	625	1207	333
Solapur	1361	1168	667	468	554	269	149
Ahmednagar	560	1666	667	422	552	798	211
Nasik	1209	1330	892	555	497	659	108
Dhule	1137	1198	1398	911	547	647	124

Nandurbar	617	1155	1242	1090	462	595	119
Jalgaon	560	1644	1499	864	899	591	213
Kolhapur	2733	1953	2082	-	627	1979	192
Satara	1732	1818	1528	469	615	1402	165
Sangli	2665	1730	470	178	741	819	165
Aurangabad	575	1183	1062	631	501	425	110
Jalna	613	1465	1232	716	644	434	198
Beed	630	971	641	491	429	475	126
Latur	649	893	1265	331	463	346	143
Osmanabad	149	938	622	298	524	334	64
Nanded	1020	1298	1163	344	608	345	114
Parbhani	550	1500	1292	452	536	345	150
Hingoli	671	1587	1251	500	574	-	177
Buldhana	1000	1783	1320	372	605	603	153
Akola	-	1535	1421	362	581	-	143
Washim	969	1411	1219	362	734	820	153
Amravati	944	1325	1402	360	868	992	119
Yeotmal	992	1144	1094	364	629	820	119
Wardha	547	2307	968	-	625	692	154
Nagpur	1290	1076	814	-	641	669	163
Bhandara	1394	1021	-	-	563	-	-
Gondia	1313	705	-	-	455	-	-
Chandrapur	1443	789	1100	-	411	-	120
Gadchiroli	1163	799	-	-	590	-	-
National average	1,990	2,755	852	639	806	774	226

Source: Agricultural Statistical Information. Department of Agriculture. Maharashtra State. Part II, 2002. 267p.

In general, the main constraints to higher crop yields include inadequate irrigation, particularly in the tail reaches of the schemes; poor drainage in some areas; use of unadapted varieties; limited use of good quality seed; inadequate methods of plant protection; low soil fertility, inadequate placement of fertilizers and unbalanced mixture of plant nutrients.

Cropping patterns. The land use patterns characteristic of each cropping season have evolved as result of the cumulative action of various factors, such as physical characteristics of the land and past decisions of

farmers based on experience, tradition, preferences, resources, profitability, access to markets, and social and political pressures. The diverse agro-ecological conditions of the state favour the adoption of many cropping patterns.

The most common crops in kharif are sorghum, millets, cotton, rice, maize and groundnut. Among the rabi crops, wheat, rabi sorghum, rabi millet, onion, chillies, and pulses are the most common. Maize is normally grown in areas of high rainfall and good soils. Sorghum is planted in areas with moderate rainfall and light textured soils. Millets are drought tolerant crops preferred in low rainfall areas with light soils. Sorghum and millets are normally grown in very similar agro-ecological conditions and both have wide adaptability in respect to soils, rainfall and temperature. Groundnut is grown in light soils and can produce reasonable yields under moderate water stress. Cotton is planted under rainfed conditions in the medium to high rainfall zones of the state. Alternative crops in the cotton area are sorghum, groundnut, pulses and millets. Rice is grown as monocrop in areas of higher rainfall (konkan region) and in irrigated command areas where supplemental irrigation ensures good yield. Other alternative crops grown in rice areas are sugarcane, sorghum, pulses, and oilseeds.

Crop mixtures and intercropping are widely grown, especially during the kharif season. Pulses and oil seeds are intercropped with maize, sorghum and millets. Intercropping generally ensures more efficient utilization of land, sunlight and water.

Farm size. Due to population pressure and land sub-division, size of family holdings in command areas of irrigation schemes is small. Number and average size of landholdings in Maharashtra are presented in **Table 3** below. The overall average size of the farms in 1990/91 was 2.21 ha/household. These limited farm sizes combined with low productivity and a risk adverse approach, make it very difficult for farmers to produce enough for family subsistence and excess for the market. The change in attitude towards a market oriented production entails risks that subsistence farmers are not familiar with. The challenge that faces the component is to offer to these small farmers technologies and management options that minimise risk and increment production of marketable crops with the objective to assure food security and increase family income.

Table 3. Number and average size of rural holdings in 1990/91 in Maharashtra, India

Items	Class of land holdings			
	Small (< 1.99ha)	Medium (2 -9.99ha)	Large (> 10 ha)	Total
Number of holdings	6,002,348	3,296,820	170,613	9,469,781
Total area(ha) of holdings	5,600,883	12,736,174	2,587,778	20,924,835

Average size of holding (ha)	0.933	3.863	15.167	2.209
------------------------------	-------	-------	--------	-------

Source: Agricultural Statistical Information. Department of Agriculture. Maharashtra State. Part II, 2002. 267p.

Gender. Women are important income earning members of rural households. Their responsibilities in farming and income generating activities (small livestock, vegetable gardens, buy and sell, among others) are crucial for sustainability of the household. Women are often engaged in the same types of wage labour as men, but usually paid less. Despite the equal responsibilities and capabilities of women in the household's economic activities, there still prevail emphasis on traditional roles of rural women and their absence in decision making. It would be appropriate for the component to address this issue by giving emphasis on practical gender needs and focus on group formation and relevant income generating activities by women. Interventions would be designed to empower women through social mobilization, effective participation in interest groups, leadership roles, and skill development that would lead to equal participation in mainstream economic activities.

Irrigation. Statistics on irrigated area of important crops in the districts to be covered by the project during a period from 1994/95 to 2001/02 are presented in **Table 4**. The irrigated area of rice has had no significant increase during this period. Largest areas of irrigated rice are found in the districts of Bhandara and Gadchiroli. The irrigated area of wheat increased only by 7.8% during this period. The largest irrigated areas of wheat are found in the district of Ahmednagar. The irrigated area of rabi sorghum has decreased by about 13% during the period of 1994/95 to 2001/02. Largest irrigated areas of rabi sorghum are found in the districts of Pune and Ahmednagar.

An analysis of the variation in total irrigated area of major crops and patterns of rainfall distribution reveal that whenever a given district/area experiences scarcity of rainfall, with a consequent low volume in irrigation reservoirs, there is a distinct change in cropping patterns of command areas. In the rabi season farmers tend to switch from high water requirement crops (wheat) to crops with lower water requirement (rabi sorghum).

Table 4. Irrigated areas ('000 ha) of important crops in MWSIP districts during the period from 1994/95 to 2001/02.

Districts	Rice			Wheat			Rabi Sorghum		
	94/95	97/98	01/02	94/95	97/98	01/02	94/95	97/98	01/02
Thane	-	-	-	0.1	-	-	-	-	-
Raigad	-	-	-	-	-	-	-	-	-
Ratnagiri	-	-	-	-	-	-	-	-	-

Sindhudurg	-	-	-	-	-	-	-	-	-
Pune	0.9	0.7	0.5	43.0	43.7	47.0	56.0	68.1	66.5
Solapur	1.1	0.1	-	28.5	32.7	40.2	64.8	38.8	41.6
Ahmednagar	0.3	-	-	64.8	66.7	84.7	82.9	64.3	71.6
Nasik	2.4	2.9	2.6	54.7	64.5	33.4	7.0	5.6	3.1
Dhule	1.3	0.1	0.3	22.5	18.0	11.3	-	-	-
Nandurbar	-	-	-	-	-	6.4	-	-	-
Jalgaon	1.1	0.2	0.1	38.0	34.0	23.9	5.0	7.6	6.7
Kolhapur	-	2.6	2.2	7.8	6.3	8.3	-	0.5	0.7
Satara	14.9	7.0	7.6	16.7	23.3	30.6	52.9	43.0	45.4
Sangli	2.0	1.6	2.2	17.7	21.4	28.7	19.2	28.4	35.4
Aurangabad	0.8	0.3	-	34.5	26.4	26.2	25.2	24.6	31.8
Jalna	0.8	0.3	-	24.5	19.5	25.2	20.8	10.7	16.7
Beed	1.5	0.3	-	24.7	23.5	30.3	42.7	42.3	45.8
Latur	-	-	-	9.0	10.9	18.1	3.4	2.3	5.7
Osmanabad	5.9	-	-	12.3	9.6	16.2	40.1	52.5	67.8
Nanded	4.1	-	-	12.3	10.8	25.4	3.6	0.9	1.3
Parbhani	1.4	-	-	33.9	38.6	29.8	0.8	1.0	2.0
Hingoli	-	-	-	-	-	39.9	-	-	0.1
Buldhana	0.2	-	-	18.0	17.1	22.8	-	-	-
Akola	-	-	-	14.6	15.0	8.6	-	-	-
Washim	-	-	-	-	-	10.6	-	-	-
Amravati	-	-	-	10.8	11.0	8.4	-	-	-
Yeotmal	-	-	-	18.5	15.9	15.1	-	-	-
Wardha	-	-	-	13.0	11.5	13.6	-	-	-
Nagpur	12.5	20.2	20.6	32.7	37.7	24.7	-	0.9	-
Bhandara	171.5	156.0	81.9	10.8	6.4	7.0	-	-	-
Gondia	-	-	85.5	-	-	1.4	-	-	-
Chandrapur	84.8	76.9	81.3	6.3	-	9.4	-	-	-
Gadchiroli	43.9	45.6	53.7	0.3	0.2	0.4	-	-	-
Total	351.4	314.6	338.5	570.0	564.7	647.6	444.4	391.5	442.2

Source: Agricultural Statistical Information. Department of Agriculture. Maharashtra State. Part II, 2002. 267p.

In general, the irrigation efficiency in most command areas is very low. This may be attributed to large conveyance losses due to poor maintenance and management of the canal system, inadequate distribution

and misuse of irrigation water by farmers at the head of canals, and low rate of adoption of improved soil and crop management practices. This has led to degradation of irrigation schemes as well as land resources.

It has been noticed that in some irrigation schemes where water shortage is less acute, large areas of land have been degraded due to water logging and salinization, arising from inadequate drainage and poor management of irrigation. Cropping systems have shifted in such schemes as a result of problems caused by poor water management. In water scarce schemes, there is distinct change in the cropping patterns from head to tail reaches. At the head, farmers take a major share of water by allocating maximum area to high water requiring crops (rice, wheat) as compared to tail reach farmers, who can only plant crops that are relatively less water requiring, but also less profitable (sorghum, gram).

In order to improve the efficiency of the existing irrigation schemes, it is necessary to bring about rehabilitation of the systems. Lining of canals in vulnerable reaches may help reduce conveyance losses. Improved irrigation scheduling, which ensures water application at the most responsive growth stages of the plants, along with improved water management techniques, may help to conserve water and reduce application losses.

The basic aim of improving water management is to save irrigation water and increase water use efficiency. These can be achieved by developing efficient irrigation schedules in terms of volumes and time of application, optimization of designs for irrigation methods, and better crop planning.

After physical rehabilitation of the irrigation schemes and adoption of improved water application methods, the overall irrigation efficiency is expected to increase significantly. Equity in distribution of irrigation water, to be facilitated by the WUAs, would enable farmers and extension staff to prepare suitable cropping patterns adapted to the available water. Water budgeting and scheduling of irrigation would be done based on discussions with farmers and staff of the Agriculture and Irrigation Departments. Irrigation schedule would be planned in such a way that it coincides with critical stages of crop water requirements.

Rehabilitation of canals would not only improve irrigation efficiency, but also help in checking soil salinity and/or sodicity, water logging, adverse effect on crops in adjacent fields and ultimately sustained agricultural productivity. Further, judicious agronomic management i.e. ensuring most efficient use of inputs and production practices, would enhance the agricultural productivity in command areas. Improved water management would also encourage farmers to grow high value crops for higher economic returns.

Thus, returns per unit of water are expected to increase through higher cropping intensity, increased productivity, adoption of improved crop inputs, recommended cultural practices, crop diversification, and use of more efficient water conveyance methods.

Water management. Water is one of the most important production inputs. It affects the performance of crops not only directly by sustaining the physiological metabolism of the plants, but also indirectly by influencing the availability of nutrients and the timing of cultural practices. In proper combinations, water and other production inputs can boost crop yields. Shortage and excess of water affect the growth and development of the plants, crop yield and quality of produce.

Water management comprises both, irrigation and drainage. The main sources of water for irrigation are canal delivered surface water and ground water lifted from dug/bore wells. Water is a costly input when supplied by canals. The construction of dams and reservoirs, conveyance of water to the fields, and the operating and maintenance of canal systems, involve large expenses. The misuse of water leads to logging, salinity and soil degradation. Hence, the need for proper economic use of water resources for maximum crop production.

Irrigation schemes are classified as major, medium and minor schemes. Although the command area of minor dams is small, their construction time is short and benefits are accrued rapidly. Large dams require long time in planning, design and construction, hence benefits take longer to materialize.

Dug and bore wells are traditional sources of water. They are generally constructed by individual farmers with own resources or loans. Wells can be completed rapidly and their benefits are available immediately. Individual farmers have full control of water for crop production or other uses. Normally, crops that require less water are irrigated by wells, especially fruits and vegetables.

Input supply.

i) Seeds: Certified seed is produced by the State Seeds Corporation (SSC), the National Seeds Corporation (NSC), Taluka Seed Farms (TSF), and private seed producers. Distribution of seed is through public and private channels. Maharashtra is well endowed with seed supply by public agencies and no difficulties are foreseen with availability of good quality seed for the project area. The following table presents the amount of seed distributed by the public sector for the major crops in all districts covered by the project.

Table 5. Quantity of seed (t) of major crops distributed in 2001/02 by the public sector in the districts covered by the MWSIP.

Districts	Rice	Sorghum	Millet	Wheat	Gram	Groundnut	Soyabean	Cotton
Thane	898.0	-	-	-	-	0.4	-	-
Raigad	861.4	-	-	-	-	-	-	-
Ratnagiri	75.5	-	-	-	-	-	-	-
Sindhudurg	125.6	-	-	-	-	-	-	-
Pune	312.6	66.9	58.3	895.7	21.7	254.9	26.0	-
Solapur	1.9	213.6	31.7	583.6	14.9	2.4	7.7	8.7
Ahmednagar	14.2	80.7	135.0	1761.6	108.3	209.4	938.1	14.3
Nasik	264.8	31.7	121.6	881.4	10.7	34.0	202.1	7.4
Dhule	3.3	93.6	36.5	583.0	17.7	48.7	49.9	114.8
Nandurbar	-	-	-	-	-	-	-	-
Jalgaon	-	219.7	27.2	1103.3	69.7	2.7	52.7	405.5
Kolhapur	522.2	89.8	-	131.0	20.4	134.9	498.7	-
Satara	178.7	222.3	26.3	797.9	12.5	196.5	156.1	-
Sangli	157.0	166.1	11.6	726.4	30.8	79.9	773.4	2.5
Aurangabad	0.7	54.2	8.2	420.5	18.3	8.5	53.8	28.7
Jalna	-	44.5	21.8	371.2	12.8	7.2	195.6	56.5
Beed	4.3	61.9	42.9	999.4	26.0	4.5	264.2	75.9
Latur	7.5	229.1	43.4	718.7	91.0	8.5	765.6	30.6
Osmanabad	6.9	122.4	14.7	267.5	29.8	0.9	70.7	2.6
Nanded	21.1	222.4	2.8	711.8	25.4	75.0	885.5	196.2
Parbhani	9.6	82.6	5.1	691.5	60.2	105.0	1182.4	81.5
Hingoli	-	-	-	-	-	-	-	-
Buldhana	-	176.9	4.5	495.1	167.8	22.6	1100.2	260.8
Akola	-	167.0	1.0	507.5	150.1	16.5	604.7	200.5
Washim	-	51.0	-	280.5	73.5	2.5	1280.4	54.3
Amravati	3.8	133.3	-	289.9	89.5	0.9	906.5	88.6
Yeotmal	-	114.1	2.7	471.9	71.1	60.0	1404.2	128.1
Wardha		36.6	-	206.6	73.7	17.4	1234.7	31.6
Nagpur	753.6	79.4	-	613.4	64.0	54.0	2552.3	33.2
Bhandara	1227.0	-	-	75.2	4.5	5.0	57.5	-
Gondia	-	-	-	-	-	-	-	-
Chandrapur	450.3	22.5	-	151.4	10.2	1.0	1216.4	11.2
Gadchiroli	360.3	-	-	8.4	2.7	-	115.5	-

Total								
-------	--	--	--	--	--	--	--	--

Source: Agricultural Statistical Information. Department of Agriculture. Maharashtra State. Part II, 2002. 267p.

ii) **Fertilizers:** Table 6 presents the average fertilizer use for crop production in each district covered by the project, as well as the total consumption of each type of macro-nutrient. In addition to chemical fertilizers, there are 47 bio-fertilizer factories distributed in 19 districts and 30000 units of vermi-compost and 300 units of vermi-culture established in the state.

Table 6. Amount of fertilizer used in 2001/02 in the districts covered by the MWSIP.

District	Average use (kg/ha)	Total consumption (t)		
		Nitrogen	Phosphate	Potassium
Thane	67.4	14132	2453	1843
Raigad	70.5	11545	2218	1126
Ratnagiri	38.9	7362	880	706
Sindhudurg	41.5	4131	1444	1017
Pune	84.4	59488	27472	15197
Solapur	82.5	55418	22096	12716
Ahmednagar	81.6	66615	34064	19388
Nasik	103.4	56136	27440	9164
Dhule	84.7	36128	9716	5241
Nandurbar	54.2	13532	3885	2372
Jalgaon	86.2	62419	24742	25577
Kolhapur	124.2	53645	22165	20674
Satara	97.00	37346	15573	11814
Sangli	119.00	41766	21328	23298
Aurangabad	56.6	36864	18050	6207
Jalna	86.1	33814	17555	8111
Beed	57.9	30565	14845	6719
Latur	71.1	23895	16237	4153
Osmanabad	28.2	13075	9149	2797
Nanded	121.2	55644	26153	14347
Parbhani	56.5	29309	11369	5495
Hingoli	37.3	13333	5318	2485

Buldhana	75.5	40304	19586	4036
Akola	81.7	32111	20528	3933
Washim	44.5	10863	7699	1347
Amravati	38.00	21172	11613	4411
Yeotmal	62.7	34734	16262	6596
Wardha	85.3	20913	9350	4880
Nagpur	67.8	21947	14174	3293
Bhandara	107.00	12524	6872	2174
Gondia	0.00	12708	5990	1938
Chandrapur	63.6	20227	10692	2733
Gadchiroli	80.8	8996	2761	1083
Total M.S.	75.9	992662	459680	236869

Source: Agricultural Statistical Information. Department of Agriculture. Maharashtra State. Part II, 2002. 267p.

Extension support. Results of research on irrigated agriculture have not been disseminated effectively to farmers as evidenced by a very low adoption rate of improved production technologies. The capability of the extension service needs strengthening by way of improving skills of irrigation and agriculture technical field staff, enabling them to disseminate effective extension messages to the farmers. They must develop confidence in irrigated agriculture and work with farmers to prepare crop plans and organize the schedule of water delivery well in advance of the cropping season. This will lead to water being released in the canals to meet water requirement of the predominant crops at all critical stages of the plant growth, from pre-sowing to maturity.

The public agriculture extension system needs improvement at all levels. The knowledge and expertise of qualified and experienced scientists of agricultural universities, research institutes, NGOs, private sector, and senior specialists from agriculture and other line departments would be tapped by the component to provide training to district, taluka and village extension workers, as well as to farmers. Greater emphasis should be given to working more closely with farmers on topics such as water budgeting, on-farm water management, improved production practices and post-harvest techniques. Modern participatory extension methods based on farmers' groups and associations would be introduced. People's participation is a key feature for development of small holder agriculture.

Some important characteristics of participatory approaches are: (i) they devote time and resources to social organisation, including training of staff and beneficiaries to facilitate collective action prior to implementation of activities; (ii) groups are formed around common interests, because rural communities are

heterogeneous, composed of social groups with diverse, sometimes competing interests; (iii) they work with farmers to design interventions and select technologies, which is critical to ensure that beneficiaries really get what they want; (iv) they choose the village, not the irrigation scheme, as the unit of implementation; (v) they select villages with enabling conditions for project implementation, to ensure that they possess agro-ecological and socio-economic conditions conducive to successful implementation of activities; (vi) implementing agencies coordinate their work, especially NGOs, FOs, and line departments, in order to complement their strengths.

B. Lessons learned from on-going and previous projects.

(i) The Maharashtra Composite Irrigation III.

This project was implemented in the command areas of Jayakwadi and Majalgaon from 1985 to 1996. The objective of the project was to increase agricultural production and farmers' income by strengthening the extension services through the assignment of Village Extension Workers (VEW) to specific irrigated areas enabling them to focus on relevant problems of irrigated agriculture. The project focused more on construction of physical structures than on support activities needed to improve agricultural production. Funds for agriculture development were only available during the later part of the project. The impact on agricultural production was much below what was originally anticipated. It was recommended that, from the onset, all future irrigation projects should have an agricultural component with adequate funding.

ii) The Maharashtra Agricultural Extension Project.

This World Bank assisted project was launched in Maharashtra in 1981 and closed in 1987. The aim of the project was to reorganize and strengthen agricultural extension services along the lines of the Training and Visit (T&V) system of extension, to provide farmers the necessary technical advice on regular and frequent visits and in-service training. Each Village Extension Worker (VEW) was assigned to work with a number of farm families depending on local conditions, population density, cropping intensity and accessibility. The final evaluation of the project showed that it achieved its main institutional objective of creating a framework of agricultural extension system based on regular training and visit system. The project has also established a strong linkage between extension and research, which led to farmers' concerns being addressed on a more systematic manner. The increased skills of extension staff made them more confident in the dissemination of improved technologies. Although slowly, farmers adopted new messages and increased crop production.

A major lesson learned in the project was that repetitive and unrealistic technical recommendations led to loss of farmers' interest in the extension service. The sustainability of the T&V system greatly depends on

the capability of field staff to understand farmers' problems and have the technical skills to solve these problems within the resources available to farmers.

iii) Maharashtra Water Utilization Project.

This World Bank funded project initiated in 1983 and closed in 1991. It aimed at increasing agricultural production and farm incomes by increasing the effective utilization of irrigation. The project upgraded irrigation and drainage systems of selected areas covering five irrigation schemes, including training in improved water management. The impact of the project on crop production was positive as evidenced by the significant increase in irrigated area and irrigation intensity of main crops.

iv) The National Agricultural Technology Project.

This World Bank funded project initiated in 1998 and is due to close in December 2004. The aims of the project are to implement innovative technology dissemination systems, formulate effective participatory extension and research plans, and coordinate activities with other line departments and agencies. The project covers four districts in Maharashtra, namely: Amravati, Aurangabad, Ahmednagar and Ratnagiri. The project created, at district level, Agricultural Technology Management Agency (ATMA) to facilitate decentralized planning and decision-making. The project uses NGOs to organize farmers, encourages participation of private sector in technology transfer, validate technologies through KVKs, SAUs and FOs, and uses bottom-up planning process.

A household survey was conducted in Ratnagiri District to evaluate the impact of the project. It was observed that the livelihood of most farmers depends on a combination of activities in agriculture, horticulture, livestock, and fisheries. Cashew processing, mussel culture and vermi-compost production were new activities started by project beneficiaries. Largest planted areas were observed in perennial crops (cashew and mango), followed by kharif and rabi food crops. Project beneficiaries showed a higher rate of adoption of new technologies than non-beneficiaries. Increase in productivity, due to adoption of new farming practices, was reported in rice, groundnut, eggplant, okra, leaf vegetables and chillies. Training was found to be an effective way of transferring new technologies. Marketing of farm produce continued to be done by individual farmers who complained of low price for their produce, long distances to market places, lack of market information, long chain of middlemen, and low demand for farm produce. Incremental farm income was higher in beneficiaries' households than non-beneficiaries. Major problems identified by households were lack of good quality seed, high price of fertilizers, frequent occurrence of crop pests and diseases, stray animals, and lack of irrigation facilities. However, very few farmers ever discussed their main problems with agricultural officers or village leaders, showing a communication gap between extension and farmers.

v) The FAO/EU Integrated Pest Management Project.

Recently, the Government of Maharashtra has adopted a new strategy for agricultural extension services, where a multidisciplinary interdepartmental approach is to be followed, with support from line departments, input suppliers, NGOs, and private organizations. The FAO/IPM project has been successful in creating a cadre of experienced extension workers by training facilitators in the implementation of Farmers' Field Schools (FFS) in Akola, Washim and Yavatmal. The sustainability of this new extension system has been demonstrated in various agricultural sectors of Maharashtra, especially in the area of high value crop production. The IPM approach promotes the use of eco-friendly pest and disease management practices through the use of bio-control agents. Constant monitoring of pests and diseases becomes a normal practice in farmers' fields. The ultimate objective of the Department of Agriculture is to spread the IPM approach to all major crops. Training of farmers, facilitators, and input suppliers in the concepts and implementation of IPM is conducted through the FFS approach.

C Agricultural Support Services Component

Agriculture and allied activities occupy an important place in the economy of Maharashtra. About 65 percent of its population directly or indirectly depends on agriculture for its livelihood. A wide range of agro-ecological conditions in the state permit cultivation of a variety of field, vegetable, spice, fruit, ornamental, aromatic and medicinal crops. However, productivity levels of most crops are low and vary widely from year to year. The reasons for low productivity include poor and unreliable irrigation facilities, lack of equity in availability of irrigation water, wide gaps between the yield levels obtained by the farmers and the reported potential yields of improved varieties of most crops due to low levels of adoption of improved technologies, inadequate use of inputs, lack of appropriate agricultural support services and credit, inadequate marketing infrastructure, high post-harvest losses and lack of value addition to agricultural produce. Most of the farmers cultivate traditional varieties of crops and do not adopt appropriate crop husbandry and water management practices resulting in low yields due to poor yield potential and heavy losses due to pest attack, nutrient deficiencies and moisture stress. Most of the public sector extension agencies carry out their programs in parallel, following a typical top-down, command and control target-driven approach with very limited field level coordination. The present system allows little flexibility to the field functionaries for addressing the priority concerns of the farmers.

Rationale :

The overriding constraint to improved agricultural production in the project area is the scarcity of water in most of the irrigation schemes. Most of the project area (84%) is rainfed, there is a large extent of degraded lands, and the rate of adoption of improved production technologies is very low. For improving

availability of irrigation water, the Project investments will be directed towards rehabilitation of 9 major, 13 medium, and 264 minor irrigation schemes covering an area of approximately 668850 ha (**Annex -1**).

The project area will cover under agriculture component all the districts but 66 irrigation schemes only (Annex-2) representing all the agro-climatic zones of Maharashtra, during first phase out of which main emphasis would be given to 19 districts having 9 major and 13 medium projects and 2 districts which have World Bank assisted National Agricultural Technology Project (NATP) other than those 2 out of 4 NATP districts already included in 19 districts.

Investments in physical rehabilitation of the irrigation schemes should contribute substantially to increased availability of water. However, in addition to physical rehabilitation, the timely availability of inputs and proper delivery of other support services must also be ensured to fully exploit the increased production potential created by improved irrigation infrastructure. Full benefits will be achieved if investments in irrigation are supported by proper delivery of agricultural support services and improved production technologies. This calls for improvement of extension services, integrated action of line departments, NGOs and private sector, with the active involvement of farmers in the identification of constraints and potentials for agricultural development.

Overall, the project will introduce the establishment of WUAs, and the Agricultural Support Services (ASS) component will complement this initiative by forming smaller farmer interest groups (FIGs) in project villages/WUAs, as well as multidisciplinary and interdepartmental technical support groups at various levels. Whenever relevant, women's groups would be targeted to develop their skills, enhance their income earning capacities, and help them to reach leadership positions in their communities.

The objective of Agricultural Support Services component is to improve productivity of water through irrigated agriculture intensification and diversification in 66 irrigation schemes. Agricultural intensification, diversification and commercialization is planned to be achieved through improved agricultural support services, strengthening of extensionist-farmer-market linkages, effective collaboration of GOMH, line Departments and greater involvement of the private sector. It is expected that the project would lead to increased cropping intensity, improved productivity of oilseed, pulse, commercial and cereal crops; expansion of area and productivity of vegetables, fruits, flowers, spices, medicinal plants and other high value crops; increased livestock productivity through better health and nutrition management (including improved fodder supply); improved post-harvest handling and marketing of agricultural produce; and sustainable use of land and water resources. A decentralized, demand-driven, farmer-led holistic farming systems extension approach focusing on farmer groups and WUAs will be implemented for the identification and dissemination of improved agricultural technologies. In terms of institutional reforms, it is envisaged that the project would help in improving inter-agency cooperation, promoting the new market-driven business processes of technology dissemination and strengthening collaboration between farmers organizations and private and public providers of support services.

COMPONENT ACTIVITIES

The Agricultural Support Services (ASS) component aims at increasing productivity of water through irrigated agriculture intensification and diversification in 66 irrigation schemes. The main focus will be on 19 districts covering 9 major, 13 medium and 16 minor schemes. In addition 28 minor schemes will be taken up in the remaining districts of the State. Including two ATMA districts (Ratnagiri & Amravati) Agricultural intensification, diversification and commercialization is planned to be achieved through improved agricultural support services, strengthening of extensionist-farmer-market linkages, effective collaboration of GOMH line Departments (Departments of Irrigation, Agriculture, Animal Husbandry, Fisheries, Agricultural Marketing, etc.) and greater involvement of the private sector. The project will facilitate adapting to the project areas a demand-driven, decentralized, farming system-based Agricultural Technology Management Agency (ATMA) model that has been successfully tested in nine states under National Agricultural Technology Project (NATP) and Diversified Agriculture Support Project (DASP), including four districts of Maharashtra. ATMA is essentially a new management concept for effectively utilizing the existing extension and other support services manpower in the district by providing need-based critical support. Under NATP and DASP, ATMAs have successfully promoted coordination among line departments, strengthened public-private partnerships, and implemented district level strategic research and extension plans focusing on local priorities and conditions. They have also provided greater representation to farmers, women, NGOs and private sector for developing and implementing decentralized, demand-driven extension agenda.

For achieving the desired outcomes, various extension activities (trainings and demonstrations) undertaken by Departments of Agriculture (DOA) and other line departments will be temporally and spatially integrated with asset rehabilitation and on-farm development program in a given minor, medium and major irrigation scheme. Thus the areas of activity will be in terms of head, middle and tail regions of a minor/ distributary or an irrigation scheme, which reflect different levels of water availability. To achieve this DOA will assign a senior level field officer to work in close coordination with the concerned Executive Engineer and participate in the meetings for developing comprehensive plans for the selected irrigation schemes. Unlike the centralized top-down extension approach followed in the past, all activities (demonstrations, trainings, etc) would be decided in consultation with the WUAs and other stakeholders. The approach will be fully participatory, based on farmers perceived needs and would use farmer groups linked to WUAs.

Though, the exact nature of project interventions will be decided in consultation with the farmers in a WUA and other stakeholders, for improving cropping intensity and productivity, promoting crop diversification, enhancing water use efficiency, reducing dependence on costly and harmful agrochemicals,

and promoting ecologically sustainable irrigated agriculture in the project areas, the following is an indicative (not exhaustive) list of activities to be undertaken.

Demonstrations:

1. An indicative kind of demonstrations to be carried out could be as given below

(a) About 10,000 Demonstrations to be organized on farmers field during the life of the project will cover integrated plant nutrient management (IPNM), integrated pest management (IPM), integrated crop management (ICM), improved rain/irrigation water management, seed production, etc. The focus of IPNM demonstrations will be on promoting soil test based application of nutrients using a blend of organic manures, bio-fertilizers and chemical fertilizers.

(b) To reduce dependence on chemical fertilizers and promote sanitation and hygiene, a major initiative will be undertaken for promotion of NADEP and other methods of composting and vermi - culture in the project villages. Vermi-compost can also be an additional source of income for small farmers and landless people (who own livestock) in the vicinity of cities. The IPM, NADEP and vermi-compost demonstrations will be integrated and harmonized with field and vegetable crop production demonstrations.

(c) The ICM demonstrations will cover the complete package of practices (including optimum time and method of irrigation) from land preparation to harvesting, and post harvest handling and marketing of produce in a farming system mode rather than covering only one or two recommendations for a given crop. These will also cover, wherever possible, improved practices for sustainable management of land and water, resource conservation technologies, etc.

(d) The focus of seed production demonstrations will be on popularization of improved varieties of crops and improving seed replacement rates with particular focus on farmer-to-farmer seed exchange, and safe storage of seed to maintain viability and purity.

(e) Although the choice of field crops to be covered in different types of demonstrations will be determined by the agro-climatic conditions in a given sub-basin, more emphasis will be laid on those crops in which there is a comparative bio-physical advantage in a given irrigation scheme.

(f) For promoting agricultural diversification and shift to high value crops, it is planned to undertake demonstrations on improved production technology for vegetables, spices, flowers, fruits, aromatic and medicinal plants, integrated pest management in vegetable crops, improved methods of irrigation, setting up of low cost (e.g. poly tunnel) vegetable nurseries, etc. in the project areas. The production technology demonstrations for vegetables, spices, flowers, aromatic and medicinal crops, would cover the complete package of practices.

(g) One of the major constraints in vegetable production is availability of quality seedlings of vegetable crops. To address this it is planned to promote setting up vegetable nurseries by the farmers by providing them training and technical backstopping within the state, and by facilitating nursery production trainings in the leading institutes outside the state.

(h) The demonstrations on specific fruit, vegetable, flower, aromatic and medicinal crops will be organized only in those WUAs which have a comparative bio-physical and socio-economic advantage for a particular crop rather than being distributed across different basins and sub-basins in the project area. It will be necessary to involve all the stakeholders in deciding these demonstrations.

(i) For avoiding market gluts due to perishable nature of horticultural produce, activities like vegetable and flower production will be undertaken in those irrigation schemes, which are near the main consumer centres/markets. It will be imperative to identify the commodities for which there is a market demand and then to tailor the demonstrations accordingly. Systematic efforts will also be made to link groups of horticultural producers in WUAs with potential markets.

(j) Since the success of IPM requires that IPM demonstrations should cover a fairly large area, these demonstrations will cover all crops grown in a given village. It will include cultivation of pest resistant/tolerant varieties (wherever possible), adoption of agronomic practices to minimize pest attack, promotion of use of bio-pesticides and need-based application of bio-rational pesticides (to minimize pesticide residues in the produce and reduce harmful environmental impacts) in the selected IPM villages.

(k) Other activities to be covered include demonstrations on farm machinery and implements, improving farmer-market linkages and pilot demonstration of agro-enterprises for post harvest handling, value addition, etc.

The focus of demonstrations will be on promoting rapid radial spread of improved technologies like production practices for field crops, irrigation water management, IPM, IPNM, seed production, organic farming, resource conservation technologies, amelioration of degraded lands, etc. to farmers in the WUAs and adjoining villages by organizing field days at particular stage(s) of crop growth in which large number of farmers, WUA members and field staff of different line departments will participate. The choice of demonstration sites should be done in such a way that these are easily accessible on a main road or village path. Such demonstrations are also seen by a large number of farmers when they pass by that site. The achievements and impact of these demonstrations will be evaluated in terms of adoption of demonstrated technologies by the direct beneficiaries and non-beneficiaries in WUAs and in the adjoining villages during

the following years rather than in terms of physical numbers of demonstrations organized versus project targets for different types of interventions. Appropriate mechanisms will be developed and implemented for documenting these impacts in the selected WUAs and villages during the years following the year in which demonstrations are organized.

Strengthening of training Institute, Capacity building and trainings

The State Agriculture Extension Management and Training Institute (SAEMTI), 7 Regional Agriculture Extension Management and Training Institutes (RAEMTIs) and 81 Agro-Polyclinics will be strengthened for organizing trainings for farmers/WUAs and staff of DOA and relevant line Departments. Krishi Vigyan Kendras, training institutes of Maharashtra State Agricultural Marketing Board and State Agricultural Universities and relevant private sector entities will also be associated with the training programs. The training programs will cover marketing, post-harvest handling, value addition, agribusiness, sustainable use of land and water (including irrigation) resources, in addition to agricultural production and natural resource conservation practices. The training modules will also have in-built monitoring and evaluation mechanisms based on trainees assessments. A mechanism will be operationalized to track selected trainees for impact assessment of training programs.

The project is aimed at demand driven technology dissemination and development of agro entrepreneurship for increase in productivity, improvements in quality of agro-produce and diversification and commercialization of agriculture in irrigated areas wherein starting from capacity building to the taking up of crop and technology demonstrations and creation of support infrastructure could all be demand driven through village support groups and Water Users Associations. The project envisages a creation of grass root level extension infrastructure created by the farmers themselves at the village level under an institution of village support group which would include the members of WUA from the respective villages, village level workers from various line department, extension service providers from the neighbouring area itself, krishi mitra representing a group of hundred farmers with five Self Help Group of 20 farmers each headed by a Krishi Sainik and a formal village level institution established for technology dissemination as Krishi Vigyan Mandal.

The project envisages the capacity building of various members of village support group, the technology dissemination from this infrastructure by way of demand driven crop and technology dissemination and farmers training in various fields of agricultural production, its post harvest management and marketing and creation of a demand driven support infrastructure managed by village level entrepreneurs. Various objectives are to be achieved through preparation of agricultural development plan along with the detailing of the plan for each year in terms of various micro projects in crop intensification,

diversification, post harvest management and marketing with the help of establishing an Agriculture Technology Management Agency (ATMA) at the district level under the chairmanship of collector.

Since the success of the project depends on the dissemination of technology in various fields of agriculture from production to processing, project requires strengthening of training infrastructure from the grass root to the apex level in the State. It is therefore proposed in the project that the taluka level technology dissemination centre as agro polyclinic would be strengthened along with the graduation of one of them as District Training Centre under the guidance of Regional Agriculture Extension Management Training Institute already existing in the state with its apex organization as State Agricultural Extension Management Training Institute.

The objectives would be achieved through capacity building of the farmers through extensive training, the demonstration of various technologies and creation of support infrastructure run by agro entrepreneurs at the village level and convergence of various line departments working in the field of agriculture and allied sectors through the establishment or strengthening of agriculture technology management agencies at the district level.

Monitoring ,Evulation and Impact Assesement.

By June 30, 2005 the Department of Agriculture will develop half yearly and yearly monitorable milestones for all activities proposed to be undertaken against which implementation progress will be measured. Similarly baseline data will be collected and the end project targets developed for various parameters such as cropping intensity, area and productivity of important oilseed, pulse, commercial, cereal, fruit, vegetable, flower and other high value crops; area under IPM, IPNM, organic farming and other environmentally-friendly practices; input use (chemical fertilizers, pesticides, bio-fertilizers, bio-pesticides), irrigated area, livestock productivity, household incomes, etc. Effective tracking of these milestones and impact indicators will be done during implementation.

ORGINIZATIONAL IMPLEMENTATION ARRANGEMENTS (Annexture-18)

The Department of Agriculture of Maharashtra will be responsible for overall coordination and implementation of project activities. Implementation will follow a community-driven approach with the active participation of the beneficiaries and other stakeholders (including line departments, NGOs and private sector) in the design, implementation and monitoring of the interventions. In order to enhance interdepartmental coordination and effectively involve farmers in the planning and implementation of various activities, a new implementation strategy, based on multidisciplinary and interdepartmental support groups, is proposed.

It is proposed that all the 9 major schemes, 13 medium schemes and one minor scheme in those districts which are covered under either major or medium schemes and two minor schemes each in other districts would be covered under the agriculture support services component of the project. Since major and medium schemes cover 19 districts with another 16 minor schemes in these 19 districts, 38 major / medium and minor schemes would be covered. The remaining 14 districts would have 2 minor schemes each which means the total schemes would be 66. It means that 19 districts having either medium or major project will have 16 minor schemes when other 14 districts would have 28 minor schemes making a total of 9 major schemes, 13 medium schemes and 44 minor schemes. The 66 schemes would cover all the districts of the state. The Cultivable Command Area (CCA) is estimated to be roughly 5.25 lakh hectares and the number of farm families in the area would be roughly 3 lakhs. The list of 66 projects is shown in **Annex-2**

At Village/WUA Level

At village level, a multidisciplinary Village Support Group (VSG) of about 7-10 members would be created. These groups will consist of three farmers who are member of WUA one of whom should be a woman, a representative from an NGO (if available), a representative from input suppliers (if available), one member from service providers (e.g. local FFS facilitator) and village/WUA level technical staff of Agriculture, Horticulture, Irrigation, Animal Husbandry, and Social/Health Service (if relevant) Departments. The TOR for VSG are given in **Annex-3**. Depending upon the area of operation (location/dispersion of villages), the technical staff may cover more than one village, but the farmers would be specific for each village. The leader of the group would be, in most cases, the progressive/innovative farmer nominated by the Water User Association, preferably agriculture graduate, who would be in-charge and take the lead in mobilizing other potential members, explain the project and the objectives of the support group. When deemed relevant by the group, a farmer could take the leadership role. The farmers should be active members of WUAs.

The project implementation structure would have one or more Water Users Association (WUA) in the respective project areas as already planned under the irrigation improvement sector. Within the Water Users Association, there would be Village Support Groups (VSG) having facilitators from line departments and extension service providers from the local area who would finally graduate to the level of the paid extension workers once the official machinery confines itself to the agro polyclinics which would be strengthened in every taluka in the project area. The facilitators and extension service providers would be regularly interacting with village level 'Krishi Vigyan Mandals' (KVM) which will be constituted through the grass root level selection of progressive farmers, one each from a group of 20 to be called as 'Krushi Sainik' (KS) and one each from five such groups covering 100 farmers to be termed as 'Krushi Mitra'(KM). The 'Krishi Vigyan Mandal'(KVM) would have an organizer / secretary and such kind of organizational

infrastructure would be a permanent feature through which the technology would be disseminated. Composition and TOR of KVM would be as given in Annex-4

The ASS component would be implemented by multidisciplinary and interdepartmental support groups. These groups would be formed from the pool of government staff, who would be officially assigned by their respective line departments and confirmed by the Policy Support Group described below. They would be intensively trained in relevant subjects and given full autonomy and mandate, with clear terms of reference, to coordinate and implement project activities at different levels. The unit of implementation of agricultural support services would be a village/cluster of villages for enhancing the success of group formation and sustainability.

The VSGs & KVMs will be formed in a phased manner during the implementation of the project, and synchronized with the creation of the Water Users' Associations and physical rehabilitation of the irrigation schemes. Technical staff will be officially assigned by the heads of their respective line departments, while farmers would be nominated by the WUAs. The VSGs & KVMs would be technically assisted and supervised by the Taluka Agricultural Officers, Circle Agricultural Officers and Agriculture Supervisors assigned to relevant Talukas, circles and irrigation schemes. They will work in close cooperation with relevant staff of Departments of Irrigation, Animal Husbandry, Fisheries, Agricultural Marketing, etc.

The responsibilities of the VSGs & KVMs will include collection and analysis of technical and socio-economic aspects of the existing farming systems in the village; identification of farmers' needs through participatory approaches; preparation and dissemination of agriculture diversification and commercialization plans based on priority needs identified by farmers and comparative bio-physical advantages and socio-economic conditions. The recommendations of VSGs & KVMs will be submitted to district level Agricultural Technology Management Agency (ATMA) for approval. The VSGs & KVMs will assemble groups of farmers for implementation of training programs, demonstrations and other technology dissemination and income generating activities. The VSGs & KVMs will also help in linking farmers groups with input suppliers, credit institutions and market outlets.

Field work will be planned and implemented by the VSG & KVM with each expert contributing his knowledge and experience to the specific activity at hand, while farmers would be exposed to in-service training and contribute land, labour and mobilization of other farmers for training, implementation of FFS and demonstration of improved technologies. Experience shows that there is no unique solution for improving productivity and incomes of small farmers. Successful interventions would be a mix of essential ingredients such as improved technologies that are adapted to the agro-ecological and socio-economic

conditions of small farmers, linkages to markets, and timely availability and access to inputs and support services.

Incentives for VSG members would be the subsistence allowance paid to cover their expenditures with transport and meals incurred while visiting and providing training in the various sites. They would also receive relevant training to upgrade their skills in the priority subjects identified through participatory needs assessment especially, social mobilization, crop production, water management, marketing, agribusiness and agro-processing.

Technical staff of the VSG will be stationed in their present location of work and assemble at the village venue (if available) or other sites within the village/WUA when required by their work plan to be prepared before each cropping season. Administrative and technical support will be provided by their respective line departments (Circle and Taluka Agricultural Officers of Agriculture/Horticulture, Animal Husbandry, Fisheries, Agricultural Marketing, etc.), while financial support for mobility, training, implementation of FFS, fieldwork, and meetings would be provided by the project.

At District Level

At the district level, in order to provide an effective mechanism for co-ordination, integration and management of activities of different agencies involved in providing support services for technology adaptation/validation and dissemination and to strengthen researcher-extensionist-farmer-market linkages, an important project intervention will be the establishment of an Agricultural Technology Management Agency (ATMA) in 17 pilot districts by March 31, 2005 in addition to support 4 existing ATMAs (**Annex 5**). To move the system towards joint ownership by key stakeholders, these ATMAs will be established as Registered Societies with the Governing Board having representation of line departments (Agriculture/Horticulture, Animal Husbandry, Fisheries, Irrigation, Dairy Development, Agricultural Marketing, etc.), State Agricultural Universities (SAUs), farmers, fishermen, livestock producers, any non-conventional agricultural producers which are important in the district, women groups, major rural NGOs, input suppliers, marketing organizations, banks, etc. As a society, ATMA will have the operational flexibility to undertake various activities as decided and prioritized by the farmers and other stakeholders. It will also be able to receive funds from different sources and adopt innovative approach to generate resources from its own programs which will contribute to financial sustainability. The critical functions of ATMA, to be guided on a day-to-day basis by a Management Committee, will include: (a) planning, validation and dissemination of location-specific, systems-based technologies through agricultural support services in the irrigation schemes, (b) dissemination of other relevant information for enhancing farmer income and livelihoods, (c) provision of expanded farmer training, and (d) improvement of in-service training and technical backstopping for extension field staff. The indicative composition and key functions of ATMA

Governing Board and Management Committee are given in **Annex 6 & 7**.

The ATMA will bring together researchers, extension workers, farmers and other stakeholders to conduct diagnostic surveys and prepare a Strategic Agriculture Development Plan (SADP) for the project area. Based on SADP, each ATMA will be responsible for ensuring the effectiveness of the coordination and management of technology dissemination activities within the district. The financial support for a given project district will depend on its production and marketing characteristics, gaps identified, and the agreements reached among stakeholders. According to locally determined needs, the project will finance training, travel and operational costs for diagnostic teams.

Apart from overall coordination at district level, the ATMA will be responsible for provision of technical support to VSGs & KVMs, including participation in their meetings following an agenda to be established based on the seasonal cropping calendar of each village. ATMA will be responsible for consolidation of activities at district level and preparation of district work plans and reports. Among the important tasks to be carried out by district teams will be the participatory identification of training needs of village level staff and farmers and implementation of such training activities. ATMA will also mobilize and effectively link farmers groups and input suppliers, credit providers and market outlets established at district and higher levels.

At State Level

At the state level, a multidisciplinary and interdepartmental Policy Support Group (PSG) will be established by Jan 15, 2005 to provide overall policy guidance and supervision to the implementation of ASS component. This group will be headed by Secretary Agriculture and consist of Commissioners of Agriculture/Horticulture, Irrigation, Cooperation and Animal Husbandry and Directors of Agricultural Marketing, Social Forestry and Sericultural, /Chief Engineer Irrigation and Joint Secretary, representatives of apex NGOs, private sector agencies, apex farmers' organizations, The PCU Nodal Officer Director of Extension will be member secretary of PSG(**Annex 8**). The PSG would ensure that ATMAs and VSGs receive adequate policy guidance, technical assistance and financial support for implementation of field activities. It will review and sanction technical recommendations put forward by ATMAs and VSGs, supervise program implementation, extend technical assistance as necessary, consolidate project work plans at state level, monitor project implementation and impact, coordinate linkages with on-going programs research institutions and universities, facilitate interaction with NGOs and providers of support service.

The PSG will report to the Project Steering Committee (PSC) headed by the chief secretary constituted at state level for monitoring overall execution of the project. The PSG would meet at least once a month and PSC once in an year to review project implementation and progress.

In order to promote ownership of the ASS component by line departments and to strengthen inter agencies cooperation for effective implementation of the component activities in the field, it is agreed upon to convene a meeting of Secretaries of Cooperation, Animal Husbandary, Dairy and Fisheries, EGS and Textiles by Nov 30, 2004. The Commissioner of Agriculture will make a presentation about the scope and proposed activities of the component in the meeting.

At Commissionerate of Agriculture Level:

The project activities will be undertaken by the existing staff of DOA in the project districts/ villages and at the State headquarters in collaboration with staff of relevant line Departments. Therefore, deployment of adequate manpower in the project areas will be necessary. A **Project Coordination Unit** (PCU) headed by the Nodal Officer (of the level of Director will be set up in Commissionerate of Agriculture, Pune. The functions of PCU will include coordination and effective implementation of project activities, monitoring and evaluation, and impact assessment of ASS.

The project will provide funds for organizing demonstrations (including field days), trainings (for farmers and line department staff), capacity building, exposure visits (for farmers and DOA staff), strengthening of SAEMTI, 7 RAEMTIs and 81 Agro-Polyclinics, establishment of 17 new ATMAs and support to 4 existing ATMAs, staff mobility (TA, POL and hiring of vehicles), workshops/seminars, publications, promoting use of modern information and communication technologies, improving service delivery, consultancies for monitoring, evaluation and impact assessment, feasibility studies, contractual services, civil works, equipment, materials and supplies, incremental operating costs, etc. Other needs-based activities relevant to the project areas may be added in consultation with PSG/PSC and the World Bank for achieving the project objectives during implementation.

In view of the necessity of observing timeliness (like optimum time of sowing, carrying out different cultural practices, application of irrigation water, fertilizers, bio-pesticides, etc.) in carrying out various activities for obtaining optimum results, DOA will ensure delivery of inputs at the demonstration sites well in advance. This will require smooth and timely flow of funds to DOA and ATMAs and compliance with fiduciary financial and procurement requirements.

PCU established in the office of the Commissioner of Agriculture in Pune would support the PSG and run the daily activities of the component. This unit would be headed by one of the existing Directors of Agriculture with background in marketing and project monitoring, who would become the Component Manager. The head of this unit will interact frequently with the Project Co-ordination Unit for routine implementation matters. The unit would be assisted by one of the Joint Directors of

Agriculture/Horticulture with experience in extension, and a Joint Director of Animal Husbandry with experience in project monitoring who would have this activity and they would implement decisions taken by the PSG and provide overall technical coordination to the component. The Operational Unit would be supported by contractual manpower, conversant with computer use, and provided with necessary office equipment and supplies. The main function of the unit would be the effective implementation of the policy decisions taken by the PSG and monitoring & evaluation of implementation followed by a study on the impact of the agriculture component for overall agricultural development in the project area with a view to replicate the lessons learnt in the entire area under irrigation.

E. DESIGN FEATURES

It is understood that sustained increase in farmers' income will not come about because of isolated incentives and measures. There is a need for concerted efforts in all aspects of farm production. The component would adopt a participatory and interdisciplinary approach to promote a detailed understanding of how cropping systems operate in the project area. Investigations and surveys would be carried out in order to identify major constraints that limit crop production. The participatory approach would facilitate coordination and collaboration among line departments, NGOs, public and private input suppliers and farmers organizations in the identification of production problems and implementation of priority actions necessary for removal of constraints.

a) Intensive training of VSGs, KVMs & extension workers

Successful intervention in rehabilitation of physical structures of irrigation schemes often do not contribute significantly to foster local organizational capacity. In many instances the involvement of users in the development, implementation, and O&M of irrigation systems has not been sufficient to achieve a desirable level of institutional sustainability. Women's groups, in particular, are often not fully involved. The agriculture component will promote the formation of community groups of men and women in the form of SHGs headed by krishi sainiks & krishi mitras and will enhance their capacity to plan, manage and implement their own activities. A participatory development approach will be applied and the communities will be supported, through training, to prepare and implement social and economic development plans. Some of the aspects of training would be as follows

(i) Since the component will be implemented through farmers groups, such as SHG, VSG, KVM & WUAs, it is imperative that such groups have relevant social skills with reference to group formation/dynamics, leadership, conflict resolution, sustainable livelihoods, asset creation, and the like. Lack of group cohesion and unity is commonly observed in farming communities of the project area. The project would identify

relevant service providers, such as NGOs, SAUs and KVKs that could impart intensive training on social mobilization to members of the VSGs and KVMs.

(ii) There are four Agricultural Universities in Maharashtra offering high level education in rural development located in Rahuri, Akola, Parbhani and Dapoli. Associated to these universities are the Agricultural Technology Information Centres, which have the function of linking the farming community with scientists, facilitate the access of farmers to improved technologies, and provide training and demonstrations. In addition, there are 23 KVKs established in the state with a mandate to impart vocational training to farmers and field extension workers, refine and adapt improved technologies to local conditions, and implement demonstrations to farmers groups with similar limitations and interests. By engaging these training institutions the project would help to improve the skills of its stakeholders.

(iii) Apart from organisational set up, reorientation of farm production towards marketing opportunities is a potential mechanism to help increase income of farmers. As farmers become more market oriented, VSGs need to be in a position to advise them on how to market their produce. Knowledge of produce handling, storage and packaging is essential. Marketing training is therefore vital for VSGs. Farmers seeking to produce new crops need to be aware of their production costs, as well as the costs of marketing.

(iv) An efficient market for farm produce should avoid distress sale when prices are low. Self-help groups may be trained and supported to develop local procurement, storage and market systems for reduction in transaction and transportation costs with consequent increase in profitability. One of the most important constraints observed across the farming communities established in the project area is the frustration with fluctuation of prices of farm produce, high prices of inputs, lack of local markets, high cost of transport, long distances to markets, deteriorated road network, among others. Lack of information on prices and market tendencies among field staff and farmers alike, is evident.

(v) The project would identify relevant and capable service providers, such as specialized NGOs, SAUs, and agro entrepreneurs, to provide intensive market related training to members of the VSGs and technical staff of line departments at Taluka and Circle levels. Training would cover the basic information needed on concepts of marketing, costs, production, distribution and identification of potential markets. Such training would strengthen the linkages among producers, consumers, processors, and exporters, which would make a significant contribution towards increased farmers income.

(vi) The approach to delivery of extension service in Maharashtra needs modernization in order to strengthen the interaction between farmers, line departments, NGO's and the private sector. At present, the methods of transfer of technology are through individual contacts, which render the extension services in irrigated areas,

particularly in canal command areas, weak and ineffective. Experience with FAO-EU based training of facilitators (ToF) programme is encouraging. In which master trainers are created in ToF training. These master trainers in turn train the farmers under farmers field school (FFS). The trained farmers under FFS act as resource persons for the further activities through FFS. Training of VSGs and KVMs would cover this aspect in detail.

(vii) Based on the technology to be transmitted, the ToF would be of five types (i) One days duration (ii) three days duration (iii) Five days duration (iv) 10 days duration and (v) 15 days duration. For the first five years of the project ToFs will be organized where training would be either continuous or distributed along the season. Details of the ToF programme are shown in **Annexure 9**. By the end of the project adequate number of master trainers will be created.

(viii) Based on the duration of training needed FFS will be of four types i.e. i) 1 day ii) 3 days iii) 5 days and 10 days. The actual session of the FFS would be once or more in a week. The group of facilitators will attend one FFS session every day for 3-4 days a week. Remaining days will be utilized by them for next weeks planning. The training acquired by the facilitators in various subject in ToF would be disseminated to farmers in FFS.

(ix) Farmers themselves will conduct FFS at suitable place where technology will be demonstrated & evaluated. FFS activity will take place in a phased manner in project & will continued till 6th year. Overall adequate number of FFS will be organized during the project period in which around 1 lakh farmers will be trained in various technologies during a period of 6 years. Details of FFS activity are shown in **Annexure 10**

(x) Maharashtra being a water scarce state with only 15% of cultivated area under irrigation, a focussed attention will have to be given on using the precious irrigation water in a most judicious manner. A component of promoting micro irrigation concept has been included in the project proposal. Since the programme will have to be implemented with the help of the officers from Agriculture Department, it is proposed to expose them to the latest techniques evolved and adopted in various agriculturally developed countries of similar agro climatic situations like China & Israel

b) On-farm demonstration of new improved technologies

There is a need to increase the efficiency of crop production inputs, such as water, nutrients and pesticides, as well as decrease the cost of production through improved technologies. The project would support on-farm testing of new production technologies that may increase the options for irrigated agriculture and help

to develop modern and more profitable production systems. New and improved technologies that have been developed by research institutions and universities and are in the pipeline for large-scale dissemination, but have not undergone sufficient on-farm testing, will be evaluated in selected project areas. Technologies to be tested will be identified on the basis of needs and priorities identified by farmers, with due consideration of their potential adaptability to the agro-ecological and socio-economic conditions of the areas. Details are given in **Annexure 11**.

Demonstrations would be conducted in farmers fields with full participation of VSG and assistance of KVM and other technical field staff and research experts of the respective disciplines. ATMA and PSG would contact relevant institutions, such as SAUs, research organizations, KVKs, NGOs, and private agencies, and request their involvement in the project. NGOs and private organizations may be contracted to carry out pilot tests. However, isolated agencies should not be solely responsible for such tests. One specific agency may lead the work, but full participation of stakeholders is mandatory. Work plans developed for such tests should spell out clearly the participation of the various stakeholders in the testing process. Demonstrations would be carried out preferably, but not exclusively, in the following areas:

i) Crop diversification

Most common crops grown in the project areas are wheat, rice, sugarcane, sorghum and millets. The project would promote additional crop diversification by supporting pilot tests of oilseed crops such as sunflower, safflower, and spices, which may increase farm profitability. Other high value annual crops, specially vegetables, medicinal herbs and flowers with potential for adaptation to the particular agro-climatic zones would be tested to provide farmers with increased options for profitable farm activities.

Diversification into fruit production will be promoted by the project in appropriate agro-ecological and socio-economic conditions. Technologies developed by SAUs and research institutions as well as introduction of new fruit crops would be demonstrated with potential for adaptation to the various agro-climatic zones.

ii) Promotion of sprinkler and drip irrigation systems

Sprinkler and drip irrigation systems are characterized by higher efficiency of water use. The project would support the partnership between private irrigation companies and farmers organizations, with the aim of introducing sprinkler and drip systems in the project area to promote more efficient use of scarce water supplies and train farmers in the management, operation and maintenance of these systems. The private

companies are expected to extend technical support for assembly, operation and maintenance, while farmers organizations would provide the area and logistics for demonstration and mobilize farmers to be trained.

The project would provide funds for acquisition of sprinkler and drip irrigation systems capable of covering certain area in villages located in relevant sites of the project area. These systems would be installed in selected schemes with agro-climatic conditions and water sources that are suited for these technologies.

The coordination of these pilot demonstrations and identification of suitable irrigation companies would be carried out by ATMA with final selection to be decided by the PSG. The selection process would be competitive and irrigation companies are expected to submit proposals specifying how farmers will be involved in the pilots.

The VSG/KVM/WUA would be responsible for the maintenance of the irrigation systems, with technical assistance from staff of the Agriculture Department and the micro irrigation companies.

Apart from drip and sprinkler other demonstrations like shading net, shading net house, green house and mulching will also be organized.

iii) In situ Water Conservation .

To promote the works under low cost technology of soil and water conservation activities among the community in-situ water conservation demonstrations would be organized. To ensure farmers involvement and to create awareness about soil and water conservation activities among the farmers, awareness campaign on contour cultivation, Vegetative Contour cultivation, Bank stabilization, C.C.T. or C.C.T. with vegetative support, recharge Trenches , Dugout Farm Ponds, Well recharging etc. will be organized through participation of individual farmers on his field through shramadan.

iv) Water Use Efficiency.

For efficient use of water, it is necessary to irrigate the crop taking into consideration the type of soil, water-holding capacity and water requirement of plants. For this purpose the water discharged should be measured using water-measuring devices, so that the optimum use of water will be possible. For this purpose there is a need to demonstrate various methodologies for efficient and economic use of water.

v) Integrated Pest Management.

By the Introduction of improved and hybrid varieties for increasing production, the agro ecosystem also got introduced with number of pest problems. Chemical pesticides though played a crucial role in plant protection the over emphasis on these chemicals led to the problems like, ecological imbalance, environmental pollution, pest resistance to pesticides and resurgence of minor pests. To strike the balance for optimum plant protection with reliance on natural resources the IPM concept was introduced in plant protection. The on field demonstrations of IPM on FFS pattern will help to update the knowledge and skills of farmers and field staff. Such demonstrations would be organized for the entire crop area in a village under a specific crop.

vi) Medicinal and Aromatic Plants.

There is need to protect various species of medicinal plants which are crucial for health care and are used by domestic pharmaceuticals. There is also a need to develop strategies for protecting medicinal plants by the way of scientific cultivation of herbal gardens on commercial basis. In order to spread the message widely there is need of demonstration of plots growing medicinal & aromatic plants linked with the processing..

vii) Farm mechanization.

The economy of Maharashtra state primarily depends on agriculture,. Acute labor shortage during peak periods of farm operations is one of the factors affecting the agricultural sector in the state. In order to overcome this problem and to enable farmers to take up crucial farm operations on time., tractor drawn / self propelled implements need to be supplied to the farmers on custom hire basis. Some of the equipments are Rotavator, T.M. Sprayer , Cultivator(9 types) Seed cum Fertilizer drill, Reaper, Multi crop Thresher, Power tiller, Multi purpose tool bar, Paddy thresher, Paddy transplanter, Grass reaper , Power driven augur, Grader, Septerator, Pulvariser/ Grinder . It is proposed to have such farm implements available at a district centre to be available for demonstration & custom hiring to demonstrate technologies related to farm mechanization.

viii) Integrated plant nutrient management.

Most farmers in the project area do not use adequate bio produce and balanced combination of chemical fertilizers. There seems that there is micro nutrient deficiency in some areas. Split applications and top dressing of nitrogen fertilizer is often not synchronized with critical stages of plant growth. Mismanagement of fertilizer application in areas with high pH leads to nutrient fixation. All of these contribute to low crop yield, high cost of production and low profitability.

Technologies to be tested in project areas would include: balanced rates of macro and micro nutrients, correct placement of fertilizer, split application of fertilizer at appropriate stages of plant growth, and foliar

spray of plant nutrients. In order to improve the physical condition and fertility of the soil, pilot tests would include leguminous crops in rotation with cereals and also soil incorporation of legume crops, such as: Sunhemp, Sasbenia and Glyrecedia. The project would also support pilot testing of microorganisms i.e. Rhizobium and Azotobacter, BGA, Azolla, E.M. etc which may contribute to nitrogen fixation and yield increase of crops.

It is recommended that FFS approach should be followed to promote a comprehensive programme towards the use of farm waste and low chemical input for soil fertilization, as well as IPM as means to promote sustainable agriculture with low cost of production and high profitability. SAUs, KVKs, NGOs and other support agencies could be tapped for technical support. Farmers in the project area normally collect farm waste, animal dung and other residues, with intention to produce compost. But, the process used, open pile, is rudimentary and lead to production of dry organic material with little value as plant nutrient. The project would support pilot testing of compost making by construction of simple low cost compost pits like NADEP, vermi-composting and correct management of the farm waste.

Integrated pest management being an eco friendly concept of pest management is gaining ground in promoting organic farming. This technology has been successfully implemented on farmers field schools approach with assistance from FAO on cotton and rice in the State. Since the technology dissemination under this project is proposed to be on FFS basis, the group of farmers participating in these FFS would be trained in integrated pest management techniques alongwith other relevant agro production technologies. The project would support capacity building of facilitators in IPM technology of various crops while other IPM components would be included in the cost of demonstration.

Presently, there are examples of farmers in Yavatmal who are successfully using organic fertilizers for the production of cotton, soybean, pigeon pea, and grams. The project would use these lessons and increase the awareness among farmers, through training, for replication of these technologies.

ix) Seed Production .

For overcoming the problem of short fall of improved seeds of paddy, wheat, rabi jowar and minor millets it is proposed to encourage farmers to produce seed in the village itself and distribute it to the farmers of the same and the adjoining villages with appropriate quality checks. The foundation or certified seed will be produced on TSF which will be supplied to seed villages for further multiplication. The seed produced by village will be processed for further distribution, This activity of seed production will help to increase the production and productivity of the state..

x) Vermi culture and Vermi composting.

For maintaining soil fertility organic farming is the need of hour. Due to excess use of water and chemical fertilizers the soils deteriorate and become unproductive. For maintaining the fertility as well as texture of soil, organic farming is most necessary. Vermi composting is the best alternative for organic farming. This activity of organic farming should be implemented on large scale particularly in irrigated area. In order to motivate the farmers for organic farming, organizing demonstrations of vermi culture is essential.

xi) Zero energy chambers .

Fruits and vegetable are perishable in nature and need proper attention at the time of harvesting for better shelf life. In Maharashtra, more than 6.93 lakhs ha. Area is under fruit production and every year more than 30000 ha. additional area is coming under production. Similarly more than 3 lakh ha. area is under vegetables, which is increasing day by day. Efforts are therefore needed to promote scientific handling of the fruits right from the stage of its maturity before harvest. Therefore, under this scheme, it is proposed to demonstrate to individual farmers for erecting “ Zero energy chambers”or to take up similar venture .

c) Strengthening of agro-polyclinics, SAEMTI & RAEMTI.

Department of Agriculture has set up a number of agro-polyclinics in the public seed farms and nurseries located throughout the state. It is estimated that about 81 of these polyclinics are located nearby villages to be covered by the agriculture component. These polyclinics are intended to serve as centres for training of farmers and dissemination of improved technology. Similarly there are regional state level training institute for the training of field staff with various line departments. The project would provide support to these institutions in terms of infrastructure, improved equipments and staff training, with the intent to upgrade them to become effective centres for planning and advice in agriculture production, PHM & marketing. They would be strengthened to provide effective linkages between farmers and farmers groups with local markets, private businesses, technology information centres, input suppliers, and credit institutions. They would also support VSGs & KVMs in the implementation of FFS and dissemination of technologies through training and demonstrations. The polyclinics & training institutions would be supported and encouraged to make full use of modern information technology (internet, TV, radio) in their daily activities.

The importance of farm mechanization is well recognized as means of saving time and speeding agricultural operations, resulting in greater efficiency and reduction in the cost of production. The project would provide resources for these 81 agro-polyclinics to acquire relevant farm equipments and use it in demonstrations and as instruction tools in training activities. The specific equipment will vary according to identified needs and priorities, but most likely tractor drawn implements, threshers, seed/fertilizer drills, sprayers, dusters, seed

bed levellers, and the like to replace the traditional less efficient implements in use would be acquired to provide them on lease by the service providers.

For Maharashtra Water Sector Improvement Project total 66 projects are identified for agricultural support services. At present there are 136 agro polyclinic, 65 TSF and nurseries located nereby in the talukas and districts. This infrastructure would be helpful for conducting the various demonstrations and workshops, seminars & training of staff and farmers. At present the polyclinics are equipped with a minimal infrastructure for conducting the demonstrations and preliminary training in the department. However, few centers are needed to be equipped with additional civil infrastructure and also to be provided with the equipments like computer, printer, telephone and necessary furniture so that they could act as District training centers under the project. Some of the TSFs also need to be equipped with seed processing units for the processing of seed produced by the farmers. The details are given in **Annex 12**.

d) Mainstreaming of ATMA Model :

The effective transfer of operation and maintenance of irrigation schemes to the WUAs is a fundamental feature of the project. Operational plans of irrigation should be developed and managed with effective participation of farmers and agricultural extension services as part of an integrated agricultural production process. For this reason, VSG must be closely linked with WUA from the onset of their establishment, and farmers of the VSGs should be active members of the WUAs. Technical staff of line departments, as well as NGO and private sector agencies, including service providers should work towards effective integration of all organizations. Strong linkages and effective partnerships between irrigation, agriculture, animal husbandry, sericulture, horticulture, Marketing , Agri business, Agro processing , NGO, private sector and farmers should bring about significant improvements in support services, with the ultimate objective of increasing farm efficiency and farmers' income. It is therefore proposed to establish at least in 21 districts, including 4 districts where such agencies already exist, Agriculture Technology manpower agencies on the line of NATP where such experiment has been found useful. The details are given in **Annex 13**.

Under this activity the project would provide funds for a series of meetings, seminars and workshops involving all stakeholders at village, taluka/circle and district levels. The main purpose of the meetings would be the involvement and interaction of farmers and providers of support services such as credit institutions, seed producers, fertilizer and pesticide dealers, representatives of agro-industries, traders of agro produce, NGOs and export agents. These seminars would be coordinated by the VSG and ATMA. Presentations would be made by representatives of the different organizations and a moderator would encourage discussion and flow of information to finally frame Agriculture Developemnt plan & Annual Action Plans to achieve such a convergence.

Exhibition is an educational tool, therefore it is necessary to prepare exhibits and organize exhibitions on latest agricultural technologies relevant to their region at regional and district level. The experience of such exhibitions has inspired the opinion leaders and farmers all over the state. The technological components are highlighted through models, tran-slides, blow-ups, bromides, live samples etc. Exhibitions are definitely helpful in motivating the farmers for adopting new agricultural technologies.

ATMA would take up this activity as well.

e) Support to agro-entrepreneurship development :

At present the agro related infrastructure like bio fertilizer and bio pesticide units, post harvest management e.g. processing packing, grading units are located at very few places with in the public sector. These units are functioning without involvement of local farmers and community and therefore the desired benefits are not rendered to the farmers. It is proposed to establish such agro related ventures in the project areas. Infrastructure could be managed by WUAs, VSGs as well with the development of local agro entrepreneurship. The units which needs more technical such inputs will continued be operated through the public sector. The details are given in **Annex 14**.

The ventures which could be operated through private sector would includes seed processing units,, bio fertilizers units, bio pesticides units, horticulture nurseries, agro processing packing and grading units., Onion storage structure, distillation units for medicinal and aromatic plants, vermi- culture units, agro processing units and urea briquetting machines etc. The infrastructure which would need more investment or greater technical content like quality (Tissue / leaves) testing units will continue to be operated through the public sector.

The experience of engaging private sector and NGOs in the delivery of extension or farm services to farmers has been mixed. Some organizations have failed in their attempt, while others have been successful. The successful ones are characterized by a well-developed infrastructure and efficient management, with dedicated and competent staff. Involvement of reputable NGOs in capacity building, marketing, training, and policy analysis, would be helpful in complementing the efforts of the public extension services.

NGOs usually place a strong emphasis on social organization. Their guiding principle is that without proper social organization, efforts to introduce production technology will be fruitless. Most NGOs work on few villages, but they devote more staff-time per village and cover many subjects, while government staff are almost exclusively trained in agricultural sciences.

The project would support, on a pilot basis, delivery of various farm services through NGOs and private sector in selected irrigation schemes on a competitive manner. Care will be taken in selecting NGOs that have necessary infrastructure support and staff capability to undertake the necessary work.

Most probably, single NGOs or private player would not have the capability to cover all extension needs (agriculture, marketing, Agro-processing, animal production, irrigation, and horticulture). But the NGOs or private player to be entrusted with the responsibility of delivering extension service to a particular irrigation scheme, must show, on its proposal, a clear multidisciplinary and participatory approach to extension with involvement of line departments and farmers. Evaluation of proposals and selection of NGOs or private player would be conducted by the PCU in coordination with ATMA and VSG. All such projects would be aimed at entrepreneurship development in the field of agriculture and allied sectors.

f) Operational Unit for monitoring and evaluation

The responsibility for monitoring and evaluation of project implementation and impact would rest with the Operational Unit stationed in the Department of Agriculture in Pune known as Projection Co-ordination Unit (PCU). Details are given as **Annex 15**.

This unit would be asked to develop and implement an effective system of monitoring the implementation of the agricultural component of the project. ATMA and VSG would be trained on collection and tabulation of relevant data that would measure implementation efficiency. Examples of such data are number and types of training at various levels, number and gender of trainees, number and types of demonstration plots, cost of activities, and other relevant indicators.

In addition to this routine monitoring, the Operational Unit would coordinate the implementation of an evaluation process that would estimate the impact of the component in the livelihoods of the farmers, measured by changes in production, productivity, profitability, and income. This impact monitoring would be conducted concurrently as well as by the end of the project. to gauge the variation of these indicators over time. This activity would be contracted out to an independent organization that would develop and submit a relevant proposal for the effect, including methods, materials, list of indicators, human resources, cost and reporting procedures.

The impact monitoring should include at least 50 villages, representing small, medium and large schemes, and 20 households per village. Household surveys would be conducted in the kharif and rabi seasons in each of the project year. In addition to household surveys, data would be gathered through group discussions and other relevant methods.

A preliminary, non-exhaustive, list of impact indicators to be considered in the impact monitoring would include the following: a) Production: yield, area planted, farm size, by-products, animal output and by-products; b) Household: consumption of crop and animal products, sale of crop and animal products, storage of production for safety/replanting; c) Inputs: seed, fertilizers and pesticides, family and hired labour, farm machinery, animal power, water for irrigation; d) Other indicators: land taxes, off-farm employment, and access to support services.

SUB COMPONENTS AND ESTMATED COSTS

Relative size of various components:

The project would provide support to a number of activities designed to enhance the coordination among institutions as well as their normal operating procedures.

It is proposed to strike a balance in all aspects of agriculture support component of the project wherein at least 50% of the project outlay would be reserved for training and demonstration of various technologies, there would be provision for development and strengthening of infrastructure with the aim of capacity building to make use of that infrastructure, part of the outlay would be reserved for carrying out activities through agro-entrepreneurs in the field of agro production and commercialization of technologies which are innovative in nature and the balance would be for monitoring evaluation, carrying out the field studies and studies on impact assessment. The strengthening of infrastructure would include the strengthening of agro polyclinics, state and regional training institutes, TSFs, and horticultural nurseries within the project area. The phasing out would be in such a manner that the requisite fund for the establishment of ATMA as a district level support group are released in the first phase along with strengthening of infrastructure at the agro poly clinics level with a similar strengthening of training infrastructure at regional and state level so that the project is fully established from taluka to district and to regional and state level as far as capacity building and physical infrastructure is concerned. The field activities would include the support for requisite networking with other organizations with the use of IT infrastructure. The establishment of project coordination unit (PCU) at the Commissionerate level with an appropriate outlay would also be taken up from the day the project is launched.

Sub Component 1 : Training VSG members, farmers & manpower with line departments

a) Training of village support groups-

The Village Support Group at the grass root level is proposed to involve each and every farmer of the village in the technology dissemination and decision making process at the village level through a membership of Water Users Associations from the respective village to establish an organic link with WUA and would have the representatives of the line departments, extension service providers, and the representatives of the

farming community of the village. The farmers would be grouped into 20 each so that the concept of the self help takes roots in the beginning itself. Such group would be headed by an individual called ' Krushi Sainik '50% of which would be women farmers.

It is estimated that in the project area, there would be nearly 3 lakh farmers grouped into 15000 SHGs which would be trained into the working of the village extension machinery under the leadership of village support groups. Such groups would meet at least once in a week and would be supervised by an individual from the village called ' Krushi Mitra ' who would have at least five such groups under his or her jurisdiction. Krushi Mitra would also be trained and would work in close coordination with a Krishi Vigyan Mandal (KVM) having its membership of Krushi Sainik and Krushi Mitra one of whom would also act as its Organizer or Member Secretary. The constitution and Terms of Reference of KVM are shown in **Annexure - 4**

The Krishi Vigyan Mandal would be supported by a small library having the literature which is relevant for the village. The entire machinery of Krushi Sainik, Krushi Mitra and Krishi Vigyan Mandal would be supervised through one day training / workshop at least once in four months during which it could be ensured whether the technologies for which the farmers are being trained and for which group demonstrations are being organized, have actually reached to the farmers so that the investments which are being made give adequate returns during the project period.

The tracking mechanism of such activities of training and demonstration would be formulated by SAEMTI and the same would be implemented by RAEMTI through ATMA. The conduct of such grass root level groups would be inspected on random basis so that the village support groups along with its grass root level infrastructure remain active for the project period and beyond.

Krishi Vigyan Mandals which work effectively would be given an incentive by way of supply of IT equipments for information dissemination on technologies as well as markets for which static and dynamic content would be developed at the state and regional level. It is proposed to engage NGOs as support groups for the formation of such KVMs through Krushi Sainik and Krushi Mitra for which incentives would be provided for such NGOs to meet their contingent expenditure. It is also proposed that since it would be an exercise in mass mobilization, adequate publicity would be given to this activity and ambitious campaigns would be organized through ATMA for the creation of this extension infrastructure with people's participation.

Exposure Visits:

Another important aspect of success of NATP has been the exposure visits of the farmers within the district, state and outside the state, which has given encouragement to the farmers to adopt various technologies relevant to them. The exposure to the district officials directly involved in the project

implementation including those from the line departments to those countries which have similar cropping pattern and agro climatic conditions would help in faster dissemination of technologies if such exposure visits include inter disciplinary talent from the respective project areas. It is proposed to take up such exposure visit during the project period.

Intensive training is proposed for Krishi Sainik and Krishi Mitra network of the agriculture department. The Krishi Vigyan Mandal, for a group of 1000 farmers families will be established through the department of agriculture which will be strengthened by providing training materials, computer and other equipments. The NGOs promoting FFS and formation of krishi Vigyan Mandal and organising training for this network will be given assistance. The detailed cost estimates are presented in the **Annex-9**. The total provision of **Rs. 382.50** lakh is proposed from the project fund.

b) Training of manpower with line departments and extension services providers (ESP)

It is proposed to organize training for human resource available with agriculture and allied line departments which would act as Master Trainers to impart training to the villagers at the grass root level. The extension cadre of service providers would also be developed who would be trained along with master trainers and who would preferably have background of formal training of agriculture. Packages of each kind of training for capacity building would be developed by SAEMTI & RAEMTI and the training period would be either continuous or would be distributed over the crop season but preferably such training would take place for each crop season separately. Depending upon the extent of training required and its depth of knowledge to be imparted, the training period would be one-day workshop or three days seminars or five, ten or fifteen days training either concentrated or distributed over the crop season.

The cost norm for such staff training or training to the extension service providers would be Rs.10,000/- for one day workshop, Rs.25,000/- for three days seminar, Rs.50,000/- or Rs.1.00 lakh or Rs.1.50 lakh for training for 5/10 & 15 days respectively. The trainings would be imparted in a batch of 40 which would include staff from the line department and the extension service providers so that the two work together at least for two years before the extension service provider acts independently as a paid extension worker in future.

The staff training would include the exposure visits within and outside the country so that some of the technologies get imbibed to the staff members as well as extension service providers. The project related personnel would also be given an opportunity to have an exposure visit outside the country for which adequate provision has been made. This component is also provided with traveling expenses for line department staff as well as extension service providers. While selecting the trainees for exposure visits, care would be taken to have adequate inter disciplinary plans so that all the aspects of agriculture and allied

sectors are covered in such exposure visits within and outside the country. Training of facilitators both from the state department and extension services providers (ESP) or representatives from Water Users Association and NGOs will be organized for one day, 3 days, 5 days or 15 days continuous or distributed at SAUs SAEMTI & RAEMTI KVKs. These trainings will cover technology demonstrations, organic farming and integrated pest management etc. The total funds required for these training would be **Rs.529.20 lakh**. The details about the cost & phasing of training programme are presented in **Annexure 10**.

The extension activities will be undertaken through technological demonstrations through WUA, FFS, KVM, or at level of village taluka, district as per the need of the farmers. These demonstration will include Horticulture and crop demonstrations organic farming, micro irrigation, agro processing, IPM, INM etc.

Funds are provided from the project to undertake the exposure visit of officers from the project districts and state headquarter to expose them to the latest technological developments in the areas of irrigated agriculture in other advanced countries. This will enable capacity building of the officers from the department of agriculture and intern to disseminate it to the farmers in selected project areas. Twenty officers are proposed to be included in this exposure visit from third year onwards during project period. Detailed cost estimates and phasing of exposure visit programme are presented in **Annex.10 Rs.120 lakh are proposed for this components Separately**

c) Training of farmers:

The services of trained line departmental staff as master trainers and trained members of the farming community as extension providers would be used for the farmers training in various technologies for which training packages would be developed by SAMETI & RAMETI for varying period of 1, 3 or 5 or 10 days either continuous or distributed basis for which a provision of Rs.2,500/-, Rs.5,000/-, Rs.10,000/- or Rs.20,000/- respectively would be provided for a training of farmers of batch of 20. Such training would be organized at the grass root level by agro polyclinics or KVKs or SAUs or RAEMTI or SAEMTI or training institutes like Horticulture Training Centre (HTC) and National Post Harvest Management Training Institute with the marketing board.

It is proposed that in the project area of roughly 5 lakh hectare, a trained personnel either from the staff or from the farming community as extension service providers should be available for each 2000 ha. area which would mean roughly 250 such extension personnel from Agriculture department and another 250 extension service providers would get trained in various subjects over a period of time. They would provide adequate trained man power to train farmers at the grass root level in groups of 20 which would act as a farmers self help group. Wherever possible, distributed training would be imparted in a mode of farmers field schools on the lines of FFS developed by FAO-EU in various states for IPM in cotton. The training would be provided as per needs of the farmers communicated through WUA. The farmers would be

encouraged to have training not only in crop technologies but also on post harvest management, decentralized processing, grading, packing and marketing.

The trained facilitators will be organized for various technologies depending upon the technology duration ranging from 1 day to 10 days at one time or distributed over the season.. The total number of FFS and year wise phasing is presented in **Annexure -10**. The total of **Rs. 1740 lakh** has been proposed for this capacity building programme.

Sub components 2 Technology Dissemination through demonstration :

Technology dissemination for various groups including demonstrations on water use efficiency would be provided based on the demand. It would be reflected in the Annual Action Plans (AAP) of the respective districts under ATMA. Such demonstrations could be grouped as follows :

- a. There would be demonstrations on crop production technologies which would be crop based for which cost norms would be assigned but the total cost of the demonstration would not exceed Rs.10,000/- and if it is more than the same, the demonstration area would be proportionately reduced. The demonstration would not be less than 0.40 ha. and could have a larger area provided the total cost of demonstration remains within the limit of Rs.10,000/- The demonstration would be taken in those villages which represent as an area near the head of the canal or its middle or its end so that the crop demonstrations cover all those areas which have adequate water availability of those areas or which have a probability of inadequacy of water for irrigation. The cost norms for demonstrations would be developed for cereals, pulses, oilseeds, cotton and sugarcane keeping in view the similar norms, which are applicable outside the project area under various schemes of central and state government.
- b. There would be need based demonstration on water use efficiency in selected villages which would include the demonstration of mulching technology, in-situ water conservation, use of drip and sprinkler irrigation and in no case, the support provided for the demonstration would exceed more than 50% of the incremental cost due to supply of equipment or material for drip, sprinkler, mulching etc.
- c. Such demonstrations would also include the trials on reclamation of ill drained soils. As in many areas under irrigation projects, the problem of salinity has assumed dangerous proportions and low cost technologies have shown promise for reclamation of such lands, they need to be demonstrated to the farmers. Some of the experiments are to increase the organic content with soil and taking up of the crops giving green manures, which could be recycled within the field itself. Such demonstrations would be need based and would be taken up only when they are reflected in the annual plan of the relevant project area.
- d. The demonstration would also be taken on IPM in selected villages over an area of 100 hectare or more so that the impacts are visible and in some cases the entire village is covered.

- e. Demonstration on IPM would have the component like green manuring, production of Blue Green Algae, Azola, Vermi composting, improved composting through NADEP, use of effective micro organism (EM) Emphasis would be given on proven technologies and new concepts would be tried on a small scale first and if found effective, would be multiplied in the later years of the project.
- f. Demonstration on seed production technologies in selected villages would also be organized so that the decentralized seed production takes place and the cost of cultivation reduces and at the same time productivity increases due to the use of seed better than the one which farmer use as a part of last year's crop production.
- g. There would be demonstration on horticultural crops for fruits, vegetables, floriculture, medicinal and aromatic plants, spices, mushroom cultivation and such need based demonstration would be asked for by village support group and would be supported by WUA and get finally approved by district support group under the overall guidance of policy support group. Demonstration would include the post harvest technologies like zero energy chambers, which could be easily adopted at the village level. Demonstrations on vegetable nurseries would also be taken up which would lead to the higher productivity.
- h. Any new technology which requires demonstration in irrigation area would also be taken up for which norms would be fixed by policy support group and the operational guidance would be issued by project implementation cell at the commissionerate level and the project based demand come from the district support group with complete involvement of WUA. This would include use of new farm equipments and machinery for which agro entrepreneurs would be encouraged to have custom hiring services provided such technologies are found to be useful after their demonstrations. The agro polyclinics for this purpose could be equipped with few items of farm machinery which could be given on hire for the progressive farmers to demonstrate their use and if found useful, the custom hiring services could be introduced as one of the innovative projects in some of the project areas.
- i. There are large number of agronomic practices and new technologies which could lead to increase in productivity if they are tried in a mode of precision farming for which it is proposed to have certain model farms either at SAUs or with KVKs or in TSFs or with any other public institutions in the project area for which a provision is proposed to be made out of the outlay available for demonstrations. A total outlay for demonstrations is shown as Rs. 1758 lakh in **Annexure-11**.

Subcomponent 3 :- Strengthening of Training Institutes

a) Strengthening of agro-polyclinics

For Maharashtra Water Sector Improvement Project total 286 projects are identified for agricultural support services. At present there are 136 agro polyclinic, 65 TSF and nurseries located nereby in the talukas and districts. Out of these 81 polyclinics in the project area are proposed to be strengthened in the

project area. These infrastructures would be helpful for conducting the various demonstrations and workshops, seminars & training of staff and farmers. At present the polyclinics are equipped with a minimal infrastructures for conducting the demonstrations and training in the department. However, other centers are needed to be equipped with civil infrastructure like dormitories for the farmers, training hall etc and also to be provided with the equipments like computer , printer, telephone and necessary furniture. Some of the TSFs needs to be equipped with seed processing units a farm implements for the processing of seed produced by the farmers and for custom hiring of equipments.

The project area is extended for 66 schemes spread over 81 talukas. It is proposed to develop the existing agro policlinics wherever they were already established or to strengthen the existing Taluka Seed Farns / Horticultural nurseries as a separate infrastructure for crop demonstration, technology dissemination, diagnostic services and training centre for the farmers within the taluka in which the agro policlinic is situated. Such agro policlinics would be strengthened in physical infrastructure by way of absolutely essential renovation of already existing civil structures, supply of IT equipments, development of training material and extension literature along with the support for day to-day operations to supply all stationery and to meet staff contingency. Such agro policlinics would act as centres of technology dissemination for the farmers for whom farm demonstrations and trainings would be organized on a regular basis. Several services will also be provided through these agro polyclinics which include disease diagnostics, supply of agro inputs like seeds, bio-fertilizers and bio-pesticides, and technology dissemination of post harvest management and facilitation of agro marketing. One of such agro polyclinics where adequate infrastructure already exists would be graduated as District Training Centres through renovation of existing civil structures, supply of equipment and materials on a higher scale than the one provided for the other similarly placed agro policlinics in other talukas.

The extension infrastructure for crop technology dissemination through demonstrations, diagnostic services through agri clinics and marketing support through agri business activities requires the strengthening of existing polyclinics in the project areas where they already exist but do not meet the requirement of market driven extension for grading, packaging for decentralized processing and similar agri business activities. With an aim to increase the employment in the project area, such agro polyclinics, Taluka seed Farns and Horticultural nurseries which would provide support services to the farmers in the project area would need upgrading for which support is proposed to be provided. One of these agro polyclinics would be up-graded as a district training centre where the facilitators and extension services providers would be trained to act as master trainers for the farmers field schools (FFS) and to work as extension service providers for the paid extension services respectively. Various technologies which could be taken up at the grass root level either for input production like seeds, bio-fertilizers and bio-pesticides or for output processing like cashewnut processing, medicinal and aromatic plant processing etc. would be

demonstrated at such agro polyclinics TSFs and nurseries either in public sector or in a joint sector with private entrepreneurs from the neighboring areas to make such technologies available to the farmers.

For the strengthening of infrastructure, a total provision of **Rs. 636.00 lakh is shown in the Annex-12.**

b) Strengthening of SAEMTI :

The State has a State Agricultural Institute by the name of Vasantnao Naik Agriculture Extension Management & Training Institute at Nagpur with its seven regional centres known as Regional Agricultural Extension Management Training Institutes. The training infrastructure which is available is inadequate in physical structures and lacks in human resource to deal with issues relevant for the irrigated cropping pattern like one for marketing, processing and exports. It is proposed that this training infrastructure would be strengthened and certain manpower with commercial background would be provided on contractual basis to provide training inputs in the field of agro marketing, agro processing, agricultural exports, WTO issues, global standards for quality, sanitary and phytosanitary measures and similar other subjects relevant for irrigated cropping system.

The State Level Training Institute at Nagpur namely VANAMTI would be strengthened further to provide inputs on agri business and agro processing, the areas in which these institutions are relatively weak in infrastructure. The physical infrastructure would be strengthened by taking up renovation of the existing civil structures and by providing adequate trained manpower on contract basis for meeting these new responsibilities of training in post harvest management, agro marketing and agro processing.

A provision of Rs. 91.20 lakh is provided for this purpose in **Annexure-12.**

c) Strengthening of RAEMTI :

The project area has 7 Regional Agriculture Extension Management Training Institutes which will have to be strengthened in physical infrastructure and trained manpower to meet the training needs in those sectors which have not been covered at present and which are mainly related to post harvest management, decentralized agro processing and domestic marketing. Human resource would be augmented through contractual assignment for providing such inputs to the existing manpower with agriculture and line departments. These institutions will also have to provide adequate infrastructure and trained manpower for capacity building in the use of IT equipments with the agro polyclinics and its usage for agricultural extension and marketing purposes. Adequate support would be provided to arrange such trainings which would need development of training material, publication of extension and training literature, provision for contingencies including supply of stationery and other office equipments.

A provision of Rs. 213.50 lakh is provided in **Annexure-12**

Training infrastructure at VANAEMTI & SAEMTI would be used to achieve translation of ATMA model as it has been experienced in the four districts where NATP is in progress and would take care of training needs for agro entrepreneurs, village support groups, conduct of various crop and technology demonstration and creation of master trainers as well as extension service providers for the village level training and extension and training to the farmers and technology dissemination at the grass root level.

Sub component 4 :Mainstreaming of ATMA:

Under this activity the project would provide funds for establishment of ATMA in 21 districts, funds for a series of meetings, seminars and workshops involving all stakeholders at village, taluka/circle and district levels the purpose of which would be the involvement and interaction of farmers and providers of support services such as credit institutions, seed producers, fertilizer and pesticide dealers, representatives of agro-industries, NGOs and export agents.

It is proposed that a five year plan for the agricultural development of the project area would be prepared for which an inter disciplinary, inter departmental technology management agency ATMA at the district level would be established based on the experience in four districts where National Agriculture Technology Project is in progress. Such agency would work under the chairmanship of District Collector and would have district level official from agriculture department as its Member Secretary.

The agency would be supported with trained manpower in project preparations and their implementation with the contractual manpower having expertise in this field. Projects to be prepared with the help of line departments to translate the agriculture development plan for the project area, adequate support could be provided in the first year of the project itself. The interdisciplinary concepts would be developed by carrying out various seminars and workshops in the field of technology dissemination, credit availability, input supply, agro processing and marketing. Such project preparation on annual basis consolidated in an annual action plan for each year would emphasise the role of private sector in various fields of agriculture, animal husbandry, dairy, fishery and agro marketing. The emphasis would also be given on increase in productivity, improvement in quality, decrease in the cost of production and sustainability of agriculture in irrigated areas while formulating such projects for domestic as well as international competitive market. The project would also give priority for diversification into high value crops once the irrigation is available on regular basis.

The district level agency would act, as a district support group under whose overall supervision and guidance of the Village Support Groups would be implementing various grass root level projects for which adequate support would be provided for capacity building, demonstrations and creation of support

infrastructure at the village level through the development of local entrepreneurship. The agency would be adequately supported, in addition to the contractual manpower with a provision for meeting the operational expenses and cost of travel.

Agency would take up various studies relevant for the project preparations and overall agricultural development of the project area. The project profiles on short contractual assignment will also be prepared which could be used by local entrepreneurs for providing infrastructure or services for overall development within the project area.

The agency would organize agricultural exhibitions for faster dissemination of technologies which have already been found to be successful and would encourage the replication of the projects which have shown some merits under various NATP districts within and outside the state.

Agency would conduct feasibility studies on innovative activities which are likely to be taken up either by WUAs or Krishi Vigyan Mandals or local entrepreneurs. One of the responsibilities of the agency would also be to give adequate publicity to the project activities and create awareness amongst the farmers for greater dissemination of technologies within the district.

The studies would include the documentation of various processes which are taking place in the field of organic production and would formulate projects on domestic certification for the organic farming which would require finalization of organic standards, recommendations on various organic practices, creation of organic certification structure, the capacity building of the manpower involved in such organizational structure and carrying out of the process of organic certification on payment basis. While the statewide standards and practices could be worked out by a state level institution, its variations at regional and district level would be studied by the regional institutes and ATMAs in respective districts. It is suggested that at least one such large scale project would be taken up by each ATMA in the project districts to give thrust to the concept of organic farming with a view to produce quality product at a lower cost for the increasingly competitive global market.

In the state, four districts have been covered under National agricultural Technology Project and the Agricultural Technology Management Agencies in these four districts have done experimentation with extension methodologies and marketing tie-ups and such success stories have been documented which could be taken up with an intention to replicate them in the project area. Various aspects of such successes depending upon the local relevance would be identified and would be replicated in a size which will have an immediate impact.

Under NATP, the four districts of Maharashtra have developed Strategic Research & Extension Plan (SREP) for the project districts. It is proposed that for each project area / scheme, instead of SREP, a comprehensive agriculture plan would be prepared which would include all the sectors of agriculture and allied subjects including Animal Husbandry, Dairy, Fisheries, Sericulture, Horticulture, Agro Forestry. Such agriculture development plans are proposed to be prepared by an inter departmental group under the chairmanship of the District Collector on the lines of ATMA - an organization which would get registered under the Societies Registration Act in each district excluding those districts where such agency already exists. It is proposed to support such an agency in the project districts with a provision of Rs. 1627.40 lakh as in **Annexure-13** to be made available to the line departments for consolidating their efforts towards agriculture and allied development in the respective districts during the project period.

Subcomponent : 5 Development of Agro-enterprise :

Several economically viable but innovative concepts have been developed in increasing productivity, agro-processing, marketing, grading, packaging etc. which needs to be demonstrated either by the respective universities, KVKs or NGOs or could be supported to be taken up by the private sector. It is proposed that such innovative activities would be taken up in the project area to demonstrate such technologies which are promising but have not been taken up commercially due to inherent risks involved in such new ventures. It is proposed to provide a provision of Rs.1305 lakhs as in **Annexure-14** for such projects for the project period.

It is proposed to establish an Agro Enterprise Development Fund for innovative technologies which would help the prospective entrepreneurs in rural areas to develop support infrastructure for various sectors related to the agricultural technology dissemination, post harvest management, agro processing and marketing. Such agro enterprises which will come up in the project area will be assisted for the equipment and machinery and the assistance would be limited to 50 per cent of the project cost for setting up such an agro enterprise.

The field of such enterprise would be selected by Water Users Association as per their felt needs and would be approved by district support group in the form of Agriculture Technology Management Agency (ATMA) up to a capital outlay of Rs.5 lakh beyond which such innovative activities would be considered on selected basis by the project coordination unit under a overall guidance of policy support group. Kind of projects are illustrated as follows.

(i) Some of the projects as a support to technology dissemination would be aimed towards the decentralized supply of agro inputs like production and processing of seeds, supply of bio-fertilizers and bio-pesticides, decentralized nurseries established either through Water Users Associations or by innovative

farmers, supply of vermi compost culture to encourage organic farming, production of urea bricks in paddy growing areas, production and processing of medicinal and aromatic plants and similar such ventures for agro enterprise in the field of post harvest management like the storage structures for onions, packing and grading units for fresh fruits and vegetables, cashewnut processing and similar post harvest management enterprise for agro processing and marketing.

(ii) The projects would include decentralized collection centres consolidated into grading and packing unit for domestic marketing and exports. Innovative technologies which could be adopted commercially would also be encouraged on selective basis. To encourage agricultural diversification projects on floriculture, medicinal and aromatic plants, spices, use of green house technology for exotic fruits and vegetables would also be considered for the support as demonstration

(iii) Since it is proposed to have an internet connected computing device with Krishi Vigyan Mandals provided such organisations contribute at least 50% of the cost of equipment, there would be a need to have a content developed for the irrigated crops and software developed for providing various services required in such areas. Since a similar project is being taken up as Virtual University for Agrarian Prosperity for Maharashtra by the state, the projects would help to develop relevant content and provide services for crops specific to the irrigated areas.

(iv) To meet the challenges in WTO and to take care of the health of the consumers, it has become absolutely necessary to have strict quality control measures adopted for the agro produce for which the regulatory mechanism has to be introduced for supply of agri inputs and marketing of the agri outputs. While quality testing infrastructure in terms of laboratories for seeds, fertilizers and pesticides exist in some measures and the pesticides residue testing is being introduced in the state, such a quality testing infrastructure for inputs as well as output is required to be strengthened in public and private sector for which a support for strengthening such structures in public sector either with SAU or with the state government or with NGOs will have to be introduced and the same under the private sector needs to be encouraged as commercial ventures for such public utility services needs to be provided. It is proposed to have such projects for strengthening and building up such quality control infrastructure in the project area.

(v) The objective of some of the projects would be to integrate field level machinery for agricultural extension and research to credit disbursement for agri input supply and marketing, as it is essential that such integration takes place for the adequate returns to the farmers. Such integrated projects would focus on all the aspects of agricultural extension through crop demonstration up to the marketing of the produce for which a well thought out model will be developed for each major crops. It is proposed that for perishable commodities like banana for Khandesh region, Pomegranate for Western Maharashtra, Alphonso for Konkan

and Keshar Mango for Marathwada region, Sweet lime for Marathwada and Orange for Vidarbha, such integrated projects would be taken up to demonstrate that if the perishable fruits are picked up properly and initially stored safely and carried to the nearest collection centre where the grading and packing could take place, the produce could be marketed either directly to the consumers or could be taken to the processors and if the quality matches the export standards, could even be exported reducing the wastages and increasing the returns of the farmers due to elimination of the intermediary in the entire fruit chain. Similarly projects could also be taken up for other perishable commodities like vegetables, flowers etc. Such projects would be encouraged to be taken up either by the marketing board or by other public institutions as well as associations of the farmers in coordination with the trade and industry.

(vi) The opportunities which have been created due to amendments in the APMC Act as well as development of the concept of the contract farming would also be exploited for the interest of the farmers. These projects could also be taken up as innovative projects in each region where the particular crop is prominent so that the model could be replicated within the region once the initial project is successful. The projects would be taken up on the lines of agro entrepreneurship development for the innovative activities as discussed here.

(vii) While the transfer of technology to a great extent could take place through a traditional system of conducting crop demonstrations, training of the farmers having Farmers Field Schools, exposure visits and similar such ventures, the technology dissemination is faster if the same is linked with the organized marketing for which storage infrastructure, grading and packing house, transport network, retail chain etc. are established in a comprehensive manner for which certain pilot projects need to be taken up either by suitable public agency or a private agency like Water Users Association with support for demonstrating the strengths of such organized marketing set ups for reducing the intermediary and increasing the returns of the farmers.

(viii) To have a marketing tie-up with the existing organizations like ITC which is a successful experiment of e-chaupal in Maharashtra, similar organizations would be encouraged to establish a system at the grass root level where the market information would be provided and the direct procurement of the produce would take place for its retail marketing or processing or exports. This component of the project would be co-ordinated and implemented by Maharashtra State Agricultural Marketing Board. The Board could by itself establish such IT centres on the lines of e-chaupal for the procurement of perishable commodities for the retail marketing or supplying it to the processing units or exporters for which projects would be taken.

(ix) It is realised that bio-fuel plantation like Jatropha, Karanj and similar such species have tremendous scope to develop into an economically viable alternative for decentralized production of bio-diesel in

irrigated areas as the present indications are that such technologies would be economically viable only after the crop is irrigated and the productivity is in the range of 10-50 tonnes per hectare of seed. Though the technology is known for quite some time, no such economically viable project have come up due to various uncertainties involved in setting up such projects for esterification. It is proposed that at least few such model projects in each university area but within the project location needs to be taken up wherein the plantation would be possible under the ongoing schemes of employment guarantee but the processing will have to take place either in public sector or in a joint venture either with SAU or one of the WUAs. An assistance is proposed to be made available for such projects for demonstrating the technology in the project area as it would lead to revolutionary change in the field technology and would also lead to mechanization of agriculture in such irrigated areas to make more efficient use of this technology. Since it has a possibility of bringing in phased manner a large part of waste land under bio-fuel plantation, such a demonstration project would be a welcome addition to various projects mentioned earlier.

(x) Although the organic farming is picking up in the state as a strategy to decrease the cost of cultivation and reduce the pesticides consumption with a possibility of increase in returns of the farmers, such a subject is being constrained due to lack of domestic organic certification for which it is proposed to provide support to a suitable agency either in public or in NGO sector under which such domestic standards would be developed, organic farming practices would be finalized, workers for certification of such processing would be trained and the organizational set up would be established for which a project could be taken up on commercial basis by agro entrepreneurs.

Sub-component 6: Project Co-ordination Unit

a) Project Support Group :

It is proposed to have a Policy Support Group (PSG) at the state level under the chairmanship of Secretary (Agriculture) with the heads of the respective line departments like Commissioner Agriculture, Commissioner Co-operation, Director Marketing, Commissioner Animal Husbandry, Commissioner Dairy, Commissioner Fisheries, Managing Director MAIDC, Managing Director MSSC, Chief Engineer, Irrigation and Joint Secretary, Vice Chancellors of the four Agricultural Universities, Director Social Forestry, Director Sericulture and other relevant line departments for a continuous monitoring District Support Group (DSG) and to avoid the replication of the machinery at the district level, this support group would be the appropriate executive committee of ATMA on the model of NATP under the chairmanship of Collector which would have representatives from Water Users Association, facilitators and extension services providers. At the village level, Village Support Group (VSG) would have the members of Water Users Association from that village, facilitators from the line departments and the extension service providers from the respective areas.

b) Project Implementation Plan : (Yearwise, Quarterly plan is shown in Annexure 20)

The project implementation would involve the establishment of a project steering committee (PSC) under the Chief Secretary, as a Policy Support Group (PSG) at the state level, the Project Coordination Unit (PCU) at Commissionerate level, the District Support Group (DSG) as ATMA under the chairmanship of Collector at the district level, the agro polyclinics at taluka level, Village Support Group (VSG & KVM) at the village level along with the training infrastructure at regional and state level through SAMETI & RAMETI. The project implementation would establish linkages with other line departments especially Animal Husbandry and Agro Marketing with possibility of increase in fodder production for animal husbandry & dairy activities and making use of amendments in the APMC Act for encouraging the direct marketing of farm produce to the prospective consumers.

The project would also establish linkages with various other state and central government organizations and possible support available from state and central government. It would include linkages with Marketing Board, APEDA, Ministry of Food Processing, NHB, Ministry of Agriculture, GoI as well as Small Farmers Agribusiness Consortium at the centre and its Maharashtra unit. The newly created organizations like Aromatic and Medicinal Plant Board and new initiatives like National Horticultural Mission would also be dovetailed with programme while preparation of the Agriculture Development Plan by respective ATMAs under the chairmanship of the Collector.

c) Project Coordination Unit :

A Project Coordination Unit (PCU) would be established in the office of the Commissioner Agriculture for the project implementation at the state level for which contractual appointment of technical experts in various fields would be made with the necessary supporting staff with adequate provision for office equipments, operating expenses, contingency, hiring of vehicles, POL and travel expenses. A similar contractual appointment would be made of officers and supporting staff in the office of each district for whom also the similar provision for contingency office expenses, hiring of vehicles, POL travel expenses, office stationery would be provided.

The project coordination unit would conduct various feasibility studies and market survey studies for technologies which are to be adopted and for varieties of crops which are to be marketed. A separate agency for monitoring, evaluation and impact assessment for the entire project period would be appointed in the first year of the project operation which would carry out close monitoring of deliverables of the project, its concurrent evaluation and its impact assessment after the project reaches its final face. Feasibility studies as well as market surveys would be taken up for each district as well so that economically viable projects could be taken up and only marketable crop produce technologies are promoted. The project monitoring cell would

also take up the follow up on actual adoption of various technologies which have been disseminated and on the success rate of various agro enterprises for which entrepreneurship is to be developed in the project area. Project implementation cell would also develop cost norms and project guidelines for various components in consultation with project

support group and would act as an authority for approval of project beyond certain costs say Rs.5 lakh to be decided by the project support group.

d) Strengthening of Monitoring & Evaluation set-up :

The project would require rigorous monitoring and concurrent evaluation for which the existing machinery of the agriculture department would be strengthened through contractual assignment of this work for the project period with adequate number of supporting staff on contract for which a lumpsum provision is proposed to be made for the entire project duration. The departmental staff still working in the project would be on pay-roll of the department itself and the project implementation would be attached to the Director Extension who would be assisted by one of the Joint Directors of Agriculture and the contractual staff engaged to oversee the project implementation, its monitoring and concurrent evaluation.

e) Market Surveys :

The bringing in of assured irrigation would lead to diversification of the cropping pattern to the crops like medicinal and aromatic plants, floriculture, spices, fruits and vegetables and many other non traditional crops which would get philip only when the marketing tie-ups are established which would require a comprehensive market survey of such high value diversified crops. It is proposed to provide short term consultancy assignment for conducting such market surveys under the project for which a lumpsum provision is provided.

The project would provide funds for the establishment of the Operational Unit at the Office of the Commissioner of Agriculture in Pune. Funds would be available for this unit to develop and put in place an effective system of monitoring the process of implementation of the agriculture component. In addition to this routine monitoring, the Operational Unit would coordinate an evaluation process aimed at assessing the impact of the component in the livelihood of the farmers, measured by changes in production, productivity, profitability, and income. The impact monitoring would be conducted in the second, fourth and sixth years of the project, to gauge the variation of these indicators over time. This activity would be contracted out to an independent organization (NGO or University) that would develop and submit a relevant proposal for the effect, including methods, materials, list of indicators, human resources necessary, cost and reporting procedures. Detailed cost estimate for this sub-component is shown in **Annex 15. Rs. 258.00 lakh are proposed for this component.**

f) Flow of funds : (Schematic fund flow diagram in Annexure 19)

Disbursement of funds for the various activities should follow the schedules shown in Annexes 6 through 12. Funds for specific activities would be based on annual workplans prepared by the relevant stakeholders like WUA, VSG, KVM, ATMA etc and approved by the PCU, and would flow from the Department of Agriculture to the Commissionerate at Pune and from there to ATMA, DSAO office and taluka offices, WUAs, and to other line departments and organizations engaged in the implementation of the component. At district level, ATMA would approve yearly workplans/budgets prepared by each KVM/VSG in the district and recommend fund disbursement from the financial section of the District Office of Agriculture to the responsible entity that would lead the field implementation of the specific activity under consideration (head of Taluka office, VSG leaders, chairman of WUAs or CBOs, heads of NGOs, amongst others). Settlement of accounts would occur in reverse order, with submission of relevant receipts and vouchers.

(g) Project cost :

cost of the agriculture component at Rs. 85.41 crores is presented in **Annex 16**. A complete summary of the proposal with proposed yearly outlays for the entire project are given along with Annexure 9 to 13 as the corresponding breakup for each component. Summary of the project outlay with breakup in terms of civil cost, consultancy and training etc. are shown in **Annexure-17**.

Annex 1. List and location of irrigation schemes, cultivable command areas (CCA).

Sr.No	Name of Project	District	River Basin	C C A
(A)	Major Schemes			
1	Mula	Ahmednagar	Godavari	118552
2	Pench	Nagpur	Godavari	104984
3	Ghod	Pune	Krishna	33660
4	Kukadi	Pune	Krishna	103312
5	Hatnur	Jalgaon	Tapi	23729
6	Kal + Amba	Raigad	West flowing	8242
7	Ltiadoh	Gondia	Godavari	22800
8	Manar	Nanded	Godavari	24470
9	Upper Pus	Yevatmal	Godavari	13678
			Total (Major) 9 Nos	453427
(B)	Medium Schemes			
10	Waghad	Nasik	Godavari	9642
11	Ghatshil Paragaon	Ahmednagar	Godavari	2142
12	Panzara	Dhule	Tapi	7328
13	Mangi	Solapur	Krishna	4068
14	Sukhna	Aurangabad	Godavari	3136

15	Kambli	Beed	Krishna	1047
16	Gharni	Latur	Godavari	3542
17	Terna	Osmanabad	Godavari	2243
18	Katepurna	Akola	Tapi	11187
19	Koradi	Buldhana	Godavari	5076
20	Kanholi	Nagpur	Godavari	3497
21	Pakdiguddam	Chandrapur	Godavari	3820
22	Takepar	Bhandara	Godavari	6315
			Tatal (Medium) 13 Nos	63043
(C)	Minor Schemes			
23	Thakurwadi	Thane	West flowing	184
24	Raitale	Thane	West flowing	162
25	Shrigaon	Raigad	West flowing	227
26	Kondgaon	Raigad	West flowing	190
27	Gawane	Ratnagiri	West flowing	146
28	Zapade	Ratnagiri	West flowing	144
29	Tithavali	Sindhudurg	West flowing	135
30	Shirval	Sindhudurg	West flowing	226
31	Amboli	Nasik	Godavari	608
32	Mahirawani	Nasik	Godavari	949
33	Ratnapur	Ahmednagar	Krishna	430
34	Belapur Badgi	Ahmednagar	Godavari	568
35	Nimgul	Dhule	Tapi	400
36	Methi	Dhule	Tapi	148
37	Hatgaon No. 1	Jalgaon	Tapi	442
38	Galan	Jalgaon	Tapi	425
39	Khaparkheda	Nandurbar	Tapi	815
40	Kodhawai	Nandurbar	Tapi	279
41	Wafgaon	Pune	Krishna	327
42	Shirsuphal	Pune	Krishna	448
43	Aatpadi	Sangli	Krishna	1619
44	Shegaon	Sangli	Krishna	862
45	Hingangaon	Satara	Krishna	320
46	Saatewadi	Satara	Krishna	162
47	Hotgi	Solapur	Krishna	1134
48	Pathri	Solapur	Krishna	1012
49	Shendri	Kolhapur	Krishna	283
50	Kandalgaon	Kolhapur	Krishna	448
51	Ranjangaon	Aurangabad	Godavari	364
52	Champaner	Aurangabad	Godavari	447
53	Dawargaon	Jalna	Godavari	536
54	Bharaj	Jalna	Godavari	584
55	Pimparala	Nanded	Godavari	1153
56	Nichpur	Nanded	Godavari	525
57	Tandulwadi	Parbhani	Godavari	566
58	Mandvi	Parbhani	Godavari	411
59	Walki	Hingoli	Godavari	578
60	Kalamnuri	Hingoli	Godavari	968
61	Belgaon	Beed	Krishna	355
62	Golangari	Beed	Godavari	417
63	Bhutekarwadi	Latur	Godavari	1013

64	Badur	Latur	Godavari	466
65	Bagalwadi	Osmanabad	Krishna	442
66	Yemai	Osmanabad	Krishna	1071
67	Shekdari	Amravati	Godavari	1775
68	Charghad	Amravati	Godavari	1860
69	Vishwamitri	Akola	Godavari	1882
70	Mozari	Akola	Tapi	397
71	Adol	Wasim	Tapi	831
72	Singdoh	Wasim	Godavari	246
73	Vyagra	Buldhana	Tapi	1993
74	Vudrupa	Buldhana	Godavari	1020
75	Manjra	Yevatmal	Godavari	1425
76	Wai	Yevatmal	Godavari	1653
77	Zilpa	Nagpur	Godavari	518
78	Ukarwahi	Nagpur	Godavari	727
79	Dodmazari	Bhandara	Godavari	322
80	Saleburdi	Bhandara	Godavari	432
81	Gadmaushi	Chandrapur	Godavari	932
82	Itoli	Chandrapur	Godavari	850
83	Kunghada	Gadchiroli	Godavari	792
84	Yerawaghu	Gadchiroli	Godavari	170
85	Ashti	Wardha	Godavari	364
86	Savangi	Wardha	Godavari	547
87	Pangadi	Gondia	Godavari	1087
88	Bhadbhadya	Gondia	Godavari	800
89	Muthewadgaon	Ahmednagar	Godavari	405
90	Ambhore	Ahmednagar	Godavari	443
91	Bhalawani	Ahmednagar	Godavari	700
92	Sakur	Ahmednagar	Godavari	469
93	Tikhol	Ahmednagar	Godavari	493
94	Mohari Pathardi	Ahmednagar	Godavari	310
95	Dastapur	Amravati	Godavari	440
96	Malkhed	Amravati	Godavari	1990
97	Satnoor	Amravati	Godavari	380
98	Saraswati	Amravati	Godavari	324
99	Kachner	Aurangabad	Godavari	547
100	Pardeshwadi	Aurangabad	Godavari	501
101	Banoti	Aurangabad	Godavari	916
102	Kelgaon	Aurangabad	Godavari	638
103	Nirgudi	Aurangabad	Godavari	990
104	Gadhe Pimpalgaon	Aurangabad	Godavari	364
105	Nimgaon Choba	Beed	Godavari	1400
106	Chandapur	Beed	Godavari	907
107	Govindwadi	Beed	Godavari	355
108	Murambi	Beed	Godavari	1307
109	Kharshipar	Bhandara	Godavari	610
110	Kotha	Bhandara	Godavari	1010
111	Kawlewada	Bhandara	Godavari	346
112	Wahi	Bhandara	Godavari	382
113	Nagthana	Bhandara	Godavari	465
114	Amgaon	Bhandara	Godavari	507
115	Andhera	Buldhana	Godavari	241

116	Garkhed	Buldhana	Godavari	457
117	Titvi	Buldhana	Godavari	694
118	Zari	Buldhana	Godavari	293
119	Telhara	Buldhana	Godavari	452
120	Mudza	Chandrapur	Godavari	478
121	Janala	Chandrapur	Godavari	977
122	Sondo	Chandrapur	Godavari	930
123	Dongargaon	Chandrapur	Godavari	677
124	Kusarla	Chandrapur	Godavari	554
125	Rudrapur	Chandrapur	Godavari	335
126	Dhanora	Gadchiroli	Godavari	297
127	Yelgur	Gadchiroli	Godavari	403
128	Rajgatta	Gadchiroli	Godavari	471
129	Bodagha-Tukumba	Gadchiroli	Godavari	490
130	Lagam	Gadchiroli	Godavari	344
131	Ankhoda	Gadchiroli	Godavari	200
132	Rengepar	Gondia	Godavari	1305
133	Aktatola	Gondia	Godavari	776
134	Hari	Gondia	Godavari	637
135	Pipriya	Gondia	Godavari	460
136	Salegaon	Gondia	Godavari	1700
137	Gumdoh	Gondia	Godavari	1255
138	Purjal	Hingoli	Godavari	588
139	Parola	Hingoli	Godavari	542
140	Bothi	Hingoli	Godavari	607
141	Savana	Hingoli	Godavari	431
142	Keli	Hingoli	Godavari	616
143	Ghordari	Hingoli	Godavari	498
144	Konad	Jalna	Godavari	1346
145	Paratwadi	Jalna	Godavari	227
146	Talegaon	Jalna	Godavari	544
147	Pimperkheda	Jalna	Godavari	582
148	Barjala	Jalna	Godavari	348
149	Jamwadi	Jalna	Godavari	695
150	Bokani	Latur	Godavari	955
151	Nivale	Latur	Godavari	455
152	Kasar Walkunda	Latur	Godavari	648
153	Gotala	Latur	Godavari	900
154	Nagathana	Latur	Godavari	1578
155	Rachnnawadi	Latur	Godavari	1040
156	Botezari	Nagpur	Godavari	611
157	Salaimeta	Nagpur	Godavari	1188
158	Urakundapar	Nagpur	Godavari	1296
159	Sattighat	Nagpur	Godavari	497
160	Suwardhara	Nagpur	Godavari	875
161	Kumari	Nagpur	Godavari	583
162	Karala	Nanded	Godavari	510
163	Mulzara	Nanded	Godavari	664
164	Sugaon	Nanded	Godavari	850
165	Ghagardara	Nanded	Godavari	419
166	Kedamath	Nanded	Godavari	1809
167	Akharga	Nanded	Godavari	378

168	Thangaon	Nasik	Godavari	428
169	Ramshej	Nasik	Godavari	525
170	Eklahare	Nasik	Godavari	351
171	Jambutke	Nasik	Godavari	589
172	Pethsangvi	Osmanabad	Godavari	287
173	Borgaon (Dha)	Osmanabad	Godavari	730
174	Kolhegaon	Osmanabad	Godavari	587
175	Devdhanora	Osmanabad	Godavari	364
176	Pedgaon	Parbhani	Godavari	405
177	Ambegaon	Parbhani	Godavari	470
178	Nakhatwadi	Parbhani	Godavari	267
179	Devgaon	Parbhani	Godavari	526
180	Wadali	Parbhani	Godavari	541
181	Marsul	Parbhani	Godavari	345
182	Ambazari	Wardha	Godavari	620
183	Kawadi	Wardha	Godavari	304
184	Umari	Wardha	Godavari	649
185	Anjiborkhedi	Wardha	Godavari	648
186	Kannamwargram	Wardha	Godavari	356
187	Dongargaon	Wardha	Godavari	972
188	Asola-Ingole	Washim	Godavari	580
189	Koyali	Washim	Godavari	242
190	Motasawanga	Washim	Godavari	1302
191	Sonkhas	Washim	Godavari	405
192	Shirputi	Washim	Godavari	595
193	Hiwara	Washim	Godavari	301
194	Ghoti	Yavatmal	Godavari	493
195	Ningnoor	Yavatmal	Godavari	738
196	Dudhana	Yavatmal	Godavari	241
197	Eklara	Yavatmal	Godavari	372
198	Khadakdoh	Yavatmal	Godavari	661
199	Karanji	Yavatmal	Godavari	488
200	Uthala	Beed	Krishna	1480
201	Icharana	Beed	Krishna	555
202	Karanjivane	Kolhapur	Krishna	252
203	Benikre	Kolhapur	Krishna	342
204	Man Padale	Kolhapur	Krishna	486
205	Pombre	Kolhapur	Krishna	680
206	Narewadi	Kolhapur	Krishna	480
207	Andur	Kolhapur	Krishna	403
208	Tinraj	Osmanabad	Krishna	275
209	Harni	Osmanabad	Krishna	1660
210	Pilanwadi	Pune	Krishna	418
211	Walén	Pune	Krishna	484
212	Alegaon	Pune	Krishna	300
213	Mahur	Pune	Krishna	435
214	Pimpoli	Pune	Krishna	405
215	Diwale	Pune	Krishna	445
216	Sidhunath	Sangali	Krishna	846
217	Dighanchi	Sangali	Krishna	664
218	Kadegaon	Sangali	Krishna	424
219	Anjani	Sangali	Krishna	499

220	Kuchi	Sangali	Krishna	347
221	Linganur	Sangali	Krishna	304
222	Hivre	Satara	Krishna	508
223	Tambave	Satara	Krishna	906
224	Pingali	Satara	Krishna	842
225	Mayani	Satara	Krishna	1672
226	Nandval	Satara	Krishna	330
227	Banganga	Satara	Krishna	1012
228	Rampur	Satara	Krishna	445
229	Padwalkarwadi	Solapur	Krishna	425
230	Sirwalwadi	Solapur	Krishna	607
231	Hanjagi	Solapur	Krishna	395
232	Chincholi	Solapur	Krishna	890
233	Sapatne	Solapur	Krishna	172
234	Kanadi	Akola	Tapi	253
235	Tuljapur	Akola	Tapi	150
236	Pimpalgaonshend	Akola	Tapi	591
237	Dharur	Akola	Tapi	213
238	Isapur	Akola	Tapi	243
239	Pimpalgaonhande	Akola	Tapi	255
240	Salai	Amravati	Tapi	347
241	Khatijapur	Amravati	Tapi	519
242	Pimpalgaonnath	Buldhana	Tapi	392
243	Chougaon	Dhule	Tapi	830
244	Mitgaon	Dhule	Tapi	162
245	Virkhel	Dhule	Tapi	279
246	Budaki	Dhule	Tapi	548
247	Kothare	Dhule	Tapi	737
248	Shewade	Dhule	Tapi	195
249	Velhale	Jalgaon	Tapi	364
250	Vaghala-1	Jalgaon	Tapi	223
251	Badrakha	Jalgaon	Tapi	335
252	Shewaga	Jalgaon	Tapi	557
253	Kanakraj	Jalgaon	Tapi	329
254	Padmalaya	Jalgaon	Tapi	175
255	Shanimandal	Nandurbar	Tapi	324
256	Ambebara	Nandurbar	Tapi	998
257	Dudhakheda	Nandurbar	Tapi	480
258	Khadkuna	Nandurbar	Tapi	1045
259	Gadhawali	Nandurbar	Tapi	153
260	Khekada	Nandurbar	Tapi	484
261	Dasana	Nasik	Tapi	524
262	Khadakozar	Nasik	Tapi	1962
263	Raniwali	Raigad	West fiowing	206
264	Warandh	Raigad	West fiowing	216
265	Bhilawale	Raigad	West fiowing	162
266	Unhere	Raigad	West fiowing	170
267	Awasare	Raigad	West fiowing	182
268	Usran	Raigad	West fiowing	182
269	Shirawali	Ratnagiri	West fiowing	102
270	Kadwai	Ratnagiri	West fiowing	134
271	Vhel	Ratnagiri	West fiowing	129

272	Kalawande	Ratnagiri	West flowing	158
273	Guhagar	Ratnagiri	West flowing	144
274	Malghar	Ratnagiri	West flowing	158
275	Oras	Sindhudurg	West flowing	200
276	Harkul	Sindhudurg	West flowing	169
277	Madkhol	Sindhudurg	West flowing	200
278	Shirgaon	Sindhudurg	West flowing	157
279	Nileli	Sindhudurg	West flowing	156
280	Amboli	Sindhudurg	West flowing	193
281	Velholi	Thane	West flowing	251
282	Jamburde	Thane	West flowing	258
283	Devkope	Thane	West flowing	243
284	Usgaon	Thane	West flowing	280
285	Kharade	Thane	West flowing	223
286	Dongaste	Thane	West flowing	182
			Total(Minor) 264 Nos	152380
			Grand Total	668850

Annex 3. Composition and Terms of Reference (TOR) of Village Support Groups (VSG).

Duty station: Villages or towns within irrigation schemes.

Duration: 5 years

Composition: Three farmers (at least one woman), representatives of NGO and input suppliers, and field staff Agriculture Assistant level from the following line departments: Agriculture, Horticulture, Irrigation, Animal Husbandry, Dairy & Fisheries.

Duties: Under the supervision of the District Superintending Agricultural Officer and in close coordination with the ATMA, the VSG group will:

- 1- Mobilise farmers of the village into project interest groups and act as facilitator/moderator of needs' assessment consultations to be conducted every season in the village;
- 2- With support and assistance from ATMA, prepare and organise materials for conduction of needs' assessment consultations (general, group and individual meetings) every season in the minor.
- 3- With support and assistance from ATMA collect relevant technical information on existing farming systems in the village and prepare, every year, relevant crop development plans for the village, based on needs and priorities identified by farmers and field staff;
- 4- With support and assistance from ATMA organise and implement every season relevant cropping calendars and demonstration plots for the village, based on needs and priorities identified by farmers and field staff;
- 5- With support and assistance form ATMA and other subject matter specialists, organise and implement training sessions for farmers using demonstration plots as "laboratories", covering topics such as land preparation, soil fertilisation, weed control, irrigation, pest control, harvest and storage. Make sure that farmers have "hands-on" experience in all training sessions;
- 6- Consolidate results of demonstration plots every season and organise "end-of-season" seminars for farmers and other stakeholders, for discussion and exchange of information;
- 7- Help on selection of farmers to be trained in relevant crop production subjects (seed production, fruit tree nurseries).

- 8- Support ATMA s to collect necessary information for preparation of district work plans and reports concerning project activities.
- 9- Organise farmers self help groups,select krishi sainiks, krishi mitra & organize their training.
- 10- Help krishi vigyan mandal to get full participation from the village and get it established with a group of 2-3 villages covering 1000 farm families.

Annex 4. Composition and Terms of Reference (TOR) of krishi vigyan mandal (KVM).

Duty station: One of the village in group of villages(mandal covering 1000 farm families.)

Duration: 5 years

Composition: Secretary,KVM, representatives from VSGs, village based farmers' organisations, and field staff from the following line departments: Agriculture, Horticulture, Irrigation, Sericulture, , and Animal Husbandry and Dairy & Fisheries.

Duties: Under the supervision of WUA and in close coordination with the VSG, KVM will:

- 1- Provide technical support and assistance to members of the VSGs and coordinate project implementation at mandal
- 2- Participate actively in needs' assessment consultations carriedout every season in the villages within the mandal and advise VSGs on proper methodologies and approaches for such consultations;
- 3- Assist VSGs to prepare and organise materials for conduction of needs' assessment consultations every year in each village of the scheme within the mandal
- 4- Assist VSGs to collect relevant technical information on existing farming systems in the village and prepare, every year, relevant crop development plans, based on needs and priorities identified by farmers and field staff;
- 5- Assist VSGs to organise and implement every season relevant cropping calendars and demonstration plots for the village, based on needs and priorities identified by farmers and field staff;
- 6- Assist VSGs and participate as a resource person in training sessions for farmers using demonstration plots as "laboratories", covering topics such as land preparation, soil fertilisation, weed control, irrigation, pest control, harvest and storage. Make sure that farmers have "hands-on" experience in all training sessions;
- 7- Participate actively in "end-of-season" seminars for farmers and other stakeholders for discussion of results and exchange of information;
- 8- Prepare and implement subject matter training sessions for technical staff and farmers of VSGs;

9- Assist and orient members of VSGs on preparation and implementation of needs' assessment consultations, crop development plans, demonstration plots and relevant work plans and reports;

10- Mobilise and effectively link farmers and input suppliers, credit providers, market outlets, NGOs and research institutions at district level;

11- Support consultants and other experts in technical missions undertaken at district (division) level on behalf of the project;

12- Prepare village level work plans and reports as required.

Annex 6

Agricultural Technology Management Agency (ATMA) Governing Board (G.B.)

1. Composition

• District Collector	Chairman
• Chief Executive Officer, ZP	Vice-Chairman
• *One farmer (Crops)	Member
• *One livestock producer	Member
• *One horticultural farmer	Member
• *One representative of SC/ST farmers	Member
• *One representative of women Farmer Interest Group (FIG)	Member
• *One fisheries farmer	Member
• One representative of Project NGO	Member
• Lead Bank Officer of the District	Member
• One representative of District Industries Centre (DIC)	Member
• One representative of Regional Agriculture/Horticulture Research Station/Krishi Vigyan Kendra of AAU	Member
• One representative of Agricultural Marketing Board	Member
• One representative of Input Supplying Agencies	Member
• One representative of Animal Husbandary Department	Member
• Concerned Executive Engineer	Member
• District Superintendent Agriculture Officer & Extension Co-ordinator ,ATMA	Member Sec.

APPOINTMENT/NOMINATION/TERMS OF MEMBERS

- (i) * Non-official farmer members of G.B. will be member of Water User Association (WUAs) and will be appointed for a period of 2 years by Secretary,Agriculture. on the recommendations of the Chairman of G.B.
- (ii) Some initial appointments would be staggered to ensure that about two-thirds of the members would carry-over for an additional year on the G.B. to facilitate continuity.
- (iii) Thirty per cent of the farmers' representatives on the G.B. would be reserved for women farmers to ensure that their interests are fully represented.

KEY FUNCTIONS

- (i) Review and approve ADP and annual work plans that are prepared and submitted to the G.B. by the participating units;
- (ii) Receive and review annual progress reports submitted by the participating units;
- (iii) Provide feedback and direction to these participating units, as needed, about the various research and extension activities being carried out within the district;
- (iv) Receive and allocate project funds to carry out priority research, extension and related activities (e.g. organize farmers) within the district;
- (v) Foster the organization and development of Farmers Interest Groups (FIGs) and Farmers Organizations (FOs) within the district;
- (vi) Facilitate greater involvement of private sector firms and organizations in providing inputs, technical support, demonstrations, training, agro-processing and marketing services to farmers;
- (vii) Encourage agriculture lending institutions to increase the availability of capital to resource poor and marginal farmers, especially SC, ST, and women farmers;
- (ix) Enter into contracts and agreements as appropriate to promote and support agricultural development activities within the district;
- (x) Identify other sources of financial support that would help ensure the financial sustainability of the ATMA and its participating units;
- (xi) Establish revolving funds/accounts for each participating unit, and encourage each unit to make available technical services, such as artificial insemination or soil testing, on a cost recovery basis, moving towards full cost recovery in a phased manner;
- (xii) Arrange for the periodic audit of ATMA's financial accounts; and
- (xiii) Adopt and amend the rules and by-laws of the ATMA.

Annex 7.

Agricultural Technology Management Agency (ATMA) Management Committee (AMC)

1. Composition

- District SAO & Extension Coordinator ATMA District / Chairman
- District Head of Department of Diary Member
- District Head of Department of Animal Husbandry Member
- District Head of Department of Fisheries Member
- District Head of Department. of Sericulture Member
- District Head of other appropriate line departments like Marketing, Industries etc. Member
that may be important within a district
- Head, Krishi Vigyan Kendra Member
- Head, Regional Agriculture/Horticulture Research Station Member
- One Representative of NGO Member
- Two representatives of Farmers' Organization Members
(one year rotation basis)
- Dy. Director in office of the District SAO / Member Secretary
Dy. Project Director, ATMA

KEY FUNCTIONS OF THE ATMA MANAGEMENT COMMITTEE

The functions and tasks to be carried out by the ATMA Management Committee would include the following:

- (i) Carry out periodic participatory rural appraisals (PRAs) to identify the problems and constraints faced by different socio-economic groups of farmers within the districts;
- (ii) Prepare an integrated, strategic technology plan (STP) for the district that would specify short- and medium-term adaptive research as well technology validation and refinement and extension priorities for the district; these priorities should reflect the important farmer constraints identified during the PRA;
- (iii) Prepare annual work plans and budget proposals that would be submitted to the ATMA G.B. for review, possible modification, and approval;
- (iv) Maintain appropriate project accounts for submission to PIU for audit purposes;
- (v) Coordinate the execution of these annual work plans through participating line departments, RARs, KVKs, NGOs, FIGs/FOs and allied institutions, including private sector firms;

- (vi) Establish co-coordinating mechanisms at the block level, such as Block Resource Centres (BRCs), Farmers Advisory Committees (FACs) and Block Technology Teams (BTTs), that would integrate extension and technology transfer activities at the block and village levels;
- (vii) Provide annual performance reports to the G.B. outlining the various research, extension, and related activities that were actually carried out, including targets achieved; and
- (viii) Provide secretariat to Governing Board and initiate action on policy direction, investment decisions and other guidance received from the Board.

Annex 8. Composition and Terms of Reference (TOR) of the state Policy Support Group (PSG).

Composition:

• Secretary of Agriculture	Chairman
• Commissioner of Agriculture	Member
• Commissioner of Animal Husbandry	Member
• Commissioner of Cooperation	Member
• Commissioner of Fisheries	Member
• Chief Engineer (Irrigation) and Joint Secretary	Member
• Director of Marketing	Member
• Managing Director of MSSC	Member
• Vice Chancellor of SAU's	Member
• Director of Social Forestry	Member
• Director of Sericulture	Member
• One Representative of NGO	Member
• Representatives of FOs	Members
• Private Sector Agencies Representative	Member
• Director of Agriculture (Extension) and Nodal Officer PCU	Member Secretary

Duties: Under the Chairmanship of the Secretary of Agriculture and in close coordination with

ATMAs, VSGs, and other stakeholders, the group will:

- 1- Provide overall policy guidance and coordination to the implementation of the agricultural support services component of the project;
- 2- Ensure that ATMAs and VSGs receive adequate and timely technical and financial assistance for project implementation;
- 3- Review technical recommendations included in the crop development plans and demonstration plots prepared by ATMAs and VSGs;
- 4- Assess training needs of field staff of line departments and farmers, and make sure that such training activities are implemented accordingly;
- 5- Take a proactive role in mobilising and effectively link farmers with input suppliers, credit providers, market outlets, NGOs, agroindustries and research institutions;
- 6- Coordinate with ATMAs and VSGs and overall the preparation of yearly progress reports, including project impact assessment, submission by the Project Co-ordination Unit to Secretary, Agriculture

Annexure -9. Establishment of Village Support Group (VSG)

Sr.No.	Components	Matrix	Cost Rs.in lakh
1	Training of Krishi Sainik in 300 batches of 50 each for three years thrice in a year in a phased manner @ Rs.2500/training	3x3x300x0.025 lakh	67.50
2	Training of Krishi Mitra in 300 batches of 10 each for three year thrice in a year in phased manner @ Rs.1000/training.	3x3x300x0.01 lakh	27.00
3	Supply of training materials in KVM(300 Nos.)For 3 years to establish library & to support Krishi Sainik,& Krishi Mitra @ Rs.10000 per KVM \year.	3x300x0.10 lakh	90.00
4	Contigenices for KVM @ Rs.2000 per yearFor 3 years	3x300x0.02 lakh	18.00
5	Computer, Printer & other equipments including water measuring devices for300 KVM in a phased manner @ Rs.30000	300x0.30 lakh	90.00
6	Incentive for NGO's @ Rs.10000/year for3 years for each KVM activities	3x300x0.10 lakh	90.00
		Total	382.50

Annexure-10 Training of Manpower with line departments, Extension Service providers and farmers.

Sr. No.	Components	Matrix	Cost Rs.in lakh
A.	MT & ESP training		

1.	Master trainers/ESP batch of 40 with 50:50 MT & ESP need based shown as indicative in numbers total 240 +240=480 MT & ESP-batch of 40 each. Total 12 batches. Each MT & ESP for 2000 to 2500 ha.area	1 day @Rs.0.10 lakh x12 x6 3 days@Rs.0.25 lakh x12x6 5 days@Rs.0.50 lakh x12x6 10 days@Rs.1.00 lakh x 12x6 15 days@Rs.1.50 lakhx12x6	7.20 18.00 36.00 72.00 108.00
2	Exposure visit within country @ Rs.1 lakh /district/ year for first 5 years	5x1x21	105.00
	Exposure visit outside country @ Rs.40 lakh /batch of 20 three times during project period.	3x40	120.00
3	Travelling expenses for trainees lumpsum Rs.0.50 lakh /year /district	6xRs.0.50 lakh x21	63.00
		Total A	529.20
B.	Farmers training		
1	Training of farmers by MT/ESP batch of 20 farmers each @ one training of each duration as per needs in each KVM for 3 years – alternate year to watch impact for next year. 4 batches/year.	one day @Rs.0.025 lakh =4x3x300x.025 3 days@Rs.0.05 lakh =4x3x300x0.05 5 days@Rs.0.10 lakh =4x3x300x0.10 10 days@Rs.0.20 lakh =4x3x300x0.20	90.00 180.00 360.00 720.00
2	Exposure visit batch of 20 each one to each KVM year @ Rs.20000 for first five year or lumpsum to each KVM @ Rs.1 lakh for project period	5x300x0.20	300.00
3	Travelling cost provision for 3 years for each KVM @ Rs.10000/year	3x300x0.10 lakh	90.00
		Total B	1740
		Total A+B	2269.20

Annexure -11. Demonstration of Improved Technologies.

Sr.No.	Components	Matrix	Cost Rs. In lakh
1	Crop Production Technology demonstrations for 4 major crops under each KVM alternate years as per cost norms for each crop(selection of crops by KVM)@Rs.10000 /demonstrations	3x300x4x0.10 lakh	360.00

	,intermediate year to set the technology used in the following year		
2	Fodder production technology demonstration three under each KVM in phased manner @ Rs. 5000 / demonstration	3x300x0.05	45.00
3	Horticultural crop demonstrations on fruits, vegetables, nurseries, floriculture, medicinal & aromatic plants, mushroom, spices zero energy chambers, ornamental trees etc as per cost norms for each crop (selection of crops by each KVM) @Rs.10000 per demonstration alternate years for 4 major crops /technologies and observing its impact in the following year	3x300x4x0.10 lakh	360.00
4	Vegetables nurseries 3 for each KVM during project period @ of Rs. 0.02 lakh.	3x300x0.020	18.00
5	Demonstration on water use efficiency-on mulching , in-situ waters conservation, drip, sprinkler, reclamation of ill-drained soils etc in alternate year with follow-up during next season for their actual acceptance @Rs.50000 /group of demonstration during the project period.(cost would include measuring devices if needed)	1x300x0.50 lakh	150.00
6	Demonstrations to introduce sustainability in agriculture through INM /organic farming/vermin composting/NADEP technology/green manuring /Demand based in each KVM for 3 consecutive years @Rs.0.25 of lakh/year	3x300xRs.0.25 lakh	225.00
7	Demonstrations on IPM for each KVM for two years in the project period @ Rs. 1 lakh / Demonstration	2x300x1.00 lakh	600.00
		Total	1758.00

ANNEXURE- 12

STRENGTHENING OF AGRO POLYCLINICS, SAEMTI & RAEMTI

Sr No	Component	Matrix	Cost Rs. in lakh
1	A. <u>Agro polyclinic</u> Strengthening of existing 60 agro polyclinics 20 in each year for first 3 years Rs. 2 lakhs per polyclinic	3x20x2	120

2	Upgradation of one agro polyclinic in to district training centre in each project district in each year for first 3 years. @ Rs. 5 lakh per polyclinic	3X7X5	105
3	Supply of IT and allied equipments during first 3 years. @ Rs. 60000 per polyclinic / DTC.	3x27x0.60	48.60
4	Developing training material and publications by each DTC for each year of the project.@ Rs. 50000/year /DTC	6x21x0.50	63
5	Incremental & operational cost contingencies @ Rs.20000/year	6x81x0.20	97.20
6	Traveling expenses@ Rs. 20000/year	6x81x0.20	97.20
7	Farm implements for custom hiring services and demon. of farm mechanism at DTC @ Rs. 5 lakh / dist.	1x21x5	105
	Total 1 to 7		636.00
1	B) SAEMTI Renovation of existing infrastructure @ Rs.25 lakh /year for first 2 years	2x1x25	50
2	Supply of equipments for first 4 years @ Rs. 1 lakh each year	4x1x1	4
3	Engaging manpower on contract basis on agri business. @5 lakh / year	6x1x5	30
4	Preparation of training material and publication @ Rs.50000 / year	6x1x0.50	3
5	Incremental operating cost /contingencies @ Rs 20000/ year	6x1x0.20	1.20
6	Traveling expenses @ Rs.50,000/year	6x1x0.50	3
	Total 1 to 6		Rs. 91.20
1	C) RAEMTI Renovation of existing civil infrastructure in first 2 years @ Rs.10 lakh each for 7 centres.	2x7x10	140
2	Procurement of equipments @ Rs. 50,000/each for first 4 years	4x7x0.50	14
3	Development & publication of training material @ 50,000/year for first 5 years	5x7x0.50	17.50
4	Incremental operating cost / contingencies@ Rs. 50,000	6x7x0.50	21
5	Traveling expenses @Rs. 50,000	6x7x0.50	21
	Total 1 to 5		213.50
	Grand Total A+B+C		Rs. 940.70

Annexure 13

Main streaming of ATMA model for agricultural support services

Sr No	Component	Matrix	Cost Rs. in lakh
1	Preparation of Agricultural Dev.Plan@ Rs. 2 lakh during first year in each project district.	1x21x2	42

2	Preparation of annual project plans (consisting of details of micro projects) @ Rs. 2 lakh per year / Distt.	6x21x2	252
3.	Need based seminars & workshops 4 no. each year in each project distt. for first 5 years lumpsum cost provision @ 25 lakh each year for the entire project area.	5x25	125
4.	Consultancy for conducting feasibility utilised for various activities based on field survey lumpsum Rs. 25 lakh for each year.	6x25	150
5.	Contractual man power support for each distt.@ Rs. 5 lakh per year.	6x21x5	630
6.	Incremental operational cost /Contingencies @ Rs. 20,000 per distt./ year.	6x21x0.20	25.20
7.	Traveling expenses @ Rs. 0.20 lakh / distt.	6x21x0.20	25.20
8.	Monitoring and concurrent evaluation @ Rs. 2 lakh per Distt/year	6x21x2	252
9.	Publicity, awareness campaign, Agro exhibitions & annual meet of WUA / KVM @ Rs. 1 lakh per year / distt.	6x21x1	126
	Total 1 to 9		1627.40

Annexure -14.

Agro-Entrepreneurship Development through implementation of innovative Project.

Sr.No.	Components	Matrix	Cost Rs.in lakh
1	Project(s) on PHM including storage, grading, packing and transportation of agro produced one project in each district as per demand during the project period @Rs.10 lakh/district (project could be just one)	21xRs.10 lakh	210.00
2	Project(s) on Agro marketing one in each	21xRs.10 lakh	210.00

	district during the project period-establishing farmers to consumers linkage @Rs.10 lakh per district(Project could be just one)		
3	Project(s) on Agro processing in decentralized manner, quality control, grading, packing and marketing by an entrepreneur @Rs.10 lakh per district	21xRs.10 lakh	210.00
4	Project(s) for input supply with production in decentralized manner and marketing through entrepreneur on seeds, bio-fertilizer, bio-pesticides, planting materials etc @ Rs.10 lakh per district	21xRs.10 lakh	210.00
5	Project(s) on providing farm services through Agro entrepreneurs including custom hiring of implements, grading , packing, branding of produce, agro information service etc @Rs.5 lakh per district	21xRs.5 lakh	105.00
6	Projects on horticulture –its decentralized production system with organized marketing @Rs.10 lakh per district for 10 selected districts	10xRs.10 lakh	100.00
7	Project(s) on decentralized production of M&A plants, its centralize processing by entrepreneur @Rs.5 lakh per project. 10 projects in project area.	10xRs.5 lakh	50.00
8	Any other innovative project in any of the project districts lumpsum provision Rs.10 lakh each district.	21xRs.10 lakh	210.00
		Total	1305.00

Annexure -15

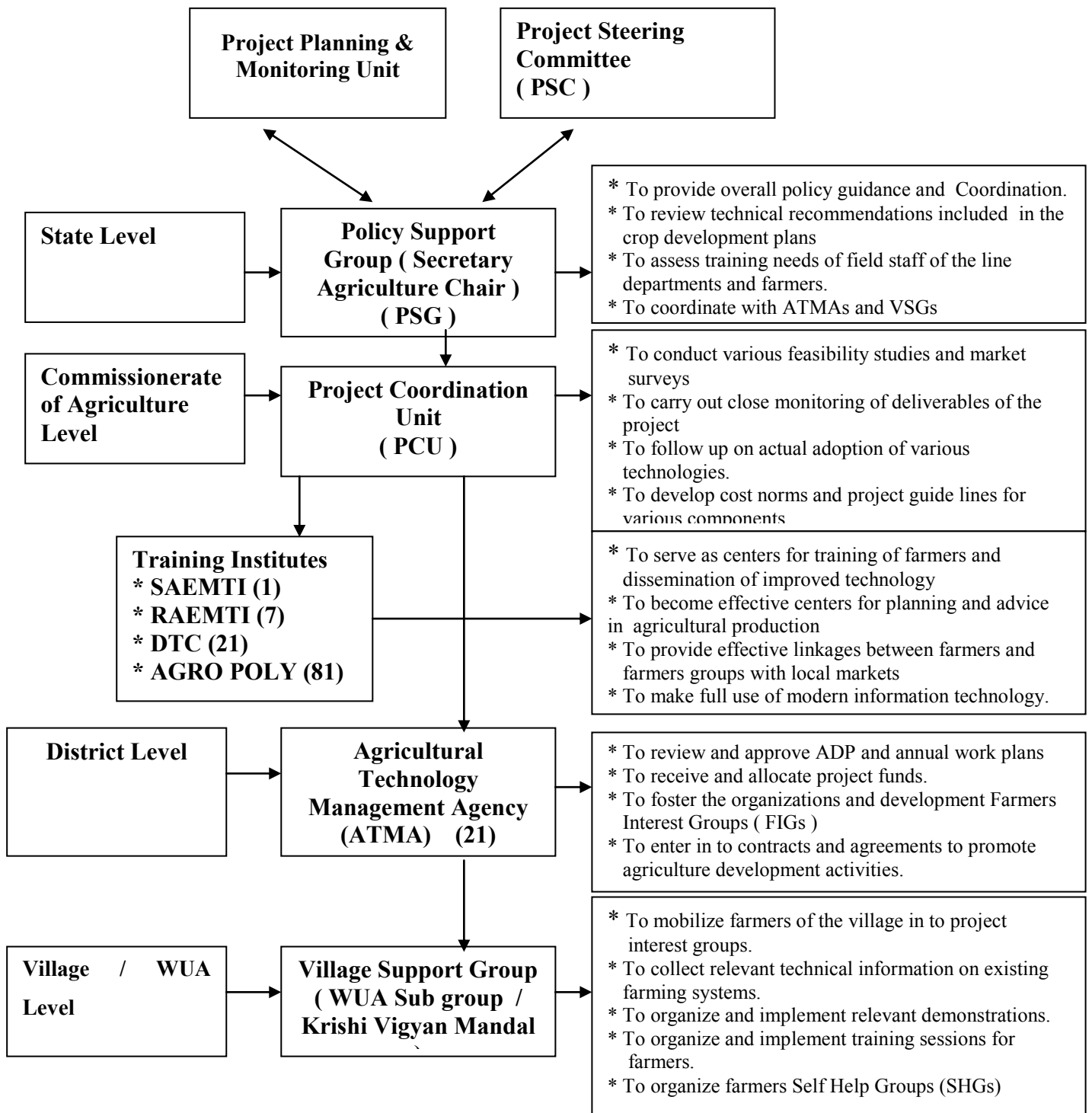
Project co-ordination unit (PCU)

Sr.No.	Components	Matrix	Cost Rs. in lakh
1	Contractual employment of project staff for PCU	@Rs.15 lakh/year	90.00
2	Consultancy assignments for field studies/project preparation for Agro – entrepreneurs	@Rs.10 lakh/year for 5 years	50.00
3	Conduct of market surveys for the Agro produces relevant for the irrigated areas like	@Rs.10 lakh/year for 5 years	50.00

	floriculture, M&A plants etc @Rs.10 lakh/year, first five years including study of impact of WTO.		
4	Consultancy assignment for monitoring concurrent evaluation and impact assessment through an independent agencies for the entire project period.		50.00
5	Travelling expenses including hiring charges on vehicles/POL etc. @Rs.2 lakh/year	@Rs. 2 lakh/year	12.00
6	Incremental operating costs including stationary/office contingencies @Rs.1 lakh/year	@Rs.1 lakh/year	6.00
		Total	258 .00

Annexure - 18

Organizational Implementation Arrangement for Agriculture Support Services Component



Annexure – 19

**Flow of Funds Under Agricultural Support Services Components
(Rs.in million)
(Total of Rs.854.080)**

