WEST BENGAL

ACCELERATED DEVLOPMENT

OF MINOR IRRIGATION

PROJECT

PROJECT IMPLEMENTATION PLAN

30 JUNE 2014

DEPARTMENT OF WATER RESOURCES INVESTIGATION AND DEVELOPMENT

GOVERNMENT OF WEST BENGAL

ABBREVIATIONS

CAS	Country Assistance Strategy
DLIC	District Level Implementation Committee
DPMU	District Project Management Unit
DPR	Detailed Project Report
DTW	Deep Tube Well
DWRID	Department of Water Resource Investigations and Development
EA	Environmental Assessment
EE	Executive Engineer
EiC	Engineer- in- Chief
EMF	Environmental management
EMP	Environmental Management Plan
FIG	Farmer Interest Group
FY	Fiscal Year
FM	Financial Management
GAAP	Governance and Accountability Action Plan
GoI	Government of India
GoWB	Government of West Bengal
IA	Implementing Agency
IBRD	International Bank for Reconstruction and Development
ICB	International Competitive Bidding
ICR	Implementation Completion Report
IDA	International Development Association
IFR	Interim Financial Reports
LA	Loan Agreement
LDP	Livelihood Development Plan
LDTW	Light Duty Deep Tube Well
MDTW	Medium Duty Deep Tube Well
MIS	Management Information System
ML	Monitoring & Learning
M&E	Monitoring & Evaluation
MLE	Monitoring, Learning and Evaluation
NCB	National Competitive Bidding
MOM	Management, operation, and Maintenance
MT	Metric Ton
PAP	Project Affecte4d Person
PD	Project Director
PFMA	Public Financial Management and Accountability
PIM	Participatory Irrigation Management
PIP	Project Implementation Plan
PMU	Project Management Unit
PSC	Project Steering Committee

QA&A	Quality Audit & Assurance
RAP	Resettlement Action Plan
RLI	River Lift Irrigation
RPF	Resettlement Policy Framework
SA	Social Assessment
SDMP	Scheme Development and Management Plan
SBD	Standard Bidding Document
SE	Superintending Engineer
SFAA	State Financial Accountability Assessment
SFMIS	Surface Flow Minor Irrigation Scheme
SO	Support Organization
SPMU	State Project Management Unit
STW	Shallow Tube Well
ToR	Terms of Reference
WUA	Water User Association

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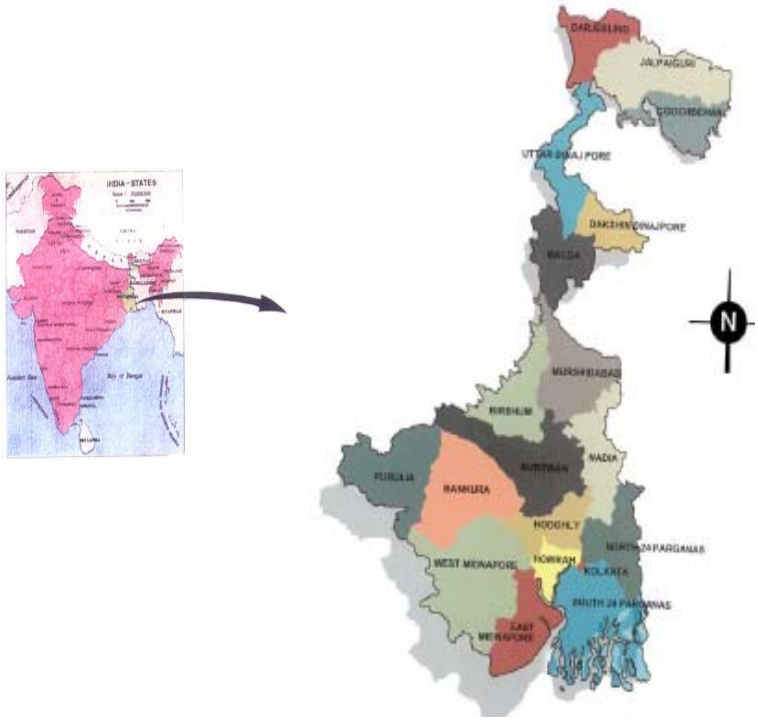
CHAPTER-1 PROJECT BACKGROUND

West Bengal a Brief Profile

1. West Bengal, one of the eastern states of Indian Union covers a geographical area of 86,849 km^2, (about 3% of the geographical area of India) and inhabited by 91.34 million people[1] (8% of the total population of India). The state is stretching from the Himalayas in the north to the Bay of Bengal in the south. The State is bound in the north by the countries of Nepal and Bhutan and the State of Sikkim. On the East are the State of Assam and the International border with Bangladesh. On the South-West is the State of Orissa and on the West States of Jharkhand and Bihar. The State is divided into 19 districts including Kolkata. There are 66 sub-districts, 341 development blocks, 3239 Gram Panchayat and 40,782 villages. The map of West Bengal is shown in Figure **-1.1.**

Figure -1.1 Map of West Bengal



2. **Demographically,** the state has a rural population of 62.2 million which account for 68% of the total population of the state. Who are directly or indirectly dependent upon agriculture? Agriculture employs about 57% of the total workforce of the State. The state has got highest density of population in the country at 1029 per sq.km. The overall literacy percentage is 77.08 with male literacy at 82.67 % and female literacy at 71.16 %. The sex ratio is 947 females, 2000 males. The state Human Development Index is - - -as compared to - - - for India. The per capita income at current prices (base - - -) is Mrs.- - - in - - -as compared to the National figure of - - - - .

[1] According to 2011 Census

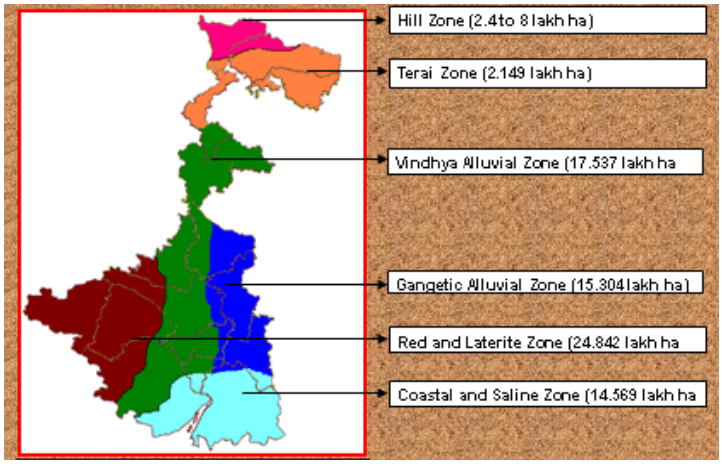
3. The **Physiography** of West Bengal is divided into four major geographical regions - the Chotonagpur plateau region in its northwestern parts, the Himalaya mountain region, the lower Gangetic plain region and the coastal belt. Ganga, Bhagirathi, Mayurakshi, Damodar, Kangsabati, Teesta, Torsha, Jaldhaka, Mahananda, Subarnarekha and Rupnarayan are the main rivers of the State. There are forest areas in the southern part (Suderban), northern Tarai belt and in the Chotonagpur plateau area of the state.

4. The **climate** of West Bengal varies from moist-tropical in the south-east to dry tropical in the south west and from sub-tropical to temperate in the mountains in the north. The climate is cooler in the northern mountains than in the southern plains. The temperature range is from well below freezing point in the hills during the winter to about 45°C in southern parts during the summer. The winter months are generally pleasant in the southern part of the state. Snowfall is limited to the Himalayan regions. The monsoon season lasts from June to September and brings heavy rain. The monsoon brings respite to the parched plains and means a bountiful harvest but they often cause floods and landslides. The winter months are from October to February. The average annual rainfall in the State is 1750 mm with considerable variations among districts ranging between 1234 mm in Birbhum to 4136 in Jalpaiguri. The map of West Bengal showing the climatic details is given in **Attachment – 1.1.**

Agro-Climatic Zoning of the State

5. Based on rainfall, temperature, soil types and topography of land and agricultural feasibility, West Bengal has been broadly divided into six agro-climatic zones: (i) Northern Hill Zone; (ii) Terai - Teesta Alluvial Zone; (iii) Gangetic Alluvial Zone; (iv) Vindhyan Alluvial Zone; (v) Coastal Saline Zone; and (vi) Undulating Red and Lateritic Zone. A map showing the Geographic dispersion of agro-climatic zones of West Bengal is given in **Figure -1.2**.

Figure – 1.2: Agro Climatic Zones of West Bengal



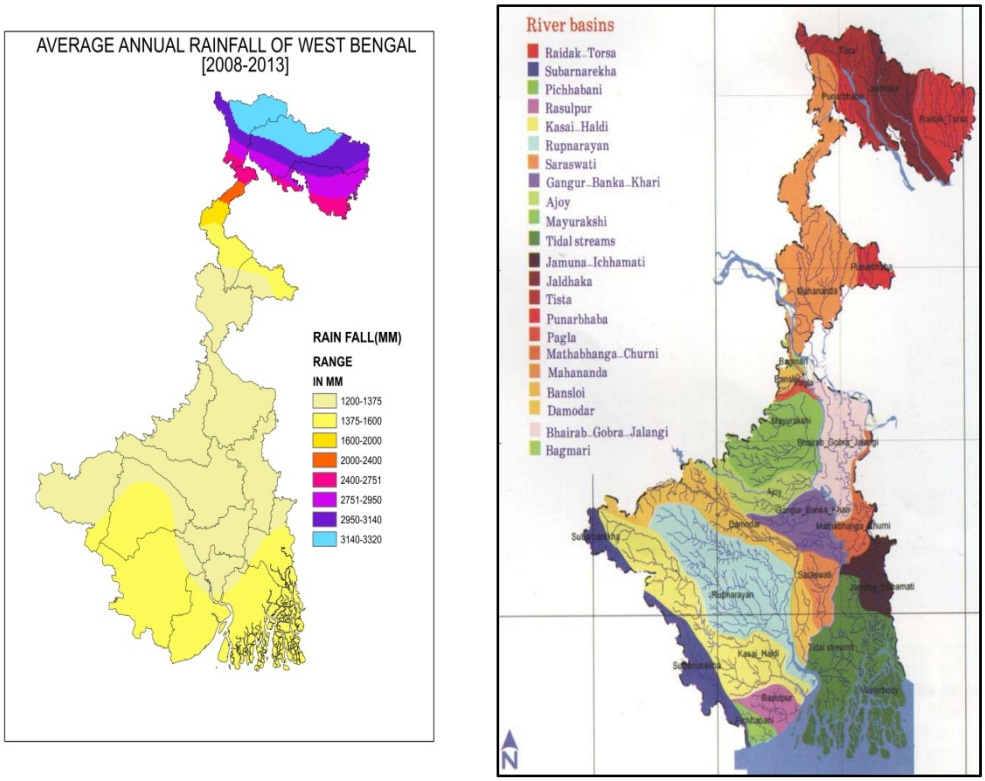
6. The climate soil type and main crops grown/vegetation in different agro-climatic zones are summarized in **Attachment – 1.2.** The physiographic map of West Bengal is given in **Attachment – 1.3.**

Status of Water Resources

7. The **Surface Water** availability in the state is assessed at 132.9[2] BCM and utilizable Surface Water resources is 53.10 BCM spread over the Ganga (catchment area of 74,439 sq. km.), Brahmaputra (11,860 sq.km.) and Subarnarekha (2,160 sq. km.) The main Basins of Ganga and Brahmaputra constitute two of the biggest rivers in the sub-continent. Drainage in the northern most part of the state passes mostly into Brahmaputra and those of the central, southern and south western parts of the state passes the Ganga Basin. The Basins are further divided into 25 sub basins.

8. The rain fall details and coverage of river basins across the state are given in **Figure – 1.3.**

Figure – 1.3 Surface Water (Rain fall and River Basins) Availability of West Bengal



[2] A assessed by a Committee of Experts in Irrigation, 1987

9. The district wise coverage, water availability and water resource utilization of surface water are given in **Attachment – 1.4.** The drainage map of the state is given in **Attachment –1. 5.**

10. The total **Ground Water** recharge in the state is 3,036 Thousand ham and the net Ground Water availability is 2,746 Thousand ham[3]. The Ground Water Resource potential, utilization and net availability are summarized in **Table – 1.1**. As seen from water balance figures in Table – 1 there is still 1,538 thousand ham of Ground Water available for irrigation development in the state.

Table – 1.1: Ground Water Potential Utilization and Net Availability in West Bengal as in 2004

Description	**Quantity ('000 ham)**
Recharge from rainfall during monsoon season	1787
Recharge from other sources during monsoon season	218
Recharge from rainfall during non-monsoon season	544
Recharge from other sources during non-monsoon season	486
Total Annual Ground Water Recharge	**3036**
Natural Discharge during non-monsoon season	290
Net Annual Ground Water Availability	**2746**
Gross ground water draft for all uses (as on March, 2004)	1165
. Current annual ground water draft for irrigation	1084
. Current annual ground water draft for domestic and industrial uses	81
Annual allocation of ground water for domestic and industrial water supply for next 25 years from April 2004	124
Net ground water availability for 'future irrigation use' beyond March 2004.	**1538**
Stage of ground water development (%)	**42.42(%)**

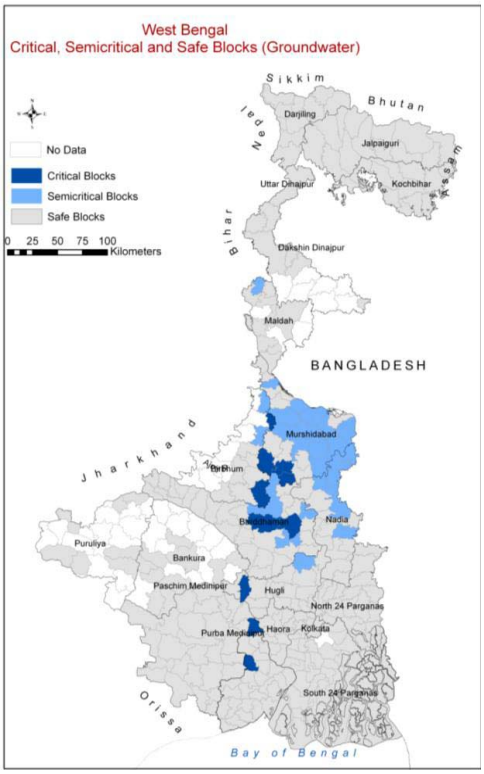
Source: SWID

11. The district wise analysis of net Ground Water resource potential, net availability utilization and status both from confined and unconfined aquifers shows that the status of groundwater development varies from as low as 4.4% in Jalpaiguri and 5.3% in Darjeeling to as high as 88.5% in Murshidabad and Nadia district. However, as many as eleven districts show groundwater development status below 50%. Hence, while groundwater development is fairly high in some of the districts in the State, there are still many districts, where ground water can be withdrawn without any deleterious effect on the water table, particularly in the northern districts of the State, where the stage of development is low and there is large scope of ground water withdrawal. The district wise details are summarized in **Attachment – 1.7.** The hydrological map of West Bengal is given in **Attachment – 1.8.**

[3] Joint estimation by State Water Investigation Directorate (SWID) with Central Ground Water Board as for 2004. Only partial assessment completed (269 out of 341 blocks) in 2009.

12. In addition, the partial estimate done in 2009 completed for 269 blocks, shows that 231 blocks of have been categorized as "Safe", 37 blocks as "Semi-Critical" and 1 block as "Critical". 72 blocks are yet to be assessed. These include 59 coastal blocks in North & South 24 Parganas, Howrah and East Medinipur, 8 mountainous blocks of Darjeeling and 5 sub-mountainous blocks in Jalpaiguri district. The ground water status of the state is given in **Figure – 1.4.**

Figure – 1.4 Ground Water Status of West Bengal

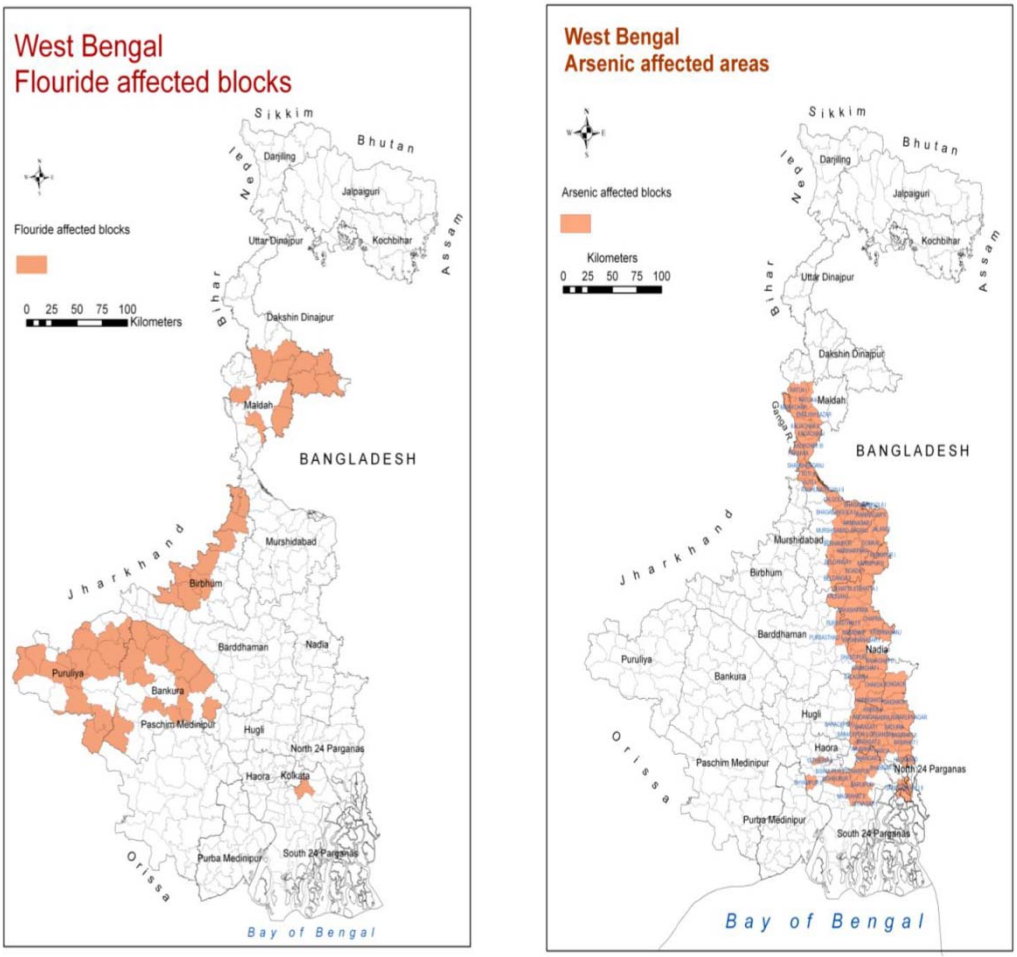


The Issue of Ground Water Quality

13. Water quality is a matter of concern in the state. There are already number of pockets were surface water to some extent and ground water aquifers in general have been contaminated by various natural and artificial process.

14. The Ground Water quality reveals occurrence of toxic levels of Arsenic in 81 blocks and fluoride in 48 blocks. Construction of Ground Water structures is prohibited in these blocks as a preventive measure. The Ground Water quality map of West Bengal showing fluoride and arsenic affected areas are shown in **Figure – 1.5** and the overall picture is given in **Attachment – 1.9.**

Figure – 1.5 Fluoride and Arsenic Affected Areas



Preferential Policy on Surface Water

15. It has been the policy of the state Government to restrict the use of ground water to only 44.49% of the proposed area and residual 55.51% of the additional coverage has been plan to be developed using surface water resources.

Characteristics of Agriculture Sector

16. West Bengal is predominantly an agrarian State with a large rural base, both in terms of demography and land resource use. Agriculture contributes about 23.30% of the Gross State Domestic Product (GSDP) in 2011-12. Agriculture is the primary occupation of 62.7% of the rural work force in the state and 70% of the rural population depends on agriculture for their livelihood. Agriculture growth rate over the past two decades was on an average around 3% per annum.

17. **Land Holding Pattern**: As per the agricultural census 2000-01 there are 6,789,991 operational holdings in the state and the details on size class are given in **Table – 1.2.**

Table – 1.2 Details of Operational Holdings

Size Class	No. of Operational Holdings	Area in ha.
Below 1.00 ha.	5,462,089 (80.4%)	2,758,843 (49.7%)
1.00 to 2.00 ha	1,009,328 (40.9%)	1,606,688 (29.1%)
2.00 to 4.00 ha	282,992 (4.2%)	783,773 (14.1%)
Above 4.00 ha	4,282 (0.5%)	397,274 (7.1)

18. About 90% of the holdings are in the hands of small and marginal farmers who till 68% of the total cultivated area. The average per capita land holding is less than 1 ha. (0.64 ha.). There are about 30 lakh landless families who earned the right to cultivate the grow crops their own land after enactment of Operation Barga System.

19. The net area sown is about 5.3 million ha which is about 61% of the geographical area of the state, compared to the National average of 46%. The cropping intensity is 182% with gross cropped area exceeding 9.6 million ha. 5.42 million Ha (56%) is the total irrigated area The land use statistics is given in **Table – 2** and the district wise details are given in **Attachment – 1.10** and the land use and cropping map of the state is given in **Attachment – 1.11.**

Table – 1.3: West Bengal Land Use Statistics (2010-11)

Land Use Category	**Area (ha)**	**Area (%)**
Geographical Area	8,684,951	100.00
Forest Area	1,174,970	13.53
Area Under Non-agricultural Use	1,728,470	19.90
Barren and Un-cultivable Land	24,851	0.29
Permanent Pasture and Other Grazing Land	5,540	0.06
Land Under Misc. Tree Crops and Groves	63,695	0.73
Culturable Waste Land	42,590	0.49
Fallow Land Other Than Current Fallow	29,590	0.34
Current Fallow	319,240	3.68
Net Area Sown	**5,296,005**	**60.98**
Gross Cropped Area	9,634,535	
Cropping Intensity		**182%**
Irrigation Potential under Major & Medium Irrigation	1,596,000	
Irrigation Potential under Minor Irrigation	3,825,770	
Total Irrigated Area	**5,421,770**	**56.3%**

Source: Department of Agriculture, DWRID & Irrigation & Waterways Directorate, GoWB

20. The state cultivates a range of crops of both food grain, non-food grain and other crops ranging from cereals, pulses, oilseeds, fibers, vegetables and fruits, tobacco, tea and sugarcane. Rice occupies over two thirds of the total cultivated area across the cropping seasons and other crops that occupy more than 5% of the total cultivated area are mustard, Jute and potato. The area production and yield of principal crops are summarized in **Table – 1.4.**

Table – 1.4: Area Production and Yield of Principal Crops in West Bengal

Sl. No.	Crops	2010-11				
		Area ('000 ha)	%age of Total Crop Area	Production ('000 Tons)	%age of Total Crop Production	Yield (Ton/ha)
Food Grain: Cereals						
1.	Rice	4,944.1	67.16	13389.6	5.02	2.7
2.	Wheat	316.8	4.30	874.4	0.33	2.8
3.	Barley	2.0	0.03	3.0	0.00	1.5
4.	Maize	88.6	1.20	352.3	0.13	4.0
5.	Other Cereals	13.4	0.18	15.1	0.01	1.1
	Total Cereals	**5,364.9**	**72.87**	**14634.3**	**5.49**	**2.7**
Food Grain: Pulses						
6.	Gram	22.1	0.30	23.7	0.01	1.1
7.	Tur (Arhar)	1.6	0.02	2.2	0.00	1.4
8.	Mung	17.6	0.24	12.2	0.00	0.7
9.	Masur	57.4	0.78	53.4	0.02	0.9
10.	Khesari	25.8	0.35	30.2	0.01	1.2
11.	Other Pulses	72.6	0.99	54.9	0.02	0.8
	Total Pulses	**197.1**	**2.68**	**176.6**	**0.07**	**0.9**
	Total Food Grains	**5,562.0**	**75.55**	**14810.9**	**5.56**	**2.7**
Non-Food Grains: Oilseeds						
12.	Rapeseed/ Mustard	410.8	5.58	419.6	0.16	1.0
13.	Linseed	4.1	0.06	1.4	0.00	0.3
14.	Sesame(Til)	182.8	2.48	168.6	0.06	0.9
15.	Sunflower	6.6	0.09	7.4	0.00	1.1
16.	Other Oilseeds	66.5	0.90	106.3	0.04	1.6
	Total Oilseeds	**670.8**	**9.11**	**703.3**	**0.26**	**1.0**
Non-Food Grains: Fibers						
17.	Jute	568.5	7.72	8137.5	3.05	14.3
18.	Mesta	6.3	0.09	76.8	0.03	12.2
19.	Other Fibers	1.3	0.02	5.2	0.00	4.0
	Total Fibers	**576.1**	**7.83**	**8219.5**	**3.08**	**14.3**
Other Crops						
20.	Sugarcane	15	0.20	1134.1	0.43	75.6
21.	Potato	408.8	5.55	13421.0	5.03	32.8
22.	Tobacco	14.3	0.19	21.3	0.01	1.5
23.	Tea	115.1	1.56	228305.0	85.63	1,983.5
	Total Other Crops	**553.2**	**7.51**	**242881.4**	**91.10**	
	Total Crops	**7,362.1**	**100.00**	**266615.1**	**100.00**	

Source: Economic Review 2011-12, GoWB

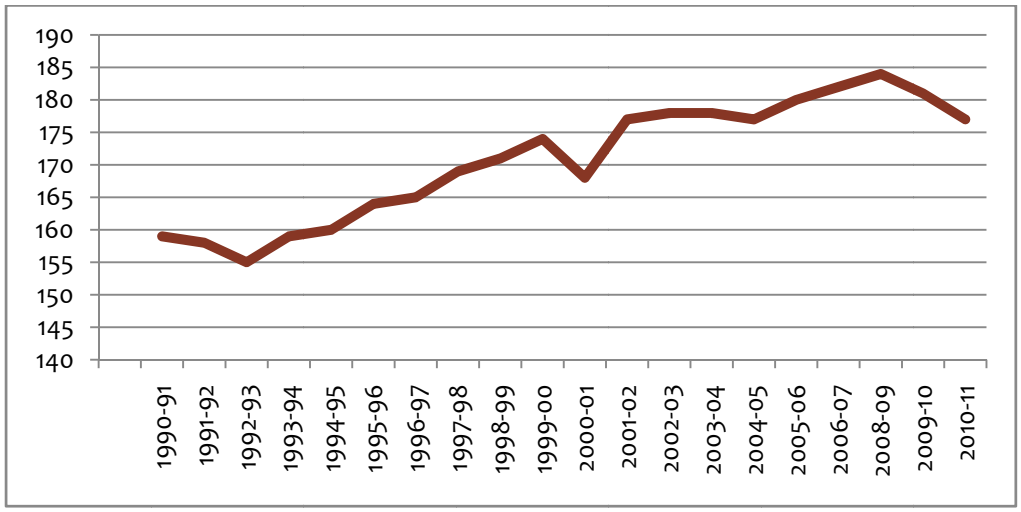
21. The West Bengal has the highest population density (1029 per sq km) in the country. Consequently, the per capita cultivable land holding is under a steady process of fragmentation. Increase in the price of agricultural inputs, fragmentation of land holding, uncertain prices of perishable agricultural produces, inadequate market infrastructure, distress sale of produce by small and marginal farmers etc, are some of the problems being confronted by the farmers of the

state. Though the productivity of many crops is better compared to national average, but requires substantial improvement when compared to the best figures in India. Similarly, due to lack of proper marketing and processing facilities and for high price of feeds and fodder for farm animal, management of the traditional family mixed farming system in the rural areas has become more difficult than ever before.

Cropping Intensity

22. The cropping intensity of the state present a not encouraging trend over 1990-91 to 2010-11 which is presented in **Figure – 1.6.**

Figure – 1.6 Cropping Intensity (%) in West Bengal (1990-1991 to 2010-11)



23. About 20 lakh ha. are single cropped areas with only Kharif crop which is about 37% of the cropped area in the state. The district wise cropping intensity and district wise distribution of Kharif cropped areas are shown in **Figure - 1.7 and 1.8** respectively.

Figure - 1.7 District Wise Cropping intensity (%) in 2006-07

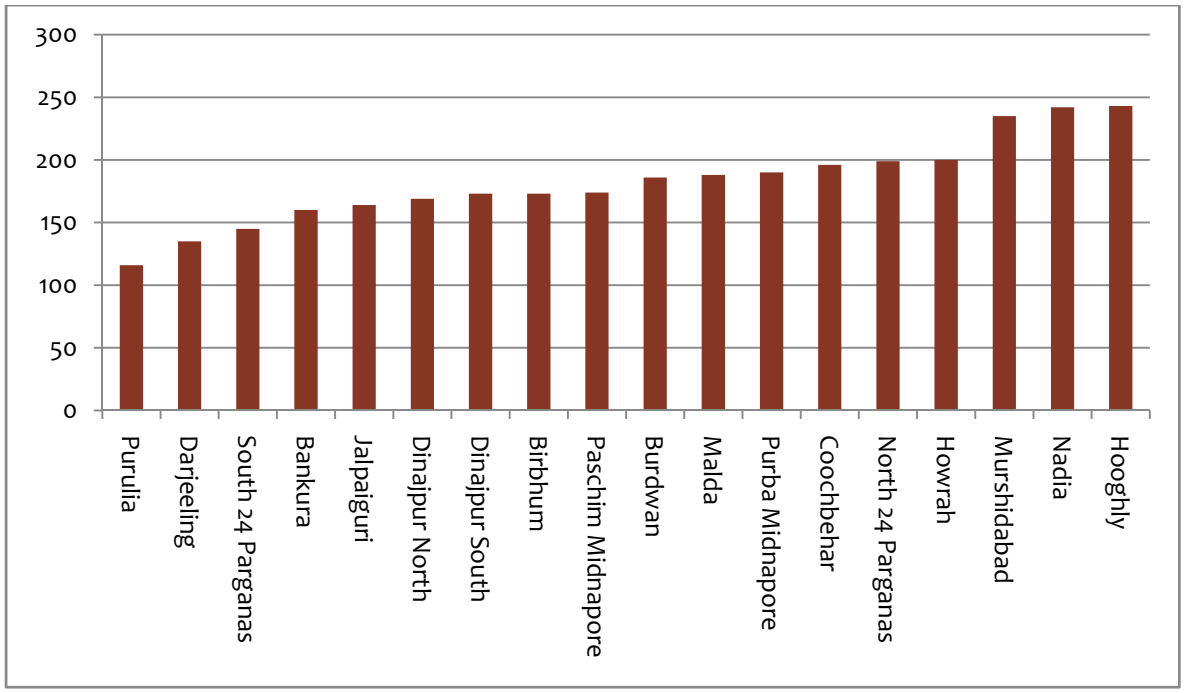
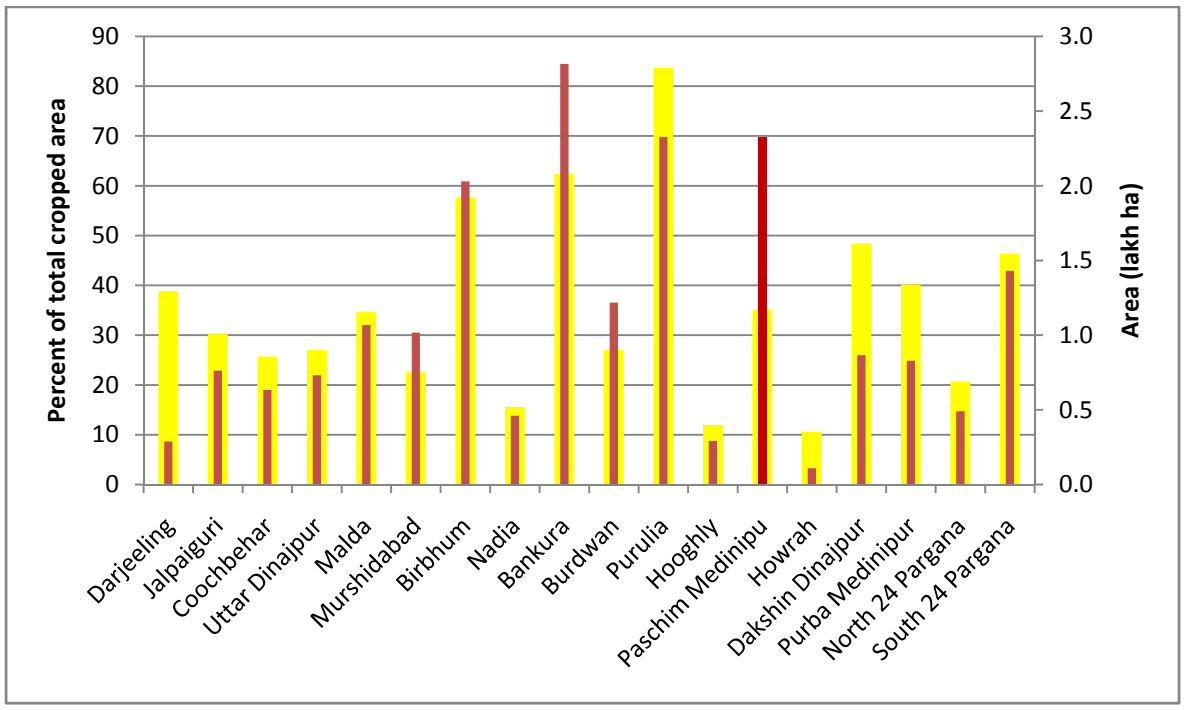


Figure – 1.8 District Wise Distribution of only Kharif Cropped Area



24. As seen from the cropping intensity analysis, status of development of water resources, especially surface water, it is evident that there are 5 districts in the state having cropping intensity

close to or less than 150%. The distribution of area above 1 lakh ha. of only Kharif crop is falling in 10 districts.

Irrigation Status

25. The total irrigation potential created in West Bengal up to 2009-10 is 5.42 million ha, out of which 3.82 million ha is under ground water and surface water minor irrigation and 1.59 million ha under major and medium irrigation. The irrigation potential created and utilized for the year 2009-10 in the State is given in **Table – 1.5.**

Table – 1.5: Total Irrigation Potential Creation in West Bengal

Source	Type of Irrigation Scheme	Ultimate Irrigation Potential Estimated (million ha)	Estimated IP Created 2009-10 (million ha)	Estimated IP Utilized 2009-10 (million ha)	% age Utilization to Creation
SW + GW	Minor Irrigation	4.62	3.82[4]	3.32	86.9%
SW	Major & Medium	2.3	1.60	1.12	70%
SW + GW	Total MMI + MI	6.92	5.42	4.44	81.9%

Source: CWC, GoI, DWRID & Irrigation & Waterways Directorate GoWB

26. It is worth mentioning that in 2009 – 10 irrigation coverage in terms of IP utilization was only 46.1% of the gross cropped area while in terms of IP created irrigation coverage was about 56%. The state agriculture continues to be dependent on Monsoon for cultivation in many districts. In about 5 districts 70% of net areas sown are single cropped areas. The district wise cultivable area and net irrigated area through different sources are given in **Attachment – 1.11.**

Minor Irrigation

27. At present, 208 million ha. is under MI sector in the state. The minor irrigation sector is dominant over major and medium irrigation with an untapped potential to harness another 1.5 million ha under it. The district wise status of existing ground water and surface water minor irrigation development is given in **Attachment – 1.12.** Though irrigation schemes having Culturable Command Area (CCA) up to 2000 ha. are classified under MI sector, following the GOWB policy to promote smaller schemes, Department of Water Resources Investigation and Development (DWRID) has been setting up smaller schemes having CCA up to 200 ha.

Operation and Maintenance of MI Schemes

28. Except for some pilot projects in the 1980s, all minor irrigation schemes developed until 1990 were and are still maintained by the government through pump operators employed by the DWRID. The pump operators operate and maintain the MI scheme and provide irrigation service to the farmers as per need. The farmers pay an irrigation fee to the government calculated on the basis of the type of crop grown and area cropped in ha for a cropping season. The irrigation fee is deposited

[4] The 4th MI Census in 2006-07 reported the IP created under minor irrigation schemes as 3.62 million ha. However, the Economic Survey, 2011-12 reported the IP created under MI in 2009-10 as 3.82 million ha.

by the farmer in the Block headquarters in the Block Development Officers office. Currently, DWRID is responsible for the operational maintenance of 9781 MI schemes out of which about 6417 are Ground Water based an remaining 3364 are river lift irrigation schemes operated by diesel or electricity. Out of the MI schemes operated and maintained by DWRID about 2351 schemes have become permanently defunct and 836 schemes have become temporarily broken down. The district wise details of MI Schemes operated by DWRID are given in **Attachment – 1.13.**

Community Maintenance and Operation of MI Schemes

29. MI schemes that were developed by DWRID after 1990 have been transferred for operation and management to the users under a MI Scheme Management Committee registered as a Cooperative Society under the State Cooperative Societies Act (and now under the State Societies Registration Act for the ADMI project). The primary farmers' organization for participatory management of minor irrigation schemes in the State is thus the MI Scheme Management Committee. The procedure for MI Scheme Management Committee formation, the procedure for handover of MI scheme and the post hand over activities are notified by GoWB in the GO No. 1710-MI/2R-3)2004 dated 16th August 2011. As per the GO, when a MI schemes is ready to supply irrigation the concerned Assistant Engineer (AE) of DWRID facilitates the formation of a MI Scheme Management Committee among the beneficiary farmers and hands over the scheme to it. The MI Scheme Management Committee is now responsible for management, operation, and maintenance, as well as mobilizing future capital investments from the beneficiary farmers. The farmer's body is expected to prepare cropping program and regulate use of irrigation water. The Committee has the right to charge irrigation service fee from the beneficiary farmers that it can keep and use for the operation and maintenance of the MI scheme. The irrigation fee needs to cover all operation and maintenance cost of the MI scheme including the full fuel charges, whether diesel or electric as the government does not provide any funds for operation and maintenance of these MI scheme. After the handing over, DWRID staff may provide technical advice, training to the MI Scheme Management Committee, and are barred from interfering in the day today management of the scheme. As on March 2013, the total number of MI schemes handed over to MI schemes management committees is 42,127 out of which 30,824 are ground water schemes and 11,303 are surface water schemes. The district wise details of MI schemes operated and maintained by scheme management committee are given in **Attachment – 1.14.** The GO No. 1710-MI/2R-3)2004 dated 16th August 2011 is reproduced as **Attachment – 1.15.**

Lessons from World Bank supported Minor Irrigation Project 1985 - 94

30. The West Bengal Minor Irrigation Project (WBMIP – Project ID - - -) was to complement ongoing groundwater development in the private sector. With respect to surface water development, the project was to provide electrical Energisation of pumps and buried pipe distribution systems for selected existing river lift irrigation schemes (RLIs) with the objective of improving their operation and management capabilities. A further objective was institution building to ensure that project works were effectively implemented and that completed works were properly operated and maintained in order to sustain predicted benefit generation.

31. The overall responsibility for project implementation was with the Secretary, Department of Minor Irrigation with the Agricultural Engineering Department as the main implementing agency. The West Bengal State Electricity Board was responsible for the construction and O&M of power transmission and transformation under the project. The Department of Agriculture was responsible for the agricultural extension component and for the agricultural development activities after the commissioning of minor irrigation works. The West Bengal State Water Investigation Directorate was in charge of assessing surface and groundwater resources and for technical clearance of any groundwater development. Finally, the Department of Panchayats through village Panchayats was

involved in the project as management agents for the Agricultural Engineering Department. Though the total project cost at appraisal was estimated at US$ 141.8 million (equivalent to Rs. 1,560 million) out of which IDA credit constituted of SDR 101 million (equivalent to US$ 99.0 million) and despite the extension of the project period by 3 years, the credit amount was reduced to SDR 46.4 million, of which only SDR 40.2 million was finally disbursed.

32. In spite of slower implementation pace and targets under achieved, the project was successful in terms of achieving higher irrigation intensities and yields than initially anticipated; entrusting O&M to Panchayats; and establishing economically viable tube well irrigation systems. Other achievements included:

- The development of incremental net irrigated area at full development of 59,500 ha (43% of the 139,000 ha estimated at appraisal); and
- Yearly estimated incremental food grain production at full development of 177,000 tons (48% of SAR estimates) which was primarily Boro paddy at 131,000 tons (74% of total);
- Yearly estimated incremental potato/vegetables production at full development of 335,000 tons (66% of SAR estimate);
- Yearly estimated incremental mustard production at full development of 7,000 tons; and
- Yearly estimated incremental jute and sesame production at full development of 5,000 tons and 900 tons respectively

33. An unexpected achievement of the project was that it developed the legal and procedural framework for the complete handing over of irrigation wells to beneficiaries for O&M and that it succeeded in getting 1,800 tube wells handed over within a time frame of only about two years. The process was continuing after project closure and further successes are envisaged.

34. **The key lessons[5] documented from project implementation are:**

- **Site Selection:** GOWB's strategy to involve beneficiaries in the site selection and initial design process has had a positive impact.
- **Operation and Maintenance:** Beneficiaries involvement in Operation and Management was easier and excellent in the case of STWs and LDTWs the including cost recovery twice the normal government rates. In addition, Irrigation channel improvements including lining where undertaken without government assistance.
- **Operation and Maintenance Cost and Capital Recovery:** Though the water rate set by the state government was Rs. 5 per acre inch of water the actual costs ranged between Rs. 410 to Rs. 940 per year per acre depending upon the type of irrigation and a capital recovery cost varied between Rs. 1,220 to Rs. 2,410. The Project demonstrated that once efficient Irrigation facilities were established farmers became financially capable and were willing to pay economic water rates to fully recover O and M cause.
- **Sustainability of Schemes:** Better sustainability for the LTWs and LDTWs where achieved as they were fully managed by beneficiary committees. Technical and financial sustainability of these schemes were also ensured due to appropriate technology, correct sitting and spacing of the wells as well as recovery of O and M charges with enough savings for future repairs.

[5] Based on findings from Project Completion Report 1995

- **Monitoring and evaluation:** Monitoring including community monitoring for planning, construction supervision and performance of schemes were conspicuously absent and could be attributed as one of the main reasons for the under achievement of the project targets.
- **Size and scope of Schemes:** The project has demonstrated that smaller tube wells with command areas of about 6 ha, benefitting some 15 to 20 farmers, are highly suited to localize O&M through Panchayats. Larger tube wells on the other hand require a higher degree of technical know-how and operational skill than can generally be found at Panchayats level. It also turned out to be more difficult to identify suitable contiguous command areas for 40 ha tube wells. Consequently, future tube well development in areas where small farmers prevail should aim at the smaller units, even against possibly higher investment expenditure per unit service area, since this may be more than compensated through the avoidance of new O&M liabilities to government.
- **Type of Schemes:** Given feasibility based on local hydrology and geomorphology surface water based MI structures are preferred to ground water based schemes.
- **Integrated Approach:** Installation and development of physical MI Infrastructure alone without integrating promotion of irrigated agriculture, horticulture and fisheries through strengthen extension services failed to deliver anticipated results.
- **Development of User Institutions:** Adequate attention need to be provided in mobilizing and developing Water Users Association; their involvement in water management, O&M and sustainable cost recovery; participatory planning and monitoring of project execution; and sustainability of the of the MI system through well designed training and capacity building programs are essential ingredients for success.

Justification for Project

35. West Bengal being an agrarian state with diverse agro-climatic zones offers huge potential for improving production, productivity and crop diversification opportunities. The main drivers emerging from the forgoing discussions are increasing availability and efficiency of irrigation, water, availability of appropriate technology and other inputs in addition to empowering farmer organizations for better price realization of produce. The key justifications for the project are:

- **Untapped Potential:** At the state level there is still about 1,538 thousand ha of ground water available for development of irrigation potential. There are many districts were ground water can be drawn safely. In addition the utilizable surface water resource is 53.10 BCM.

- **Productivity Enhancement:** Differential productivity levels between irrigated and non irrigated crops are more pronounced for grains and high value crops. 47% of the gross rice area in the state is still rain fed with substantially low productivity levels.

- **Improving Cropping Intensity:** Due to limitation in the land availability for agriculture, the scope for increasing area under crop cultivation is limited. The average cropping intensity is still lower at 182% with scope for enhancing only under availability of irrigation water.

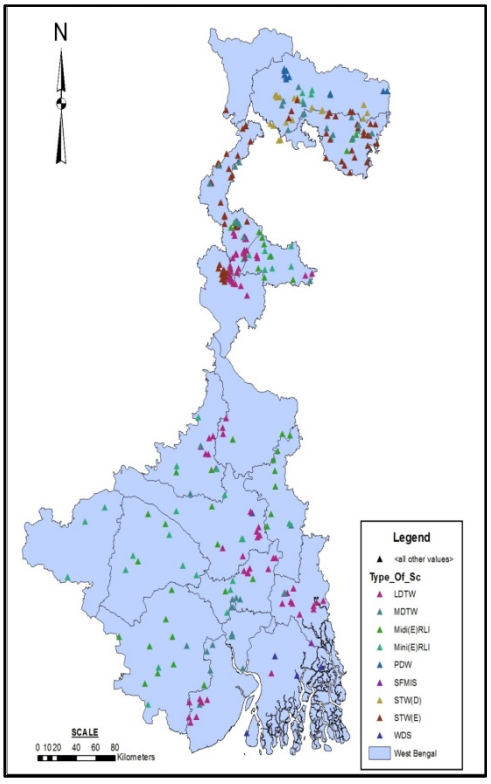
- **Targeted Investment for Small and Marginal Farmers:** 97.7% of farm holdings are still held by small and marginal farmers whose capacity for private capital investment for irrigation development is still poor seriously restricting graduation from sustenance agriculture to commercial agriculture leading to economic empowerment.

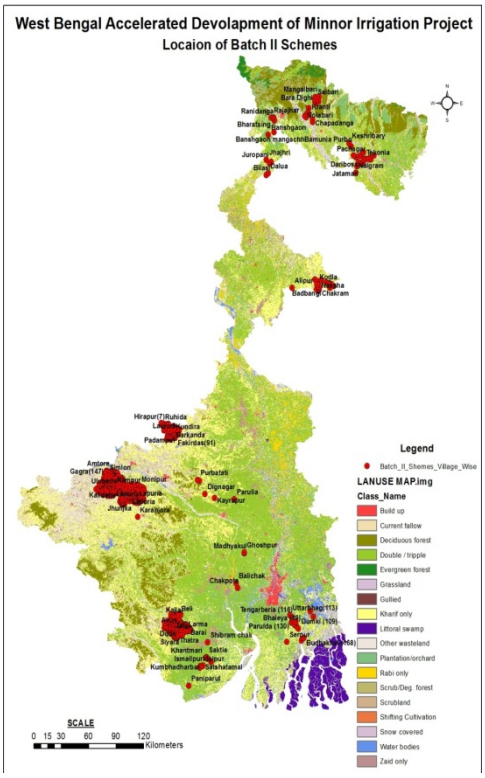
- **Diversification of Crops:** Transition from sustenance to commercial agriculture requires introduction of crops and crop varieties for the market. Introducing high value crops and high yielding varieties calls for ensuring availability of inputs, technical facilitation as well as investments in small equipments and machinery.

Geographic Targeting of Project MI Schemes *[the scheme targeting for phase II is not in agreement with the districts in the west showing areas under low cropping intensity and other factors]*

36. The geographic dispersion of MI schemes under implementation in Batch – I and those proposed under Batch – II are given in **Figure – 1.9.**

Figure – 1.9 Geographic Dispersion of Project Schemes





CHAPTER – 02 PROJECT DESCRIPTION

Key Project Principles

37. The West Bengal Agriculture Development and Minor Irrigation Project aims to accelerate the development of MI Schemes that promote farmer involvement in selecting, designing, implementing and continued use and maintenance of small scale Irrigation Infra Structure coupled with support services for improvement of agriculture based livelihoods targeting on marginal and small farmers of the state. The focus of the program is a concerted effort to maximize the benefits of irrigation water through sustainable growth in agriculture leading to poverty reduction.

38. Hence the key principles underlining the project design are:

- A decentralized setting where the main beneficiaries play an active role in planning, managing, and sustaining project interventions;
- The scheme design and implementation activities meet technical quality and safety standards, and pay adequate attention to social, environmental, and fiduciary considerations; and
- Access to improved agricultural technologies and practices for agricultural producers is as important as improving access to water for improving agricultural production and farmer incomes.

Project Development Objectives

39. The project development objective is to enhance agricultural production of small and marginal farmers in the project area. This would be achieved through accelerated development of minor irrigation schemes, strengthening community-based irrigation management, operation and maintenance and support to agricultural development, including provision of agricultural services, encouraging crop diversification and use of new technologies, and creating income generating opportunities.

Key Outcome and Results Indicators

40. The key results indicators to measure the achievement of project objectives are:

- Increase in yield of main agricultural crops (measured in MT/ha);
- Operational Water Users Associations created (measured in number, based on the majority of members satisfied with the performance of the WUA);
- Resources generated by user groups to manage, operate, and maintain the schemes (as percentage of required resources); and
- Number of female and male water users (defined as member of the WUA) provided with water delivery services: (i) number of female water users; and (ii) number of male water users. In addition, (iii) the percentage of female WUA management committee members will be measured.

Key Project Approaches and Strategies

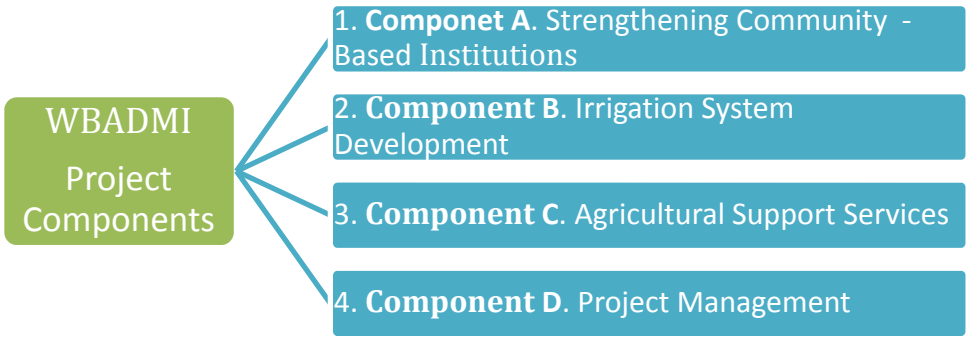
41. In order to achieve increase the agriculture production and improve use of water resources the project will make use of following strategies:

- The Project implementation will follow a water shed/polygon/cluster approach using two levels of targeting: (i) selecting rain fed areas with low cropping intensity; and (ii) zeroing in areas with substantial concentration of small and marginal farmers.
- Micro and small hydraulic facilities primarily based on surface water will be primarily promoted owing to sustainable use of water resources and ease in management and maintenance;
- The management and maintenance of Hydraulic Infra Structure will be vested with small and marginal farmers in the command area;
- Farmer Institutions of small and marginal farmers will be mobilized and strengthened as water users associations;
- Orchestrated involvement of Department of Agriculture, Department of Food Processing and Horticulture and Department of Fisheries with overall support from State Agricultural Universities will be harnessed to provide technology, advisory and training support to farmers;
- In addition to supporting farmers in the command area of new schemes, target farmers benefiting from existing schemes will be supported with institutional strengthening and agriculture technology support activities;
- The livelihood focus of agriculture technology support is intended to transform sustenance agriculture to producing for the market, focusing more on high value crops, enterprise farming etc; and
- The primary farmer institution of WUA will be networked and aggregated at district level to form Farmer Producer Companies as second generation institutions to achieve economies of scale in input supply and output marketing including enhanced bargaining power and establishing strategic partnerships and linkages.

Project Components

42. The project has four components around which project activities will be implemented and project resources channeled, as shown in **Figure – 2.1.**

Figure – 2.1: Overall Project Components



Component A. Strengthening Community – Based Institutions

43. The **objective** of the component is to mobilize and strengthen farmer institutions (WUA) to assume responsibilities for management operation and maintenance of minor irrigation schemes including enhancement of water use efficiency by adopting suitable agricultural technologies for production and post harvest management.

44. The Main activities under the component are:

- Providing social and institutional facilitation support to farmers in the command areas to mobilize and form WUA;
- Providing organizational development assistance and facilitation for strengthening WUA to help them carry out the intended roles;
- Providing technical facilitation to WUA in identifying and prioritizing irrigation development needs and selection of appropriate technology for addressing the needs including the participatory preparation of Scheme Development and Management Plan;
- Providing technical and capacity building services to WUA in accessing and adopting agricultural technology packages;
- Building capacity of WUA in management operation and maintenance of minor irrigation infrastructure;
- Facilitate preparation of manuals for: (i) organization development of WUA including by laws; (ii) management and operation maintenance of irrigation infra structure; and (iii) training manual etc.;
- Providing facilitation support to women farmers and ensuring their active participation in project activities;
- Providing capacity building support;
- Facilitating participatory monitoring learning and knowledge sharing activities within and among WUA; and
- Facilitating preparation and implementation of water use planning, production planning, marketing plans and produce etc.

45. The implementation arrangement consists of: (i) hiring and providing the services of a support Organization (SO) to carry out all mobilization and organization development activities including capacity building and assistance in plan preparations: and (ii) the state Project Management Unit (SPMU) and District Project Management Unit (DPMU)are equipped with specialists staff to batch stop SO services. It is anticipated that once the WUA is fully formed and capacity built, most of the project activities will be undertaken by the office bearers.

Component B. Irrigation System Development

46. The **objective** of the component is to improve availability of water for agriculture and fisheries by developing new minor surface and ground water irrigation schemes on areas that are currently cultivated under rain fed conditions.

47. The **main activities** under the component are:

- Providing facilitation support to WUA in preparing SDMP based on participatory need identification and technology choice;
- Providing technical assistance for designing of irrigation schemes and its approval by the WUA;
- Constructing the irrigation infra structure as per the plans and utilizing community procurement methodologies wherever feasible;
- Providing technical assistance for community supervision and quality assurance of the construction activities;
- Building capacity of WUA in management operation and maintenance of schemes;
- Collecting water use fees and operating the irrigation facilities;
- Managing sustainable use of water resources by WUA through the introduction of water saving technologies and water quality monitoring programs; and
- Implementing pilot zone water harvesting.

48. The **implementation arrangement** consists of:

- The technical staff provided to the SPMU and DPMU will be responsible for spearheading implementation of irrigation system development;
- The officials of DWRID will be providing technical assistance in the preparation of SDMP and implementation of Irrigation systems;
- The Support Organization will supplement the DWRID efforts.

Agriculture Support Services

49. The **objective** of the component is to enhance agriculture based rural livelihood by increasing production of agriculture, horticulture and fisheries. The component will help the line departments to focus and scale up their activities on a command area based approach and improve the income of farmers. The component activities are expected to increase cropping intensity, diversification of cropping system and promote collective activities in input supply and marketing of produce. The component will have three sub components namely: (i) agriculture; (ii) horticulture; and (iii) fisheries.

50. The **main activities** carried out under the component are:

- Supporting Crop Production Plans and Irrigation Plans by Water Users Association;
- Demonstrations – of agronomic productivity interventions;
- Organizing Farmer Field Schools for wider adoption of demonstrated technologies;
- Community based investment for small scale equipments and implements;
- Community based seed production;
- Farmer capacity building and exposure visit;
- Capacity Building of implementing staff;
- Streamlining Farmer Advisory System through Para-Professionals and Project Program Promoters; and
- Promoting and Strengthening Farmer Producer Companies for value chain integration and market linkages.

51. The **implementation arrangement** for the component consists of:

- Provision of specialist staff at SPMU and DPMU level for overall planning and monitoring implementation of the component;
- Identifying and promoting Community Service Providers /Para professionals from among farmers as village level extension workers;
- The project will also hire agriculture graduates as Project Program Promoters (PPP) at the sub divisional level as facilitators for agriculture support system;
- The support organization will also field one Agriculture Specialists; and
- The overall monitoring and technical backstopping will be done by the agriculture, horticulture and fisheries departments through a state level and district level coordinator.

Project Management

52. The **objective** of the component is to provide enabling and facilitating support for the overall coordination planning, implementation and monitoring including learning sharing of the project at state, district and scheme level.

53. The **main activities** under project management are:

- Carrying out strategic communication at state and district level including advocacy and learning sharing including knowledge management;
- Bringing about coordination and orchestrated performance of SPMU and DPMU with DWRID, Department of Agriculture, Department of Food Processing Industries and Horticulture and Department of Fisheries;
- Preparing and disseminating implementation guidelines, manuals and training modules;
- Providing Human Resource Development for Project Implementation including staff capacity building, performance appraisal and performance based incentive system;
- Carrying out fiduciary management responsibilities including project accounting and procurement;
- Implementing social and environmental safe guard measures;
- Designing and establishing Project Management Information System;
- Setting up and implementing project monitoring evaluation and learning activities; and
- Documenting and disseminating project learning among wider development communities.

54. The **implementation arrangement** consists of:

- Establishing an SPMU and DPMU for the day to day management of the project with staff provided by the line departments and DWRID and those contracted through a consultancy firm;
- The drawing and disbursement officer for the SPMU will be supported by Senior Divisional Accountant and Nodal Officers of the three line agencies will be provided by the government; and
- A similar arrangement will be followed at the district level through setting up of a DPMU.

Project Scope

55. The project will be implemented eighteen districts in the state. About 4660 minor irrigation schemes will be set up out of which about 2400 will be minor surface flow irrigation systems

having command area varying from 5 to 50 ha. The ground water irrigation schemes will also be minor having command area 20 to 36 ha. and shall consist of pump dug wells, shallow tube wells and light duty tube wells. The total area to be developed under the project is estimated to be 139,000 ha. Benefiting about 166,000 farm families. The map of West Bengal showing project districts is given in **Attachment – 2.1.**

Project Area Selection

56. The project follows a three stage targeting process for identification of project area: (i) identifying **polygons/watershed** geographic targeting based on rain fed agriculture with low cropping intensity; (ii) **village selection;** and (iii) **scheme self selection.**

57. **Polygon Selection**: The implementation will be done in focused clusters/polygons/watershed (? sq km) in each district which may cover around 1-2 blocks at a time. Once the implementation is complete in one polygon, the project will move to next polygon/watershed with the district. The polygon shall comprise of predominantly rain fed areas and preferably single Kharif crop only which has no source of irrigation.

58. Since the cropping practices vary with respect to respect to rainfall pattern and other hydro-geological characteristics in the various regions of the state, the identification of rain fed areas (without any irrigation) in various regions of the state will follow following procedures: Priority area (Western Region): Majority of rain fed crops are Single cropped Kharif area in this region. Therefore the priority will be given to single cropped Kharif area. The remote sensing based land use and field verification will be used as guideline to identify the polygons. The rain fed areas in Northern Region may have two crops including pre-Kharif crop and Kharif crops but without any irrigation source. These areas and practice will be verified by the field team while also supplementing with the latest remote sensing images.

59. **Village Selection:** The villages in which the schemes will be proposed for selection shall fall within the polygon created including number of mini watersheds (10 sqkm-25sqkm) based on remote sensing based land use, site reconnaissance survey by DPMU, and social baseline (based on census information). Within the polygon the scheme shall be provided to rain fed areas only.

60. The actual area for scheme development within the polygon shall target contiguous area in adjacent villages. A typical village should have a rain fed area of 80-100 ha however it may vary in small villages. While selecting the villages, priority shall be given to tribal dominated & backward villages. In the Villages under tribal development plan, the need is to ensure more than 60% beneficiaries belong to tribal community. At least 13% of the project fund will be used for sub projects in Tribal dominated area further within the polygon, the watershed project area is recommended to be taken on priority for convergence to ensure much better results. Support Organizations will submit the list of identified villages to DPMUs in the specified format and facilitate the Village selection process. DPMU will do the necessary verification and recommend the proposal for selection of these villages to the SPMU for The World Bank Clearance.

61. **Scheme Selection** will also follow water shed approach to harness the maximum irrigation potential. Watershed approach need to be followed to harness the maximum irrigation potential before the actual site selection, preliminary selection of potential sites/ areas should be planned out of remote sensing based water resource, cropping pattern, agricultural statistics data and field

verification by support staff. The final selection would be done after receiving the mass petition from the villagers showing willingness to form WUA and carrying out operation and maintenance of their own and verification by the DPMU engineers and specialists both technically, socially and environmentally through Technical Feasibility Report (TFR).During final selection of schemes, SWID clearance will be necessary (for all kind of schemes) and it will be submitted along with the Technical Feasibility Report. In the villages under tribal development plan, the need is to ensure more than 60% beneficiaries are tribal.

62. In order to have a manageable size of WUA and simplified system to operate and maintain, the priority will be given to small size schemes. The midsize surface and groundwater schemes will be discouraged to the extent possible. Priority is to be given to surface water based schemes which are i) Water Detention Structure (WDS/ Tank**) ii) River Lift Irrigation(RLI), iii) Gated check Dam, iv) Surface Flow Minor Irrigation Structure(SFMIS) v) Hydrum. The water distribution should have a facility to upgrade with Sprinkler/drip irrigation system which will be provided later depending upon the cooperation of community. While deciding type of the scheme, surface water schemes should be preferred. If the possibility of surface water scheme is limited then ground water structure is to be considered judiciously along with surface water schemes. Where ground water is very scanty the possibility of PDW type scheme might be considered along with surface scheme in clusters.

63. Areas without permanent irrigation facility alone are eligible. The selected schemes shall be technically and environmentally feasible. Preferably minimum 80% of the proposed water users are to be small and marginal farmers. Potential beneficiaries Farmers are to be ready to form WUA and agreeable for the Operation and Maintenance (OMM) of schemes. Priority need to be given to Women farmers to be the beneficiaries and also the representative of WUA management committee and subcommittee. Further, fishery activity may be taken /proposed in the proposed villages within/outside command area and fishery Interest group will be formed separately but must be part of the any ongoing project promoted WUA.

64. **In southern Districts** proposals for strengthening the WUA in existing government or community managed schemes may be submitted for consideration. Solar/Sprinkler/Drip system may also be introduced as individual/group activity and WUA may be formed with all the proposed/potential beneficiaries for promoting Agriculture/Horticulture/Fishery activities. Support Organizations will submit the list of identified schemes to DPMUs in the specified format and facilitate the Scheme selection process. DPMU will do the technical feasibility assessment and place the proposal for selection of these schemes to the DLIC for their approval.

Project Cost

65. The total project costs are estimated at US$300 million, including a base cost of US$248.5 million and physical and price contingencies of US$51.5 million. The physical contingencies of are included only in the cost of schemes while the price contingencies of are based on the current inflation rates in India and have been applied to all works, goods, equipment and services. The component wise cost including financing plan is given in **Table – 2.1.**

Table – 2.1: Component Wise Project Costs

S.No.	Component	Amount		Percentage
		(INR Million)	US $ Million	
A	Strengthening Community Based Institutions	372	8.1	2.7
B	Irrigation System Development	10,808	235	78.3
C	Agricultural Support Services	1,015	22.1	7.4
D	Project Management	1,605	34.9	11.6
Total		**13,800**	**300**	**100**
Project Financing Plan				
S.No.	**Sources of Finance**	**INR (Million)**	**US $ Million**	**Percentage**
1	Government of West Bengal	2270	50	16.66
2	IBRD	5765	125	41.67
3	IDA	5765	125	41.67
Total		**13,800**	300	100

66. The government share will be for the component irrigation system development and the bank financing will be restricted to 79%. All other components will be financed 100% by the Bank.

CHAPTER –03 COMPONENT A – STRENGTHENING COMMUNITY BASED INSTITUTIONS

67. Experience from other states in India and elsewhere have successfully demonstrated the capacity of farmers, especially small and marginal farmers when mobilized into inclusive and accountable farmer institutions , in prioritizing their needs, managing resources, demanding better services and operating and maintaining various common infra structure including minor irrigations structures. The institutional platform help member farmer's access technology and information, agricultural inputs including credit and better market the produces by substantially improving their negotiating skills and bargaining power. The empowered local institutions of farmers are able to drive their priorities and over see investments effectively within their farms as well at the community level like minor irrigation investments. The component provide enabling conducive environment and technical assistance including facilitation, hand holding, mentoring and other capacity building services to farming communities in the command area with special focus on small and marginal farmers. The intended outcomes are efficiently performing WUA fully empowered for group action including creating a demand pull on the agriculture technology dissemination system, establish links with public and private operators for input supplies, output marketing and seize opportunities for value addition including prevention of post harvest loses.

Main Approaches

68. The component will design and implement activities building on the following principles: (i) full participation of small and marginal farmers; (ii) inclusion in decision making and equity of benefits to all member farmers; (iii) inter-institutional linkages among primary farmer organizations for building second generation institutions of farmer companies; (iv) inclusion of women headed farm households and other women in the institutional activities; and (v) public and private partnerships for establishing linkages for farmer advantage.

Objectives

69. The objective of the component is to establish, train and strengthen Water Users' Association (WUA) to assume responsibility for sustainable operation, maintenance and management (MOM) of their respective MI schemes and improving irrigation based livelihood options.

Expected Outcomes

70. The expected outcome under this component is improved effectiveness and financial viability of irrigation water management by WUAs measured in terms of: (i) Operational Water Users Associations created (a) WUAs holding regular General Body meetings (measured in percentage) (b)WUAs maintaining appropriate cash books and water regulation registers (measured in percentage) (c) Female WUA executive committee members (measured in percentage); (ii) Resources generated by user groups to manage, operate, and maintain their MI schemes (a) Percentage of required resources starting the year after completion of construction; (iii)Number of female and male water users (defined as member of the WUA) provided with water delivery services (a) Number of female water users (b) Number of male water users. .

Main Activities

71. The main activities leading to the formation and strengthening of WUA supported under the component are:

- Social intermediation and farmer mobilization support services through the provision of

Support Organization;

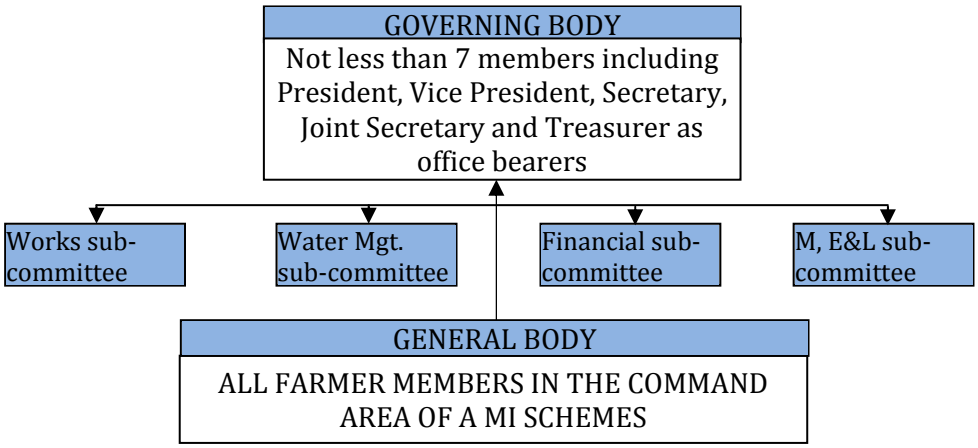
- Capacity building of farmer organization (WUA) through workshops, exposure visits, training programs;

Water User Association (WUA)

72. WUA is an organization of farmers who practice agriculture as their main livelihood in the command area of minor irrigation schemes promoted under the project. It is a society registered under the West Bengal Societies Registration Act. All key decision making powers for project implementation at the scheme level including allocation of water resources, fixing water fees, crop planning etc. are vested with the WUA. The model memorandum and articles of association of the WUA is given in **Attachment 3.1.** WUA is considered as the project implementation agency at the schemes/village level.

73. The **composition and structure** of WUA consists of: (i) General Body of all farmer members; (ii) a Governing body of not less than 7 members including President, Vice President, Secretary, Joint Secretary and Treasurer as office bearers; (iii) for sub committees namely (a) works sub-committee, (b) water management sub-committee, (c) financial sub-committee and (d) monitoring and evaluation sub-committee.

Figure – 3.1 Structures and Composition of WUA



Steps in Formation of WUA

74. The formation of WUA consists mainly of a 5 step process: (i) step-1: IEC Campaign; (ii) step-2: self selection of villages; (iii) step-3: formation of WUA; (iv) step-4: organization developments and registration of WUA; and (v) Step-5: capacity building of WUA as shown in **Figure 3.2.** The steps

usually follow the same order, but there will be concurrent and over lapping steps as well in the field depending upon field conditions.

Figure 3.2 Step wise Formation of Water Users Association

IEC Campaign

75. Immediately upon selection of polygon based on rain fed areas and cropping intensity as described in Chapter – Irrigation System Development, the project through the support organization carry out an information and outreach campaign among potential villages and sites. The campaign will focus on key project principles, rules for participation as well as farmer responsibilities of operation and maintenance.

Self Selection of Villages/Schemes Sites

76. In line with the community driven approach of the project the potential schemes sites/villages are selected based on farmer willingness to follow the messages given out during the IEC campaign. Their readiness is to be demonstrated through a farmer meeting and resolution to apply for joining the project. If the community shows interest and readiness to take up scheme related responsibilities as per the norms of the project, then only will the SO, with the assistance of the DPMU and line departments, take up primary level environmental, technical and social screening of the locality to assess feasibility of taking up a scheme there. Scheme sites identified on the basis of such a screening will be submitted to the DLIC for approval. Once DLIC confers its approval for a scheme site, the process of formation of Water User Association and preparation of a Scheme Development and Management Plan (SDMP) for that scheme will commence.

Formation of Water User Association

77. The SO will carry out various participatory tools to delineate the command area and identify the potential farmers who will benefit from the proposed schemes. The main participatory tools used are: seasonal crop calendar; transect analysis; spatial mapping of farm fields, ponds and residences as well as a participatory targeting exercise to identify and list small and marginal farmers who forms the main target beneficiaries of the project. After a clear understanding on WUA is created among the potential WUA members, the SO will conduct a second meeting with them to prepare a formal list of members of the WUA. This will be followed with the constitution of the WUA General Body. During the meeting the draft Memorandum of Association (MoA) of the WUA will be presented to the General Body for discussion and approval. On approval, a formal resolution will be passed by the WUA General Body adopting the MoA, which all the present members will sign.

Organization Development and Registration

78. After adoption of the MoA, the SO will announce a notification for the constitution of the WUA Governing Body (Management Committee) and officer bearers such as the President/Chairman, Vice President/Chairman, Secretary, Joint Secretary and Treasurer in the meeting. In case the Governing Body members and the officer bearers are unanimously elected, they will be constituted during the same meeting and a formal General Body resolution passed listing the names of the Governing Body members and the office bearers. However, if there is a need to hold elections, the WUA General Body will fix a date for conducting it. Also the General Body members desirous to stand for Governing Body or officer bearer positions will need to inform about it during the meeting so that their nomination and the position for which they wish to stand can be formally recorded and announced in the WUA General Body.

79. The SO will facilitate conduct of the election for the Governing Body (Management Committee) and officer bearers on the date fixed for this purpose. Election may be conducted using raise of hands or ballot papers depending on the wishes of the General Body members. All General Body members will have one vote, which they may exercise only in person. The counting of the votes will be carried out by the SO immediately after the voting and the results announced thereafter. Once the election results are declared, a formal General Body resolution constituting the Governing Body and the officer bearers will be passed listing the names of the Governing Body members and the office bearers. While constituting the WUA Governing Body and officer bearers, whether unanimously or through election, the legal and project provisions of women and SC / ST representation will need to be adhered to. Apart from Governing Body, a WUA will also form four Sub committees under project requirement, namely, i) the Works Sub-committee, ii) the Water Management Sub-committee, iii) the Financial Sub-committee and iv) the Monitoring & Evaluation Sub-committee. These sub-committees will also be formed during a WUA General Body meeting and may follow a similar procedure as described for the Governing Body.

80. After the completion of the process of formation of the WUA, the Governing Body will prepare and submit an application to office of the Registrar of Societies office for formal registration of the WUA under the West Bengal Society Registration Act, 1961. The application needs to make along with the WUA MoA, a list of members of the Governing Body and officer bearers and copies of the General Body resolutions related to this. The SO and the DPMU will assist the WUA in submitting their application for registration as a society.

81. The WUA will open its bank account in a nearby nationalized or cooperative bank branch. To facilitate opening of a WUA bank account, the General Body will need to pass a resolution to this

effect. The WUA will then make an application to the bank to open its account with a filled up account opening form, deposit slip, duly signed copy of resolution, copy of WUA MoA, 2 copies of passport size photograph of the President/Chairman, Secretary and Treasurer along with photocopies of their voter ID card / ration card. These three officer bearers of the WUA will be authorized by the WUA General Body through a resolution to operate the bank account in its favor. Two more documents will be required to be submitted to the bank to open a WUA account, namely: (i)Certificate issued by the Panchayat Pradhan that all members of the WUA are living in the village / panchayat and are personally known to him; (ii)Certificate from SO / DPMU that the WUA is being formed under a GoWB project of ADMIP. The SO will assist the WUA in making the application to the bank.

Capacity Building of Water Users Association

82. The farming community particularly, marginal farmers face several challenges in managing minor irrigation sub project, such as inequitable water distribution, deprivation at the tail end point, poor performance of irrigation facility due to deferred maintenance, below optimum yield from farm because of not planning cropping pattern on the basis of availability of water etc. Institutional strengthening of WUA through training and other capacity building means can enable the water users to cope with these challenges. The institutional strengthening of WUAs under the project will be achieved through various training and support activities. The purposes of training are: (i) to strengthen the institutional functioning with well defined role of WUA sub-committees; (ii) to facilitate water and land resource management; and (iii) to improve the productive potential of the command area in terms of agriculture, horticulture, fisheries.

83. The Project will impart initially training to the WUA through six training modules has detailed below and described in **Attachment – 3.2.**

i. Module 1: About ADMI Project
ii. Module 2: Roles and Responsibilities of WUA
iii. Module 3: Supervision and Monitoring of MI Schemes
iv. Module 4: Operation and Maintenance of MI Schemes
v. Module 5: WUA Accounts and Book Keeping
vi. Module 6: Agriculture based Livelihood Options (see Chapter 4 on ALSS)

84. The SOs, DPMUs and the Line department staff will impart training to the WUA. Module 1 to Module 5 will be covered in 11 training days for each WUA during the Project Implementation stage. During the Post Implementation Stage, refresher training of 2 to 3 days duration will be conducted as per requirement. The SO will prepare training plan for each WUA along with the budget on the basis of the modules and submit it to the DPMU on a quarterly basis for approval. Based on the training plan the DPMU will release the necessary fund to SO to conduct the trainings. Trainings will be conducted at the WUA level as well as cluster level. Each cluster will include 7 to 15 WUAs. Module 1 deals with more general topic and all members of the WUA will get training on it. A part of Module 2 and Module 3, which deals with building general awareness on role and responsibilities of the members, supervision during construction phase will also be provided to all WUA members. These trainings will be conducted at each WUA level. The remaining Modules (2 to 5) cover majorly specific technical topics. Hence, only specifically responsible members of a WUA will receive these training. These trainings will be arranged at cluster level. 2 to 3 representatives from each WUA will take part at the cluster level training. Total number of participants per training event will not be more than 40.

85. A Training Manual covering on all the topics of module 1 to 5 will be prepared by the SPMU in simple Bengali language and distributed to each WUA for ready reference. The Manual will also guide the resource person in conducting the training. In addition to formal training the following activities are undertaken as part of capacity support: (i) Training Need Assessment - TNA for WUA will be performed regularly by SO and DPMU and based on the assessment training modules will be re-deigned, if necessary: (ii) Exposure Visit - Apart from training, exposure visit will be organized for the WUA to nearby best practice sub projects which can act as hands on training. Even during training representatives of successful WUA will share their experiences. Failure cases will also be shared during training as a part of practical training (iii) Hand Holding - SOs and DPMU will provide hand holding support to WUA for three consecutive years after sanctioning of SDMP by DLIC. Post handing over of the scheme, they will receive hand holding support from the SO and DPMU and whenever necessary from line department for about 1 year. During that period refresher training will be arranged: (iv) IEC Material - Various Information, Education and Communication (IEC) materials, such as leaflet, posters, flip charts, video film will be developed to disseminate key information related to ADMI project to the WUAs and farmers. It would also enhance the visibility of the project to larger community; (v) Case Documentation - Successful and innovative cases will be documented by the SO and DPMU team. The cases will act as training / awareness material, not only for WUA but also for other the stakeholders of the project.

Roles and Responsibilities of WUA

86. The min **roles** of the WUA cover the following areas: (i)Planning, monitoring implementation and management of Irrigation infrastructure –To carryout timely maintenance of the irrigation systems –To improve the system for efficient and economical use of available water; (ii)Water management –To prepare the schedules of water deliveries –To supply water to all members in the command area –To avoid and prevent misuse and wastage of water –To use water economically: and (iii) Agriculture Development–Preparation of crop plan –To inspect water utilization –To educate farmers on agricultural aspects.

87. The specific responsibilities of WUA are:

- Preparing and implementing Water distribution Schedule for every irrigation season
- operational plan has to be prepared based upon the entitlement area, soil and cropping pattern
- Preparing O&M plan for the irrigation system at the end of each crop season and its implementation as accepted by the GB of WUA
- Carry out the maintenance works of feeder channels and field drains with the O&M funds from time to time
- Ensure judicious use of as per the approved water distribution schedule
- To promote economy in the use of water
- Prepare demand and collection of water charges
- Monitoring the flow of water for irrigation
- Resolving the disputes if any in between the water users in the area of operation
- Raising the local and community resources
- Maintaining the records for annual audit and for transparency
- To encourage avenue plantation on canal bunds and waste lands
- Water budgeting and enabling Social audit and complying with social audit recommendations.
- Organizing the general body meetings

- Financial audit to be done to maintain the transparency
- Operating the drainage
- Protecting the assets of WUA
- Protecting the irrigation canals and other constructions and repairs

88. The detailed tasks and responsibilities are elaborated in **Attachment 3.3**

WUA Self Rating Tool

89. Institution strengthening of WUAs is expected to result in active participation of WUA members and functionaries in project implementation in all stages, namely, pre planning, planning, implementation and post implementation. The WUA also has to operate and manage the MI scheme sustainably, which requires a system of checks and balance within the operation process. Consequently, the WUA members and functionaries are required to perform different functions on day to day basis and periodically. The functions are related to WUA administration, operation, maintenance and management of the irrigation system, irrigation management and WUA fund management. The project through specific interventions target institutional strengthening of the WUAs to prepare and capacitate them to take up these responsibilities. However, training and exposure visits alone may not bring in the required capacity and the WUAs may need to practice self assessment and learning to continuously build capacities and improve performance. Participatory monitoring and cross learning approach provides scope and opportunity for self learning and improvement as collective action as long as vital and effective indicators are identified and self monitored. The WUA Self Rating Tool being developed by the SPMU is based on this approach and is expected to facilitate critical self assessment and learning among WUAs. The monitoring tool is also expected to lead to exchange of ideas among the WUA functionaries and members in planning improvement in WUA performance.

90. The Monitoring and Evaluation Sub-committee of the WUA will carry out the self rating exercise using the tool developed after the Kharif and rabi crop season. They will be trained by the SOs in administering the tool and analyzing the findings to make self assessment.

91. The self rating tool will make the WUA members understand their current state of functioning, help them identify existing weaknesses and gaps in WUA performance and identify and plan corrective measures to improve WUA performance. For ease of use, the self rating tool is designed keeping in view simplicity in understanding, analyzing and rating the indicators by the WUA functionaries and members.

CHAPTER –04 COMPONENT B – IRRIGATION SYSTEM DEVELOPMENT

93. Maintaining Agricultural Growth Rate in the state is principally constrained by very limited scope for increasing cultivable area and very small land holding size. Absence of assured irrigation facilities constitute the main inhibiting factor for enhancing productivity levels, especially in the predominantly rain fed areas of the state. Expanding irrigation facilities for the state is more significant not only for maintaining reasonable agricultural growth but also providing sustainable rural employment and optimal utilization of available water resources. Hence, Component – B Irrigation System Development intends to improve availability of water for agriculture and fisheries by developing new minor surface and ground water irrigation schemes in areas currently cultivated under rain fed conditions.

Objectives

94. The objective of the components is to improve availability of water for agriculture and where feasible for fisheries by developing new minor surface and ground water irrigation schemes. The component will also introduce water saving technologies and expand on ground water monitoring programs.

Main Principles

95. Provision of irrigation services under the project will be guided by the following main principles.

- Development of new facilities will be targeted in rain fed areas where there are no permanent and functioning irrigation facilities as well as low cropping intensity.
- The proposed schemes have to benefit economically poor small and marginal holders (80% holders in CCA).
- Small scale minor surface water schemes and gravity fed schemes will be preferred to ground water based schemes.
- Selection of type of scheme will not only be based on hydrological and technical consideration but also take into consideration farmer demand and preferences relating to their participation in planning, implementation and post-implementation management.
- Strengthened and inclusive Water User Association functioning accountable to all small and marginal farmers in the command area will be empowered to take decisions on sustainable investments and judicious use of resources including post project management of the scheme.
- Diesel energy will be used only in remote areas without access to electricity (generally within a distance of 2.5 km. Solar energy and wind power will be used as alternate energy wherever feasible.

Expected Farmer Coverage Main Technology Options

96. The project proposes to promote construction of 10 different types of irrigations schemes. A bout 4660 minor irrigation schemes will be installed to irrigate a total command area of about 139,000 ha., in 18 out of the 19 districts in the state. The total number of farm families expected to be benefited is estimated at 166,000 farm families.

97. The project does not propose any ground water structure in the areas bordering with Bangladesh. The surface water structures especially in the northern district will also consider externalities resulting from impact on down stream flows particularly after considering the effects of return flows. The location of the schemes will also follow the requirements of various safe guard policies of the World Bank. The details of main types and technologies of irrigation schemes proposed for construction under the project are summarized in **Table – 4.1.**

Table – 4.1 Types of Schemes and Farmer Coverage

Source Type	Technology Type	Average Benefited Area (ha./unit)	Average Farmers Benefited (no./unit)	No. of Schemes	Total Area Benefited (Estimated) ha.	Total Benefited Farm Families (Estimated)
Surface Water Irrigation Scheme	Surface Flow MI schemes	30 - 50 ha.	45 – 80	284	**139,000**	**166,000**
	Medium River Lift Irrigation - Diesel / Electrical (Midi RLI - D/E)	40 ha.	60	577		
	Mini River Lift Irrigation - Diesel /Electrical (Mini RLI - D/E)	20 ha.	30	1417		
	Water Detention Structure (WDS)	5 -10 ha.	5 - 15	117		
Ground Water	Medium Duty Tube Well - Electrical (MDTW)	20 ha.	30	359		
	Light Duty (Cluster) Tube Well – Electrical (LDTW)	36 ha.	9x6	522		
	Shallow (Cluster) Tube Well – Diesel (STW)	36 ha.	9x6	1309		
	Pump Dug Well (Cluster) (PDW)	30 ha.	7x6	75		
Total No. of Schemes				**4660**		

98. The area to be irrigated by a scheme normally ranges from 5 to 40 ha. with an average CCA of 30 ha. The number of farmers benefited per scheme range from 20 to 200 farmers. Thus the membership in a WUA also will be 20 to 200 farmers. Shallow tube wells, light duty tube wells and pump dug wells will be normally constructed in a cluster of 6, with each scheme covering 5 to 6 ha. As the selection of the type of scheme will be based on hydrological, technical and user demands the actual numbers at the end of the project may tend to differ from the above. The detailed description of the different technology options are given in **Annex – 4.1.**

Main Component Activities

99. To achieve the objectives and following the main principles of the project will finance the following main activities:

- Assessment of availability of irrigation water for surface flow and river lift irrigation schemes as well as that for ground water based irrigation schemes to be developed under the project;
- Construction and installation of proposed irrigation infrastructure, including electro-mechanical components;
- Procurement of survey and quality control equipment for scheme preparation and implementation;
- District level third party quality assurance consultants to monitor construction quality standard;
- Contractual staff to bridge technical man power shortage, if found necessary;
- A well qualified and adequately staffed Technical Unit attached to the SPMU for review of design and supervision of construction of key irrigation infrastructure to ensure adequate safety and performance quality;
- Piloting introduction of water saving irrigation with drip and sprinkler;
- Water quality labs to monitor ground water level and ground water quality; and
- Development of state wide GIS based minor irrigation data base to enable DWRID plan future investments following lessons learned from the project.

Targeting Rain Fed Areas

100. The agriculture in the state continues to depend predominantly on rain fall and hence the cropping intensity remains low at 182 percent. The irrigation coverage in terms of IP created remains low at 46 percent. In about five districts 70 percent of net area zone are single cropped areas while in many districts there are still extensive mosaics of rain fed areas. Most of the single cropped areas fall in the Western Plato districts which receives average annual rain fall of about 1400 mm., of which 90 percent is received during the main monsoon months of June to September. Surface Flow Minor Irrigation Schemes are most preferred in these areas and would ensure supplementary irrigation to Kharif crops and full irrigation to at least 40 percent of Rabi crops wherever possible the reservoirs of SFMIS would also help raise short duration fish farming.

101. In order to have major impacts on production and productivity of crops, it is important that the new schemes proposed under the project are clearly targeted and located in the rain fed areas of the state. The implementation process has been streamlined to achieve maximum coverage of rain fed areas of the state. In areas where MI schemes have already been built, the project will focus on institutional development aimed at mobilizing WUA for these schemes with the aim of farmer based operation, maintenance and management of the schemes. In addition the agriculture development activities will be strengthened in these command areas to fully utilize the irrigation potential created.

Untapped Minor Irrigation Potential

102. The minor irrigation census figures and the Water Data Book of Ministry of Water Resources Government of India indicate that, there is a huge gap between the irrigation potential assessed and irrigation potential created. There are still variations in irrigation potential utilized and gross irrigated areas clearly indicating the need for remedial measures. The minor irrigation

census data clearly indicate that there is huge scope and expressed demand for development of minor irrigation in the state.

Technology Preferences

103. As the project focuses on setting up community managed irrigation systems and sustainable and judicious use of water resources, the technology or types of minor irrigation schemes need to have a strong preference towards smaller schemes which are sustainable and easy to manage. The state has rich annual usable surface water, with limited creation of storage and the potential to create major storage is limited. The utilizable surface water is estimated to be 5.31 m.ham while that of ground water is 1.46 m.ham. Hence surface water based schemes wherever feasible will be given preference. Only in cases were such options are not available ground water based schemes will be a choice. Even while developing ground water, pumped dug wells (PDW) will be the first option to be explored.

104. **Surface Flow Schemes: -** Surface Water Minor Irrigation schemes include diversion structures like weirs, check dams, lift irrigation, small storage tanks, rivers, natural water bodies etc. Mini river lift with and without check dams are preferred in perennial river sources. A number of mini RLIs are preferred to large size mid RLI. Wherever seasonal rivers are available mostly in the western parts of the state check dams to create small storage with gravity or lift distribution is preferred. Water is stored in the U/S side of a stream constructing a barrier. Water distribution will be mainly through gravity flow and / or some times by lifting devices depending on the level of irrigated field.

105. **Ground Water Schemes: -** Ground water in the state occurs as multi - aquifer system having different hydraulic and chemical characteristics. Development of ground water normally takes the form of shallow dug wells or tube wells and medium or deep tube wells. Ground water development option is taken only if surface water availability in the hydrological unit is sub-optimal. The nature of aquifer system, stage of ground water development, water quality concerns, pumping options and irrigation water demand are the main consideration for selecting ground water option.

106. Communities prefer shallow tube wells and light duty deep tube wells with average CCA of 6 ha. each due to easy maintenance and avoidance of buried distribution system. Farmers use portable lay flat types of PVC pipes for improved irrigation efficiency. Pumped dug well (PDW) is a low technology solution which is very efficient, environmental friendly and promote high level of community participation. This is the best option where uncontaminated water tables aquifers directly recharged by rain fall are available. Construction is easier, operation and maintenance cost is minimal and community management is most feasible. PDW can irrigate on an average CCA of 5 ha. and are useful for irrigating Rabi season crops. Irrigation channel require no lining and command area can be enhanced by increasing storage area. The dug wells are accompanied with suitable recharge structures as well. Shallow tube wells are next higher option to PDW to tap near to ground level aquifers. The project proposes to promote generally a cluster of MI structures consisting of 6 of these small structures. Shallow tube well clusters are suitable for areas were water table is within suction limit.

107. Light duty tube wells require mechanized rigs for construction and use submersible pumps as lifting devices. Hence, LDTW are suitable for large scale implementation but suffer from various potential problems like deterioration of casing pipes, failure of screens, gravel and sand in water discoloration of water etc. While selecting river lift irrigation and tube wells, technical selection of

the most appropriate location assumes importance and possible over abstraction need to be avoided.

108. Medium Duty Tube Wells (MDTW) constructed in the past have already reported various problems leading to failure of schemes and hence will not be promoted. Whatever be the technology type, cost and economic viability of these schemes have to be properly assessed before selection of the technology.

Polygon Based Approach

109. Community based minor irrigation services and management is aimed at bringing in sustainable utilization of water resources, judicious water management practices for improving efficiency and community based self monitoring and learning to enhance effectiveness of the systems. A polygon is a basic hydrologic unit demarcated as a contiguous geographic area covering few mini water shed and may extent to 10 km^2 to 25 km^2. Remote sensing data and already available statistical data interlaid with GIS information are used to identify and map polygons. In addition to water resources data and land use data, using remote sensing, site reconnaissance survey and social baseline census will also be used.

110. The approach departs from the traditional build and operates stand alone random schemes scattered over large geographic areas. Instead, the project propose to utilize a polygon based model to arrive at informed as well as participatory decisions about water resources, water budgeting and balancing, collective action in land management and use of other natural resources. The polygon based approach provides for a bottom up and farmer driven planning and implementation process leading to development and strengthening of farmer institutions (WUA) and wider adoption of improved agricultural practices leading to enhanced farm incomes. The minor irrigation investments form the institutional platform for strengthening farmer institutions and social capital in addition to becoming the economic platform for enhanced farm incomes.

111. The selected polygons for project implementation are predominantly rain fed areas with single cropped Kharif cultivation and without permanent irrigation systems currently functioning. The rain fed areas within the polygon will be clustered in different batches to take up implementation in each year. Within the polygon the schemes shall be provided to rain fed areas only. Typically a cluster of schemes or single schemes could cover a rain fed area of 80 to 100 ha, which can be smaller villages. In order to cover an entire village even if a part of it fall outside the polygon, a 10 percent buffer along the periphery of the polygon is allowed. Also, if potential beneficiaries of a proposed scheme fall close to the periphery of a polygon but belong to a nearby village could also be included as beneficiaries. As the rain fed villages within a polygon are fully covered in different years another polygon will be identified.

Scheme Selection Process

112. As already elaborated polygon approach will be followed to harness maximum irrigation potential. A preliminary list of potential site/areas is identified using remote sensing based data on water resource, cropping pattern as well as agriculture statistics data. This will be supplemented by field verification. The submission of mass petition by potentially benefiting farmers will be verified by DPMU engineers. They prepare a Technical Feasibility Report (TFR) covering technical,

social and environmental feasibility of the location and scheme. The final selection of scheme will be done by SWID based on TFR.

Scheme Selection Criteria

113. The project is promoting farmer managed operation and maintenance of schemes and hence the following criteria are used to select schemes.

- Areas without permanent irrigation facility/rain fed are only eligible.
- Minimum of 80 percent of direct beneficiaries of the scheme shall be small and marginal farmers and at least 60 percent beneficiaries are tribal in villages under tribal development plan.
- Small sized schemes with manageable membership size of WUA and simplified system to operate and maintain. Mid size surface and ground water scheme are discouraged.
- Surface water based schemes have priority and the most preferred technology types are: (i) Water Detention Structures (WDS/Tank); (ii) River Lift Irrigation (RLI); (iii) Gated Check Dams; (iv) Surface Flow Minor Irrigation Structure (SFMIS); and (v) Hydrum.
- Wherever surface water scheme is limited then only ground water structure is to be considered but to be judiciously combined with surface water schemes. For example PDW schemes considered along with surface schemes in clusters.
- The water distribution system should have facility to upgrade with sprinkler/drip irrigation wherever feasible.
- The proposed schemes are technically feasible without significant environmental impacts.
- The direct beneficiaries farmers are ready to form WUA and willing to carry out operation and maintenance of scheme.
- Preference will be given to schemes benefiting women farmers with women representatives in the WUA management committee and sub committees.
- Fishery activity will be undertaken within our outside the command area by mobilizing separate Fisheries Interest Groups.

Enhancing Effectiveness of Existing Schemes

114. In areas where there are existing minor irrigation schemes, to enhance the effective operation and maintenance as well as to improve the efficiency of water use, WUA will be formed and/or strengthened in schemes benefiting more than 80 percent small and marginal farmers as beneficiaries. However such activities will be based on case to case basis and subject to DPMU undertaking technical feasibility and approval by DLIC. The selection of the schemes will follow the general scheme selection process and eligibility criteria. Existing Government or community managed schemes will be considered.

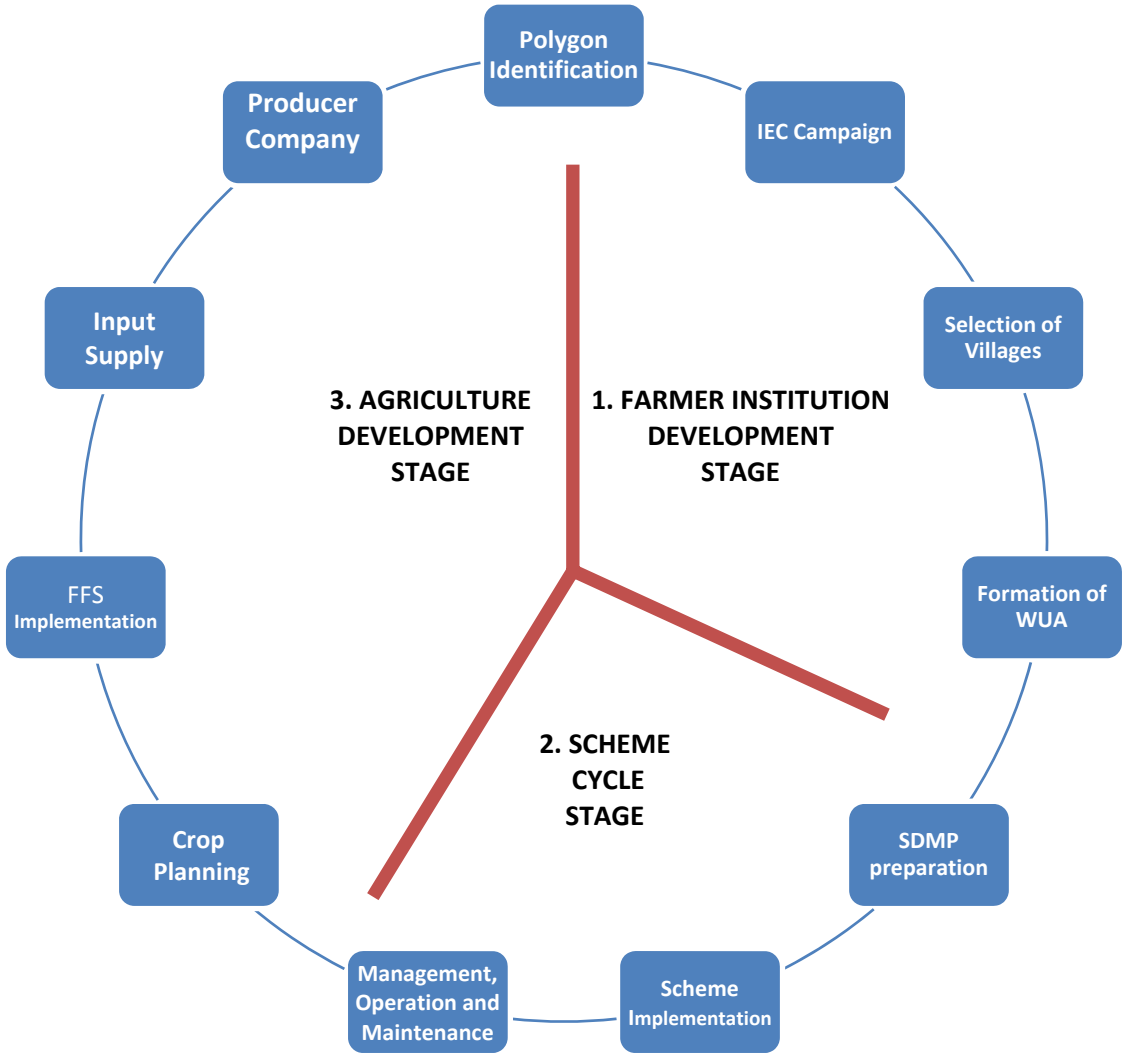
115. Existing schemes will be supported for strengthening WUA and their capacity building. The promotion of agriculture support services to improve agriculture, horticulture and fisheries activities will be undertaken. More over introduction of irrigation water saving devices like sprinkler or drip as well as solar based energy support will be considered on an individual or group activity basis.

Overall Project cycle

116. The project being farmer driven follows a process approach in its implementation. This will help the implementing and facilitating agencies to orchestrate implementation with the full

involvement of farmers and also to ensure quality of the processes. Therefore, project implementation progress along a step wise sequenced as well as some parallel activities which make up the Project Implementation Cycle. The project cycle is divided into three main stages: (i) **Farmer Institution Development Stage** (which may last for 6 months); (ii) **Scheme Development Cycle** (which may last for 18 to 30 months depending upon technology and size); and (iii) **Agricultural Development Stage** (which may last for 36 months). For a typical project site the total duration of project activities under the overall project cycle may be 36 to 40 months. The project will have a clear phasing out strategy to fully exist from a project site leaving the management operation and maintenance with the empowered WUA. The overall Project Cycle is shown in **Figure – 4.1**

Figure- 4.1 Overall Project Cycle



117. The project cycle analysis follows work breakdown, following hierarchical sequence of Stages, Steps and then Main Activities. Each of the main stages of project implementation corresponds to project interventions as planned under the main program components of the project. The stages consist of clearly identifiable steps which together help achieve certain milestones of physical achievements. Successful achievement of the milestones, culminate the logical completion of the step and trigger the project process to move on to the next step. The key steps under each of the main stages, the key steps and the milestone triggers to move to the next step are summarized in **Table – 4.2.**

Table – 4.2 Overall Project Cycle Analyses

Main Stages	Key Steps	Main Milestones/Triggers to move to next steps
Farmer Institution Development Stage – 6 months	• Potential Polygon Delineation	A Hydrological Unit comprising of mini water sheds identified in a predominantly rain fed area.
	• IEC Campaign	Key project principles of community based irrigation management disseminated among potential villages.
	• Self selection of villages	Mass petition to join the project with community endorsement on project principles including community contribution received
	• Formation, Organization Development of Water User Association and Capacity building of members	Representative WUA with small and marginal farmers in decision making position fully strengthened to take up planning, implementation and continued management of MI schemes.
Scheme Cycle Stage – 18 to 30 months	• Participatory SDMP preparation	Technically feasible, environmentally and socially acceptable and economically viable scheme designs and estimation (SDMP) finalized
	• Implementation of SDMP monitored by WUA.	MI schemes as per SDMP commissioned
	• Community Management of operation and maintenance	The commissioned MI schemes are sustainably operated and maintain through the management of WUA
Agriculture Development Stage – 12 to 36 months	• Information Support and Crop Planning	Market information based crop calendars and water distribution plans approved and implemented by WUA
	• Farmer Field School Implementation	Promising production technologies adopted by majority of small and marginal farmers.
	• Seeds and other input supply	Access to improved seeds and quality inputs; reduction in cost of production achieved along with productivity improvement.
	• Market linkages	Better price realization for produce
	• Producer company strengthening	Economies of scale and improved bargaining power through collective action.

118. Once potential hydrological units or polygon is selected for implementation, the first stage activities of farmer institution development starts. The stage leads to the identification and mobilization of target small and marginal farmers in the self selected scheme areas into the lowest level farmer institution, the Water Users Association. The capacity building and hand holding of the Water Users Association to function as a representative and accountable institution of target farmers has been described and provided for in the Component A - Strengthening Community - Based Institutions. The Agriculture Development Stage will start overlapping the scheme cycle stage. As the WUA will be intensively involved in the SDMP preparation and its approval, the initial activities of Agriculture Development Stage would preferably start after this. The description and

support of Agriculture Development Stage is described in Component C – Agriculture Support Services. This chapter focuses on the Scheme Cycle Stages describing Component B – Irrigation System Development and the details are described below.

Scheme Cycle Stages

119. Scheme Cycle is the second stage of the project Cycle. The Component B – Irrigation System Development mostly focus on the scheme cycle stages. Scheme Cycle take in the three steps relating to planning, implementation as well as continued operation maintenance and management of the minor irrigation schemes proposed to be implemented. The main steps in implementing scheme cycle stages are: (i) **participatory preparation of SDMP**; (ii) **implementation of SDMP** monitored by WUA; and (iii) **community management of operation and maintenance**. Each of the steps within the stages, are elaborated in terms of the main activities involved and the outputs the activities deliver.

120. **Step-I: Participatory SDMP Preparation:** which is the main scheme planning step leading to the preparation of a comprehensive Scheme Development and Management Plan (SDMP). The SDMP preparation will be lead facilitated by technical support team consisting of engineering and hydro geological expertise. The WUA is a key partner in all activities and the finalized SDMP will be placed in the farmer General Body and approved. The SDMP will be institutionally, environmentally, technically and financially appraised by DPMU. The procurement documents and arrangements for operation and maintenance of the scheme are part of SDMP.

121. The SDMP preparation involves group work with command area farmers, participatory resource and social mapping, focus group discussions, hamlet meetings etc. to generate the general profile and status of the command area. Even though WUA is the focus of all activities, the preparation of SDMP requires skillful technical service provision from DPMU and DWRID. The participatory SDMP preparation also follows a step by step process approach and mainly consists of two step activities: (i) identification of scheme/technology types; and (ii) design and estimation of scheme. The details of participatory SDMP preparation are summarized in **Table – 4.3.**

Table – 4.3 Participatory SDMP Preparation Activities

Main Activity	Activity Description	Key Output/ Deliverable
(i) Identification of Scheme Type		
• Location study on Demography and Socio Economic Profile	*Participatory Generation of Primary Data on Command Area* • Hamlet meetings • Focus Group Discussions including women and tribal groups • Participatory Water Resources and Social Mapping *Collection of Secondary Data relating to Agriculture, Fisheries, Water Resources existing Irrigation Services.*	• Delineation of command area, demography • Identification and listing of small and marginal farmers (target farmers) including women, tribal. • Current status of involvement of women in resource management, agriculture based livelihood and their enhance role in community based irrigation services and management.
• Livelihood and Agriculture Situation Analysis		• Existing agriculture situation – cropping pattern, seasonality, productivity, production and marketing issues.
• Water Resources, Agro-Climatic and Hydro Geology Situation Analysis		• Existing status of Water Resources and irrigation practices. • Surface water resource utilization • Ground water resource utilization
• Comparative Analysis of Technology		• Status of existing Irrigation Schemes • Selection of Minor Irrigation Type options preferred by target farmers.

Options for Scheme Selection		
• Water Visioning and Commitment on SDMP		• Justification for community based irrigation services and management through a well articulated irrigation need analysis. • Village vision for expanding area under irrigation, improvement in cropping intensity and percentage improvement of farm income.
(ii) Designs and Estimation of Selected Scheme Type		
• Detailed Study of Hydrology and Water Budgeting	Investigation, Surveying designing and estimating by DPMU/Technical Staff	• Hydro-geologic profile of the area • Surface Water Resources • River/Stream Hydrology • Run of Estimation • Overall and monthly Water Budget separately for Kharif and Rabi Crops
• Initial Design of proposed schemes		• Proposed scheme, along with available water, command area, season wise area for Irrigation • Estimation of discharge, peak flow, land use and land cover, cropping pattern in scenario
• Technical feasibility Assessment		• Technical feasibility report and design principles
• Elaborating Sub-Project System Description		• Layout and description of head works pump houses, water distribution systems, pumps and mechanical systems, electrical system and source of energy.
• Elaborating Operation Maintenance and Management	In participation with WUA	• Crop Planning and Water Distribution Arrangement including collection of User Fees • Financial Projection of Capital and Operational Expenses including irrigation charge revenue. • Arrangements for Environmental and Social Safeguard Plans
• Community Approval of SDMP	The salient features of SDMP are presented and explained to WUA	• The command area farmers endorse the SDMP
• Appraising SDMP	Technical team of DPMU carry out final appraisal and assessment	• The SDMP is independently appraised by DPMU and technically and administratively approved by DLIC

122. **Step-II: Implementation of Scheme:** The implementation of scheme is normally done by outside agencies procured through a transparent bidding process using national shopping or NCB. The Water User Association plays an active role during implementation in the area of community monitoring of implementation. The project will also invest in building capacity of WUA on quality assurance and implementation monitoring. The main activities and description of implementation of SDMP are summarized in **Table – 4.4.**

Table – 4.4 Participatory Implementation of Scheme

Main Activity	Activity Description	Key Output
Implementation of Scheme		
• Bid Processing and Contract Management	• Inviting Bids, evaluating and awarding Bids for works and goods	• The executing agency selected
• Capacity Building of WUA on	• The WUA members are trained on construction	• WUA fully empowered to undertake monitoring of construction.

Construction Monitoring	supervision	
• Construction and Establishment of Electrical and Mechanical Systems	• Sourcing of materials and equipments • Constructing and curing of works • Erecting of equipments and energizing • Regular technical supervision by DPMU • Third party quality assurance consultants carry out periodic monitoring and recommend corrective action. • Energisation of the scheme.	• The schemes are completed as per design for commissioning.
• Community Monitoring of Implementation	• WUA meeting to discuss progress • Social Auditing of scheme implementation	• Display boards and wall paintings • Implementation Progress review using main milestones and timeline • WUA general body endorse quality of implementation
• Commissioning of Scheme	• Trial running of the scheme • WUA approve scheme completion report. • Approving the operation and management arrangement by general body • Signing of MOU between GoWB and WUA. • Starting full operation by WUA	• Water User Association takes charge of fixed assets and fixtures of completed schemes and start operation and maintenance.

123. **Step-III: Community Management of Operation and Maintenance:** The scheme structures and fixtures will be transferred under the custody and management of the WUA. The terms and conditions, accountability relations as well as roles and responsibilities are outlined in a MoU to be signed between WUA and GoWB. The model agreement is given in **Attachment- 4.2.**

124. The WUA members are trained on operation and maintenance. With the support from the agriculture development component crop plans and water distribution plans are prepared and approved by the WUA general body. The WUA also approves the irrigation water fee. The schemes are operated and maintained by WUA utilizing the revenue generated through fee collection. All financial transactions are recorded and books of accounts kept. The procurement of supplies and tools will be done using community procurement. Any grievances of members are resolved through a systematic redress mechanism. WUA constitute a social audit committee from among its experienced and acceptable members to social audit, water distribution, finances, institutional aspects etc. The activity description for community management of operation and maintenance are summarized in **Table – 4.5.**

Table – 4.5 Community Management of Operation Maintenance

Main Activity	Activity Description	Key Output
Operation Maintenance and Management of Scheme		
• Operating the scheme and distribution of water	• Capacity building of WUA on operation maintenance and management • Approving water charges rates by general body • Finalizing water distribution plan with the approval of general body • Distributing irrigation water and collecting user fees	• Small and Marginal farmers receive irrigation water as per distribution plan
• Conflict Resolution	• WUA trying to resolve the issue • Unresolved issues investigated by Social Audit Committee and resolved in the general body	• All issues resolved amicably and WUA strengthened
• Maintenance of Scheme	• Undertaking preventive and curative maintenance activities. • Community procurement of supplies and tools • Promoting water saving mechanisms like drip irrigation, sprinkler irrigation and water saving crop management techniques	• Uninterrupted supply of irrigation water as per distribution plan
• Accounts and Book Keeping	• Training of WUA on book keeping • Operating bank account • Maintaining books of accounts	• All financial transactions are undertaken transparently
• Social Auditing of Operation	• Capacity building of social audit members • Social Auditing and scheme completion report • Social Auditing of water distribution and fee collection	• WUA perform with good governance and remain accountable to its members.

Construction Quality Monitoring

125. As the construction of works and installation of mechanical and electrical units are the responsibility of outside agencies contracted for the purpose, it is important that the implementation follow approved standards of design and quality parameters. The completed schemes are also to be incompliance with the approved SDMP and clause 4.4. of the Technical & Quality control/Quality Assurance manual for minor irrigation sub-projects for the ADMI Project. Though WUA will be monitoring implementation, stringent and scientific quality control need to be undertaken by a separate quality assurance and quality control unit to be set up within the PMU and DPMUs. These units will be equipped with necessary tools and instruments and staffed with trained technical personnel. Each of these mobile units could cover 3 to 4 districts with the primary responsibility of quality audit, checking and assurance. These units will report directly to PMU.

126. The regular day to day construction supervision and quality assurance will be done by field engineers who supervise the work from DPMU. The detailed quality objectives, assurance processes and quality control test are detailed in quality control manual. Main highlights of their feedback will be presented and discussed by WUA.

Water Distribution Planning

127. The aim of the component is to make irrigation water available so as to enhance cropping intensity and income of farmers by introducing high value crops with assured irrigation. The water requirement is a function of soil conditions, type of crops, climate conditions etc. The immediate effect of assured irrigation is conversion of single crop area to multi crop areas especially during Rabi season. A water balance is typically arrived at considering the proposed crop pattern and water demand. Care will be taken to avoid any water deficit during critical stages of crop growth. The maximum water demand as per a proposed crop plan will be estimated. Based on the water demand and cropping pattern a water distribution schedule will be worked out which will consists of estimated pumping hours/distribution time. The whole distribution plan will be discussed and approved by the WUA general body. The schemes will be operated to achieve the water distribution schedules approved.

Water User Fees

128. Water fees are to be decided to fully recover expenses for running, possible repairs and replacement of worn out parts. The rates are to be approved by WUA general body and regular collection and accounting shall be ensured. The payment of electricity bills are to be promptly done before due dates for uninterrupted operation. Maintenance of the civil construction and distribution system shall best be done through community contribution of labour, material and donations. The factors to be considered in arriving at feasible water charges are: (i) payments to operators, fee collectors and book keepers; (ii) electricity expenses; (iii) cost of repairs and spare parts (based on depreciation of installation on a regular basis and creation of a contingency fund for meeting emergencies); (iv) operational expenses of WUA; and (v) other operational expenses including stationery and audit charges.

129. The per farmer monthly fee is to be decided and agreed upfront based on crop, area of cultivation, seasonality of cultivation, water saving technologies used etc. All collections of revenue and expenditure shall be routed through the bank account and accounts books maintained.

Documenting SDMP

130. The processes and participatory activities leading to the preparation of SDMP result in the preparation of Scheme Development and Management Plan. Compared to traditional investigation, surveying, designing and estimation result in the preparation of Detail Project Reports,(DPR), the SDMP preparation involves farmers who are the potential users of the service being built. In addition to the traditional tools, many participatory tools are used and the iterative community consultations approximate the design and plans to the needs of the farmers. While the DPR mainly detail the technical designs, drawings and estimates, SDMP is a comprehensive document depicting the baseline situation of water resources, land resources, cropping patterns, farmer details, the physical structures, operation and management arrangements, environmental and social safeguards etc. The document outlines the efficient use of water resources, all round sustainability of the schemes, and the roadmap for effective use of the services for achieving farmer's vision on

productivity and income enhancement. The document also contains digitized maps using GPS and social maps prepared through farmer participation using participatory tools. SDMP is a document owned by the WUA, but prepared with active technical and institutional facilitation support from SO, DPMU and SWID. The Executive Engineer cum the Nodal Officer of the SWID will be overall responsible for the quality and feasibility of the SDMP.

131. The detailed format for the SDMP is given in **Annexure - 4.3.** The content sheet and the persons responsible for providing the technical assistance are given in **Table- 4.6.**

Table 4.6: SDMP Contents and Persons Responsible for Technical Assistance

Chapter No.	Title	Responsible Person from SO	Responsible Person from DPMU/ SWID
1	Context	Team Leader, SAE	Surveyor, GIS Expert
2	The Process		
3	Village Profile	TL, AWME, TC, CWs	IDS, Surveyor, GIS Expert
4	Project Area Profile		
5	Hydrology and Water Budgeting	AWME	Hydro-Geologist, Agriculture Expert
6	WUA profile	TL, AWME, TC, CWs	IDS, Surveyor, GIS Expert
7	Scheme Profile		
8	Management, Operation and Maintenance	SAE, AWME, TL	PC/TL, AE
9	Key Concerns on Social Safeguard	TL	IDS
10	Environmental Management Plan	SAE	ES
11	Agriculture Support Services	AWME	Agriculture Expert
12	Cost Benefit Analysis	SAE	PC
13	Time Schedule for Implementation	TL	AE
14	Monitoring and Evaluation	TL	IDS
List Of Annexure			
I.	Engineering Design Drawings and Estimates (DPR)		
II.	Application from Beneficiaries/ Mass Petition		
III.	List of Beneficiary Farmers with land holdings		
IV.	Land Donation Format		
V.	Total Budget Estimates		
VI.	Handing Over Document		
VII.	Scheme Feasibility Report		
VIII.	Checklist for Scheme Preparation and Approval		
IX.	WUA Committee and Subcommittee Details		
X.	Procurement Plan		
XI.	Arrangement for Work Quality Supervision		

CHAPTER- 5 COMPONENT C - AGRICULTURAL SUPPORT SERVICES

Context and Rationale

132. Considering the fact that 93% of the agricultural holdings are cultivated by small and marginal farmers and tank based fisheries is the main livelihood to many landless and marginal farmers achieving broad based rural growth and reduction of poverty are easily achieved by fully utilizing the income generating potential of the primary sector especially. In addition maintaining a reasonable growth rate of the sector necessitates not only provision of assured irrigation infra structure but also improvements in cropping intensity, productivity, crops diversification and market access.

133. The major crops grown in the state are rice (67% of the total cropped area), wheat (4.3%), pulses including masur, khesari and gram (2.68%), oil seeds including mustard and sesame (9.11%), fibers including jute (7.83%), potato (5.55%) and other commercial crops including tea and sugarcane (1.96%). The productivity of important crops in West Bengal, on a comparison with all India average benchmarked against maximum productivity recorded elsewhere in the country are summarized in **Table – 5.1.**

Table - 5.1: Productivity of Important Crops as Compared with All India Average and Best in India

Crop / Particulars	Rice	Wheat	Pulse	Oilseed	Jute	Potato
West Bengal Average	2.71	2.7	0.8	1.1	15.2	35.8
All India Average	2.24	2.9	0.7	1.2		21
Best in India	3.8 (Punjab)	4.5 (Punjab)	1.3 (Kerala)	2.1 (Tamil Nadu)	15.2 West Bengal)	35.8 (West Bengal)
WB as a % of India Average	121.0%	93.1%	114.3%	91.7%		170.5%
WB as a % of Best in India	71.3%	60.0%	61.5%	52.4%	100.0 %	100.0%

Source: Department of Agriculture, GoWB & Department of Agriculture & Cooperation, GoI

134. For all major crops, there is a critical gap in productivity in the state compared to all India average or the best yields achieved elsewhere in the country. This analysis is a clear indication that there is potential scope for bridging the yield gap of important crops especially rice, wheat, pulses and oil seeds in the state.

135. Interestingly the productivity levels achieved in the state shows substantial differential between irrigated and non-irrigated cultivation. As on 2007 – 2008 approximately 47% of the gross rice area still fall under rain fed condition. Though the yield gap for rice in upland is substantially bigger, there exist significant gaps even in rain fed low lands. This is also true for other crops including horticultural crops. Hence it is expected that assured availability of water and its efficient use coupled with utilization of improved production technologies, strengthening of agriculture support services as well as aligning production commercially with market opportunities would help improving the social and economic condition of the small and marginal farmers in the project area.

136. Moreover, the State Extension Policy also supports dovetailing of agriculture support systems with the provision of minor irrigation infra structure. *[is there an enabling agricultural policy environment which justifies the component? if so add some critical points have]*

Crop Seasons and Crop Calendar

137. Predominantly there are three crop seasons in the state, Pre-Kharif, Kharif and Rabi. The main crops are cultivated confining to the main crop seasons and the overall crop calendar currently being practiced in the state is given in **Attachment – 5.1.**

Main Constraints in the Agricultural Sector

138. The State Agricultural Sector is significantly challenged from a number of constraints and the main ones are as follows:

- 93% of the holdings are cultivated by small and marginal farmers.
- Predominantly crop production is rain fed in many districts.
- Lack of access to improved production technologies and water management practices and continued to use traditional cultivation / husbandry practices.
- Lack of access to quality seeds/breeds of improved varieties.
- Inadequate access and coverage of institutional service support to farmers.
- Lack of access to market information, like price, demand etc.
- Limited agri-business enterprises orientation and lack of integration, governance and market linkages of main Agriculture/Horticulture supply chains.

Objectives of the Component

139. The Objective of Component C - Agricultural Support Services is to enhance the production of field crops, horticulture crops and fisheries of small and marginal farmers in the project area through efficient on farm water management practices, dissemination of improved production technologies, strengthening agriculture support and advisory services and better aligning production with markets. The main focus of the component will be improving productivity as well as intensifying and diversifying production system by large scale adoption of technologies and management practices, enhancing farmer's knowledge and skill base, and post harvest management of produce including market linkages.

Key Results

140. This component is expected to produce the following results in terms of farmers adopting better practices is the command area of the minor irrigation schemes established under the project:

- Farmers in project area adopting improved production techniques (measured in percentage)
- Area under system of rice intensification (SRI) cultivation in scheme commands (measured in ha); and
- Increase in yield of main agricultural crops (rice, oil seeds, vegetables, measured in tons per ha,

Subcomponents

141. The agriculture support services component will have four sub components namely: (i) Agriculture; (ii) Horticulture; and (iii) Fisheries.

Agriculture Subcomponents

142. The subcomponents will focus on increasing productivity of main field crops grown by command area farmers. An 'irrigation system–wide' approach promoting efficient use of irrigation water will be followed. The key project activities hence will directly benefit all target beneficiary farmers in the command areas MI schemes establish under the project or already established.

143. The main activities to be financed under the project are:

- *Supporting Crop Production Plans and Irrigation Plans by Water Users Association*
- *Demonstrations – of agronomic productivity interventions.*
- *Organizing Farmer Field Schools for wider adoption of demonstrated technologies*
- *Community based investment for small scale equipments and implements*
- *Community based seed production*
- *Farmer capacity building and exposure visit*
- *Capacity Building of implementing staff*
- *Streamlining Farmer Advisory System through Para-Professionals and Project Program Promoters*
- *Promoting and Strengthening Farmer Producer Companies for value chain integration and market linkages*

144. As new Minor Irrigation Schemes will be targeted to existing single cropped rain fed areas, command area farmers will be helped to prepare seasonal crop plans to help them shift to irrigated agriculture with two or more crops. The crop planning will also lead to preparation of Irrigation Plans depending upon water requirement in the new cropping scenario. Detailed guidelines for the preparation of Irrigation System Wide Agricultural Action Plan, is given in **Attachment - 5.2.**

145. The project will have demonstrations and services to enhance adoption of various technology themes suiting the agro-climatic zones in which MI Schemes are constructed /operational. Each MI Schemes will have at least one demonstration which will be repeated through Pre-Kharif, Kharif and Rabi seasons. The technology themes will be demonstrated on farmer's field 'as a package of practices' to fully tap the yield potential of different crops, without being constrained by input availability, farmer capacity, scalability and adoptability by small and marginal farmers. Though several agronomic productivity interventions will be identified based on farmer demands and implemented in a phased manner over the life of the project, some of the technologies ready for demonstration are: (i) Integrated Crop Management (ICM); (ii) Crop Diversification; (iii)System of Rice Intensification; (iv) Methods Of Irrigation; (v) Conservation Agriculture etc. The detailed guidelines for carrying out demonstrations are given in **Attachment – 5.3.**

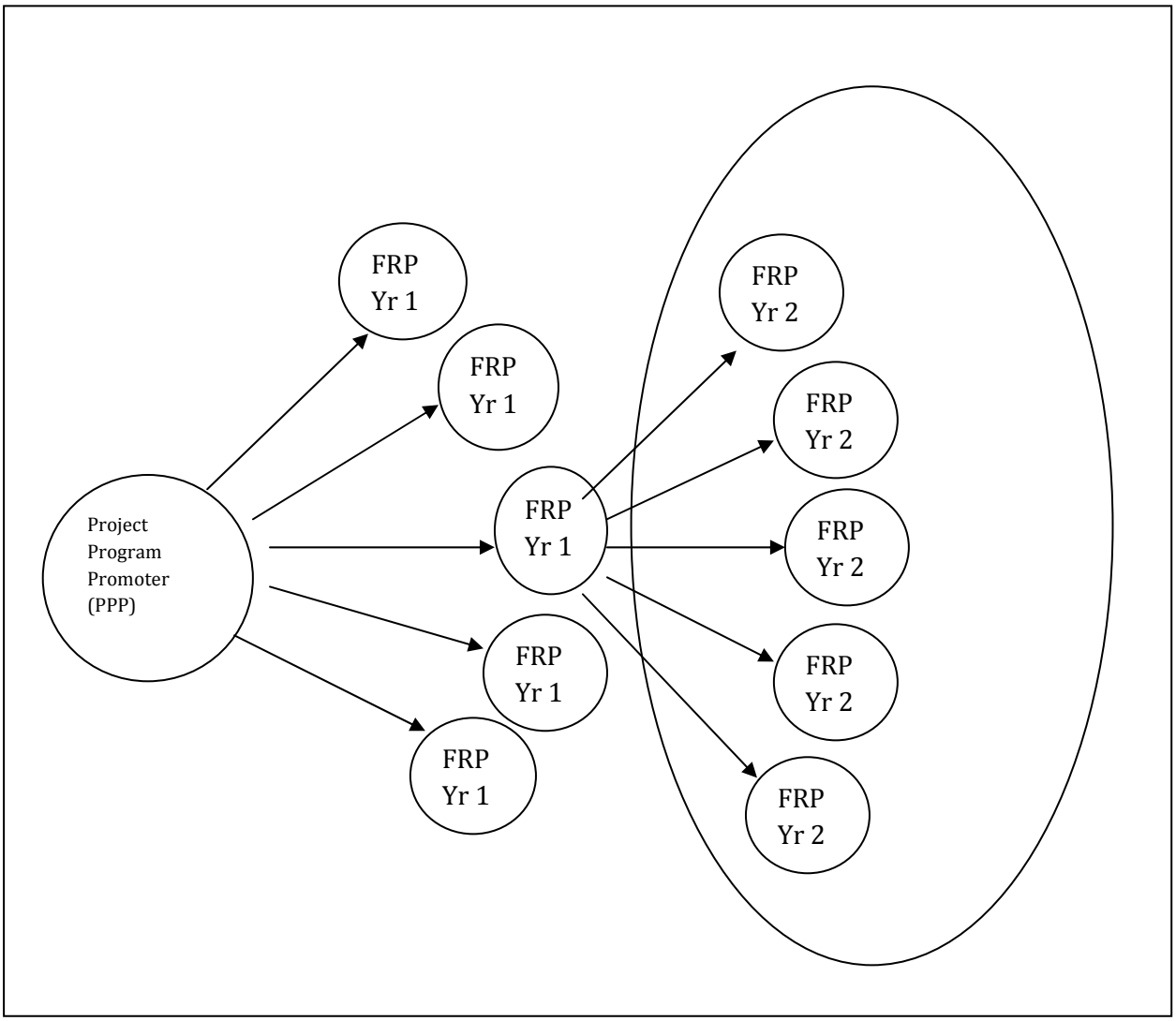
146. A total of 11,987 demonstrations are being planned during the life of the project and details are given in **Table – 5.2.**

Table - 5.2: Details of Agriculture Crop Demonstrations

Suggested Crop Demonstration Technologies	No of Demo.	Covered Area (acre)
Integrated Crop Management	1,020	1,020
Crop Diversification	1,475	1,475
Water Management-SRI	5,838	5,838
Water Management- Methods of Irrigation	1,047	1,047
Conservation Agriculture	687	687
Seed Production of Potential Crops	830	830

147. Each of the demonstration will be conducted through **Farmers Field Schools** approach. A multi-tiered FFS will be implemented to cover all project farmers. Each DPMU with support of SO will implement at least 2 FFS at the cluster level in Year One. In each of the FFS, it is anticipated that 25 members from at least 5 WUAs will attend the year-long FFS. 10 farmer participants consisting of lead farmer (who volunteers to provide his plot to set up demonstrations for the cropping season) and Community Service Provider (who is a farmer with good knowledge on agricultural practices being introduced and has the potential ability to be facilitator for the farmer run FFS) from each FFS will be identified to facilitate a FFS in their respective habitations in Year One. Farmer run FFS will be run within a week after the implementation of the cluster-level FFS. The farmer run FFS will be on the same crop in which s/he participated in. The DPMU/SO will monitor the quality of the farmer run FFS with assistance of the Project Program Promoters (PPPs) who are fresh agriculture graduates and appointed by the project. In the Year Two, 10 farmer participants (lead farmer and Community Service Provider) from each farmer implemented FFS will be identified to facilitate a FFS in their respective WUA. This will ensure that all members in a particular WUA will be covered. Here too, the farmer run FFS will be on the same crop in which s/he participated in. WUAs should be actively involved in the selection of the FFS participants and farmer facilitators (lead farmer and progressive farmer). Also, a norm that at least 50% of the FFS participants are women will help reach a large number of women. The project will also implement FFS exclusively for women farmers. The **Figure 5.1** illustrates the multi-tiered FFS structure of a unit.

Figure 5.1: Multi-Tiered FFS Structure



Each PPP will facilitate two units each

148. The proposed crops under agriculture subcomponent for which the FFS are being planned are given in **Table- 5.3.**

Table - 5.3: Crops Planned for FFS

Year	Kharif Season	Rabi Season
Year 1	Rice/SRI	Mustard and chickpea
Year 2	Rice/SRI	Groundnut and black gram
Year 3	Rice/SRI	Sesame and lentil

149. The agricultural experts in the DPMUs and support organizations will provide requisites knowledge in crop and practices being demonstrated short duration trainings on facilitation skills, section guides and other communication materials will be given to facilitators implementing FFS. The roll out plan for the FFS for the project is given in **Table – 5.4.**

Table – 5.4: Roll Out Plan for FFS 2014 to 2017

S. No.	District	FFS Yr 1 (June 2014 – March 2015)			FFS Yr 2 (June 2015 – March 2016)			FFS Yr 3 (June 2016 – March 2017)			FFS Yr 4 (June 2017 – Dec 2017)			Total FFS	Total Farmers
		N*	O*	T*	N	O	T	N	O	T	N	O	T		
1	Bankura	24		**24**	24	100	**124**	24	100	**124**	24	100	**124**	**396**	9,900
2	Barddhaman	12		**12**	12	100	**112**	12	100	**112**	12	100	**112**	**348**	8,700
3	Birbhum	12		**12**	12	100	**112**	12	100	**112**	12	100	**112**	**348**	8,700
4	Dakshin Dinajpur	24		**24**	24	100	**124**	24	100	**124**	24	100	**124**	**396**	9,900
5	Darjeeling	6		**6**	6	100	**106**	6	100	**106**	6	100	**106**	**324**	8,100
6	Howrah	12		**12**	12	100	**112**	12	100	**112**	12	100	**112**	**348**	8,700
7	Hooghly	12		**12**	12	100	**112**	12	100	**112**	12	100	**112**	**348**	8,700
8	Jalpaiguri	24		**24**	24	100	**124**	24	100	**124**	24	100	**124**	**396**	9,900
9	Koch Behar	24		**24**	24	100	**124**	24	100	**124**	24	100	**124**	**396**	9,900
10	Malda	24		**24**	24	100	**124**	24	100	**124**	24	100	**124**	**396**	9,900
11	Murshidabad	12		**12**	12	100	**112**	12	100	**112**	12	100	**112**	**348**	8,700
12	Nadia	12		**12**	12	100	**112**	12	100	**112**	12	100	**112**	**348**	8,700
13	North 24 Parganas	12		**12**	12	100	**112**	12	100	**112**	12	100	**112**	**348**	8,700
14	Pashchim Midnapore	24		**24**	24	100	**124**	24	100	**124**	24	100	**124**	**396**	9,900
15	Purba Midnapore	24		**24**	24	100	**124**	24	100	**124**	24	100	**124**	**396**	9,900
16	Purulia	24		**24**	24	100	**124**	24	100	**124**	24	100	**124**	**396**	9,900
17	South 24 Parganas	12		**12**	12	100	**112**	12	100	**112**	12	100	**112**	**348**	8,700
18	Uttar Dinajpur	24		**24**	24	100	**124**	24	100	**124**	24	100	**124**	**396**	9,900
	Grand Total			**318**			**2,118**			**2,118**			**2,118**	**6,672**	**1,66,800**

N-FFS in New Clusters, O - FFS in Old Clusters; T – Total FFS in an Year

150. The expected **Results** from this subcomponent are: (i) 40 to 50% increased in yield of main crops like rice, wheat, oil seeds, pulses etc.; (ii) increase in crops diversification and value addition through enhancement of potato, maize and other crops; and (iii) self sufficiency in paddy and other seed production.

151. The project also proposed to organize **Exposure Visits** to selected farmers of WUA to learn directly from other farmers and institutions who have successfully implemented proposed interventions. The project plans to arrange 150 numbers of intrastate exposure visit (among adjacent districts). Each batch of exposure visit will have about 45 farmers (total 6750 farmers) and the visit duration will be for two days with one night halt. The project may also conduct 9 out of state visits with each group consisting of 30 farmers (total 270 farmers). These exposure visits will be made to learn about water management and farming practices adopted in other States that have a potential to be introduced in West Bengal.

152. The **Capacity Building of Project Staff** are aimed at orienting project staff, SO staff and DPMU staff on successful conduct of demonstrations and FFS. It is proposed to provide 1832 training days to line department and project staff under this training program. Trainings for the line department staff will be conducted at the departmental training institutes or other state level training institutes Resource persons of specific field from Agricultural Universities and other State and National Agriculture Institutes of repute will be hired for giving these training. The training program and training module etc. will be developed by the SPMU in collaboration with State Nodal Officers of the line department. The training of SO and DPMU staff will be carried out by the SPMU agriculture expert and resource persons from among the trained line department staff. These trainings will be carried preferably in the service area of the respective staffs, mainly at the district or cluster of district level.

153. End of crop season comprehensive **Workshops** are being planned for the five agro-climatic zones. These workshops will be conducted to review the performance of crop demonstration and FFS, fact sheets, results of adaptive trials conducted in that agro-climatic zone. Each workshop will have about 100 numbers of participants, including select lead farmers from each district, line department staff, SPMU, DPMU and SO staff and Agriculture University experts etc. The workshop will allow sharing of information and cross learning amongst the district teams from an agro-climatic zone facilitating improvement in the crop demonstration program for the subsequent years.

154. It is also proposed to send select line department staff, who will be associated directly with the implementation of the project for the entire implementation period, for some **Overseas Exposure** and training, particularly to countries which have similar agro-climatic conditions and have successfully implemented innovative agronomic technologies and practices that can be adopted in West Bengal. The participating staff should be willing to take this training and give undertaking that they will work for the entire project period and apply the accumulated knowledge in the project.

155. The expected **Outcome Indicator** targets are summarized in **Table – 5.5.**

Table – 5.5: Year Wise Targets for Project Outcome Indicators - Agriculture

Outcome Indicator	Baseline	Yearly Targets					Reporting Frequency
		Year 2	Year 3	Year 4	Year 5	Year 6	
Increase in yield of the main Agricultural Crops (Tons / ha.)							
Rice	2.9	2.9	3	3.5	4	4.2	Annual
Oil Seeds	0.4	0.4	0.5	0.7	0.8	0.9	
Wheat	2.3					3.1	
Maize						3.4	
Pulses	0.3					3.8	
Jute	1.8					3.1	
Percentage of Farmers Adopting Improved Production Techniques	0	-	15	20	30	40	
Area Under SRI Cultivation within Scheme Command Areas (ha.)	-	-	0	7000	15000	20000	

156. The project will undertake **Cropping Pattern Shift Analysis** to measure changes in cropped area of important crops and the projected values without project and with project are summarized in **Table 5.6.**

Table - 5.6: Agriculture Cropping Pattern Shift Analysis

Crops	Without Project (WOP)	With Project (WP)	Percent Increase
Paddy	122,859	160,561	30.7%
Wheat	6,154	19,523	217.2%
Maize		3,997	
Jute	14,891	15,708	5.5%
Potato		22,017	
Pulses	7,162	14,797	106.6%
Oilseeds	16,183	15,302	-5.4%

157. The project will also carry out **Productivity Impact Analysis** to measure Incremental crop productivity impacts of the project are quantified by using with project and without project crop estimates. The production and productivity impact of the project interventions are assessed separately by agro-climatic region and then aggregated with crop area as weights. For the existing cereal, jute, pulses, oilseed, and vegetable crops, productivity project will increase by 36% to 144% when full project implementation takes place. Substantial gain in productivity comes due to the shift in cultivation from rain fed to irrigate agriculture. It is assessed that by full project implementation, at least 45% of the project benefited area will come under improved resource efficient cum production technology to be promoted under agricultural support services component. The detailed targets for productivity impact analysis are given in **Table – 5.6.** Paddy seed production is planned within the project area to produce quality seeds to cover one-third of the project benefited area, improving the seed replacement ratio substantially.

Table – 5.6: Agriculture Productivity Impact Analysis

Crops	Without Project (Ton/ha)	With Project (Ton/ha)	Increase in %
Paddy	2.9	4.2	Overall increase in yield from 30% to more than 100%
Wheat	2.3	3.1	
Maize	---	3.4	
Jute	1.8	3.1	
Potato	----	25.7	
Pulses	0.3	0.8	
Oilseeds	0.4	0.9	

158. The project proposes to identify and promote **Community Service Providers/Para Professionals** to strengthen demonstration and FFS implementation. They are the village level extension workers from the same village with at least 12th Pass, innovative and having interest, understanding and leadership in Agriculture activities and who have willingness to serve and work

effectively in his/her working area. Para-Professionals will be activity and task based. They will be paid consolidated monthly Honorarium @ Rs 3500 per month including communication. The working area of one person will be limited to one village or Command area of about 100 Ha, as applicable. The key responsibilities of Para-Professionals are:

- Mobilizing farmers on good agriculture practices
- Identification of Lead farmer for demonstration
- Attend Cluster level Training of Trainers on Good agriculture practices
- Conduct farmer field school activities Classes and field visits to demo plots
- Assist in Distribution of agri inputs
- Ensure proper utilization of agri-inputs by lead farmer
- Record keeping of FFS and Demonstrations
- Facilitate dissemination of GAP within the village
- Reporting of FFS to DPMU
- Assist Focus Group Discussion and Farmer Field day with DPMU/SO
- Bridging the information gap between farmers and Agriculture department

Horticulture Subcomponent

159. Provision of assured irrigation water is expected to trigger diversification from field crops to high value fruits and vegetable crops. The identified fruits crops are banana, papaya, pineapple, guava and lime and vegetables crops are bhindi (ladies finger), cucumber, brinjal, and chilli though other horticulture crops may be considered on the demand of the farmers and its suitability to the local conditions. The cropped area under high value horticulture crops like vegetables and fruits are projected to cover at least 17% of the gross irrigated area created under the project.

160. The main activities to be financed under the subcomponent are:

- Supporting horticulture production planning and irrigation planning by Water Users Association.
- Demonstrations of seed / planting material production, packages of practices of production technologies, post harvest technologies and micro-irrigation for efficient water use.
- Organizing Farmer Field Schools for wider adoption.
- Provision of Community based equipments, tools, small scale facilities for post harvest produce handling.
- Farmer Capacity Building and Exposure visit.
- Capacity building of implementing staff
- Streamlining Farmer Advisory System through Para-Professionals and Project Program Promoters
- Promoting and Strengthening Farmer Producer Companies for value chain integration and market linkages

161. The **Demonstrations** of horticulture crops proposed cover innovative practices: (i) micro irrigation (annually 70 numbers); (ii) integrated fest management (about 600 clusters of 4 vegetable crops); and (iii) vegetable seedling production (1600 units of 40 $m^{2)}$. Each demonstration will cover 1 bigha (0.1335 ha.) plot and a small control plot adjacent to the

demonstration to facilitate comparison and promote adoption. Altogether 8,750 demonstrations (2,750 fruit crops and 6,000 vegetable crops) are proposed to be conducted under the project. These demonstrations will cover a total area of about 1,167 ha, which is about 0.84% of targeted irrigated area under the project. The steps in conducting demonstrations including selection of farmers and organizing Farmer Field Schools will follow the guidelines for agriculture subcomponents.

162. Farmer **Exposure Visits** will be organized. A total of 90 intra-state exposure visits will be organized on horticulture practices during the project. Each exposure group will consisting of 25 farmers (total 2250 farmers). These visits will be made to villages within or near the project area where successful horticulture cultivation is being practiced. Farmers will also be taken to visit important horticultural development centers and institution within the State.10 groups of farmers, each group consisting of 20 farmers (total 200 farmers) will be taken for inter-state exposure visit to visit some outstanding horticulture project / development centre or institution.

163. **Staff Training** and capacity building activities include provision of 1700 horticulture training days to line department and project staff under the project. The training will be conducted for 2-5 days in groups of 15-20 trainees. Trainings for the line department staff will be conducted at the departmental training institutes or other state level training institutes Resource persons of specific field from Agricultural Universities and other State and National Horticulture Institutes of repute will be hired for giving these training. The training program and training module etc. will be developed by the SPMU in collaboration with State Nodal Officers of the line department.

164. In addition cross learning **Workshops** will be organized twice a year in North and South Bengal to share implementation experience of subcomponent. It is also proposed to send a couple of horticulture department officers on overseas training to reputed institution/centre of excellence on horticulture to share experience and learn new technologies suitable for adoption project area. The visits may preferably cover countries well known for horticulture development such as Israel, Belgium, Netherland, Japan, China and Brazil.

165. The key **Results** expected from the subcomponent implementation are: (i) enhanced productivity and production measured through increase in yield of horticulture crops from 10.3 Tons/ha. to 15.2 Tons/ha. and increase in area from 6209 ha to 19696 ha.; (ii) crop diversification and value addition measured through increased productivity of fruits to 50 Tons/ha. And increase in fruit tree cultivation to 7012 ha... The outcome indicators targets expected from the subcomponent are summarized in **Table – 5.7**.

Table – 5.7: Year wise Targets for Project Outcome Indicators - Horticulture

Outcome Indicator	Baseline	Yearly Targets					Reporting Frequency
		Year 2	Year 3	Year 4	Year 5	Year 6	
Increase in yield of Horticulture Crops (Tons / ha.)							
Vegetables	10.3	10.3	11	12.5	14	15.2	Annual
Potato						25.7	
Fruits						15	

166. The project will undertake **Cropping Pattern Shift Analysis** to measure changes in cropped area of important horticulture crops and the projected values without project and with project are summarized in **Table - 5.8.**

Table - 5.8: Horticulture Cropping Pattern Shift Analysis

Crops	Without Project (WOP)	With Project (WP)	Percent Increase
Vegetables	6209	19696	217.2
Fruits		7012	

167. The project will also carry out **Productivity Impact Analysis** to measure Incremental horticulture crop productivity impacts of the project are quantified by using with project and without project crop estimates. The productivity impact analysis for horticulture analysis will be done separately for at least north and South West Bengal and the detailed targets are summarized in **Table 5.9.**

Table – 5.9: Horticulture Productivity Impact Analysis

Crops	Without Project (Ton/ha)	With Project (Ton/ha)	Increase in %
Vegetables	10.3	15.2	From 50 to more than 144
Fruits		50	

Fisheries Subcomponent

168. The newly created water resources (MI) like surface flow Minor Irrigation Structures will result in perennial ponds as well as other seasonal water detention structures in the command area will open up opportunity for enhancing fish production and fish productivity.

169. The fisheries component of project will be implemented in only seven districts, namely Jalpaiguri, Birbhum, Bankura, Burdwan, Paschim Medinipur, Purulia and Darjeling covering a total area of about 989 ha. The beneficiaries for fisheries development will be landless and marginal farmers who are members of the WUAs of the MI scheme in which the fishery intervention is being made. The WUA will constitute a Fisheries Common Interest Groups (FCIGs) to look after the day to day operation of the fisheries activities. The fishery activities will provide the beneficiaries an additional source of employment and income and also a source for generating additional revenue for the WUA to take up operation and maintenance of the pond.

170. The main activities to be financed under the project are:

- *Selection of water bodies, beneficiaries and supporting fish production Plans*
- *Fish Farming Demonstrations*
- *Training of fish farmers and exposure visits.*

- *Community based investment for nets, fish feed making machines, water quality testing kits, limited plastic crates and boxes etc.*
- *Identification and training of lead fish farmers (Matsya Mitra)*
- *Community based fingerlings production.*
- *Capacity Building of implementing staff*

171. The **Selection of Water Bodies** for fish cultivation, selection of landless and marginal farmers as beneficiaries will follow a step by step approach leading to planning of the activity. The steps are:

- SO and DPMU staff under the guidance of the line department staff to identify WDS and SFMI schemes that are conducive for fishery development interventions;
- SO and DPMU staff will organize a meeting with the WUA members to create awareness about the potential for fish farming in their area including the type of fish farming that is suitable for their MI scheme. During the meeting an agreement will be arrived at with the WUA on taking up fishery development activity with them;
- SO and DPMU staff under the guidance of the line department staff will collect the measurement of water body and other data required for the line department staff to plan the fishery development intervention for the MI scheme;
- The WUA will constitute a Fisheries Common Interest Groups (FCIG) out of the WUA members who will be the fishery development activity beneficiaries. The SO staff will assist the WUA in formation of the FCIG.
- The SO and DPMU will collect the list of identified FCIG members from the WUA for organizing training and exposure visit;
- The line department staff in coordination with the SO and DPMU staff and in consultation with the WUA will select the lead fish farmer and provide him / her with the Matsy Mitra training;
- On approval of implementation of the fishery development intervention by the DLIC and the SPMU, the DPMU will make the requisite funds available to the WUA to purchase the first year's inputs for the fish farming activity under the guidance of the line department staff.

172. The fish farming **Demonstrations** will be separately planned for seasonal (ponds with 5 feet depth of water for about six months a year) and perennial ponds. The demonstrations for seasonal ponds are aimed at improving aquaculture productivity and consist of: (i) composite fish farming (47 ponds with around 47 ha. Water spread area); (ii) Pangus Mono Culture Demonstration (70 ponds with 70 ha water spread area). The demonstration for perennial ponds consists of: (i) Intensive composite fish farming; and (ii) poly culture. All demonstrations will be for optimal technologies like stocking density, feeding, water quality monitoring etc. Depending upon year wise schedule of MI structure under the project, the extent of fishery development intervention is given in **Table - 5.10.**

Table – 5.10: Area of Fishery Demonstration

Project Year	Water Spread Area to be Covered under Fishery Demonstration (ha)	Percentage of Total Target Area
Year 01	97	10%
Year 02	199	20%
Year 03	302	31%
Year 04	236	24%
Year 05	155	15%
Total	989	100%

173. The demonstrating farmers will be provided with critical input costs for the first year and technical guidance. The project will also organize basic two days training on fish farming practices to about 5430 project beneficiaries which will also include field visit. With a view to provide technical facilitation and advisory support to fish farmers, a cadre of **Lead Fish Farmers (Matsya Mitra)** will be selected from amount the beneficiaries and provided with advanced training in fish farming and management practices. One Matsya Mitra for each fish farming demonstration will be trained to ensure sustainable management of the fish farms developed under the project. The training module will be prepared by the SPMU in consultation with the line department nodal officer and the trainings will be provided by the district level line department staff in coordination with the SO and DPMU staff. Training material will also be prepared in local language by the SPMU for distribution among the trainees.

174. In addition it is proposed to organize **Exposure Visits** for about 400 fishery development beneficiaries to other States for studying best practices that can be developed back in the project area.

175. **Training** to fisheries department will cover block level fisheries extension officers and district and State level nodal officers involved in project implementation. The project will organize tailor made training at the Central Institute of Fisheries Education, Mumbai, the Institute of Freshwater Aquaculture, and Bhubaneswar and in other ICAR/GOI fishery research institutes on relevant technologies and packages of best practices. In order to provide exposure to line department staff on advanced technologies in the field of fisheries management covering culture technologies, best harvesting practices, health management, post harvest, marketing, policies and socio-economic aspects, the project will organize training cum exposure visits to foreign countries which are climatologically and farming practices wise comparable to West Bengal i.e. China, Thailand, Vietnam, etc. About twelve line department officers will be imparted overseas training by the project.

176. With a view to share experience and disseminate lessons learned from fishery development activities implemented under the project one annual State level fishery development **Workshop** is proposed to be organized by the project. Around 100 participants will participant in the workshop representing project staff, line department staff, lead fish farmers, representatives of fishery development and research institutes.

177. The **Key Results** expected from this subcomponent will be increased incomes of fisheries farmers resulting increase fish production.

178. The expected outputs and outcomes of the fishery development interventions are summarized in **Table – 5.11.**

Table – 5.11The Key Outcomes and Outputs of Fisheries Subcomponent

Sl. No.	Outcomes	Outputs
1	Household incomes of FCIG members increased by fish production	Increase in productivity from 3.4 Tons / ha to 5.9 Tons / ha
2	Provided additional employment to landless and marginal farmers	Provided additional employment to about 5,430 landless and marginal farmers

179. The fishery development interventions is therefore expected to provided additional employment to about 5,430 landless and marginal farmers in the project area and produce around 3062 tons fish and around 293 tons prawns during the project period against the current production of 558 tons, ie. an incremental production of around 2,504 tons fish and 293 ton prawns during project period.

Monitoring Arrangement for the Component

180. In line with the overall monitoring learning and evaluation frame work of the project, the monitoring of the component activities will be done at four levels: (i) Water User Association Level; (ii) SO Level; (iii) DPMU Level; and (iv) State Level.

181. At the **WUA level**, participatory monitoring will be done. SPMU will develop simple monitoring formats for the activities to record inputs, outputs and returns to farmers in consultation with the SO and DPMU and test it with select WUAs before finalizing it (sample of formats given below). The formats will be introduced to the WUAs to carry out self monitoring. First the WUAs and the lead / beneficiary farmers will be trained on applying these formats by the SO staff, who would then maintain them for the season. After each cropping / annual season, the findings in the formats will be analyzed and discussed in a WUA General Body meeting. The SO, DPMU and line department staff will assist the WUA in making these assessments and facilitate discussions during the meeting. The self monitoring exercises will be done under the supervision of the WUA M&E Sub-committee. Based on the self monitoring and assessment, the SO and DPMU staff, in consultation with the WUA, will identify the weaknesses and shortfalls in the ASS interventions and suggest corrective measures for future interventions. The findings of the WUA self monitoring will be compiled by the SO staff into a comprehensive report for submission to the DPMU. The different monitoring formats to be used at the WUA Level are given in **Attachment – 5.4.**

182. At the **SO level**, monthly physical and financial progress reports on ASS activities will be submitted by the SO to the DPMU through the Project MIS. Similarly, the SOs will also submit progress report against annual action plan on quarterly basis to the DPMU. They will also submit half yearly and annual report as stated in their contract for progress review to the DPMU. The SPMU in consultation with DPMU and SOs will prepare the formats for monthly, quarterly, half yearly and annual physical and financial progress reports to be submitted by the SOs.

183. At the **District Level** the physical and financial progress reports submitted by the SOs will be compiled and reviewed against the ASS action plans to monitor timely and effective completion of the scheduled work, identify scheduled work left incomplete and suggest actions to be taken therein by the SO. The DPMU will also directly monitor a sample of the ASS work progress within its work area to cross verify performance and determine actions to be taken to improve performance in implementation. The DPMU will compile the SO progress reports and its own monitoring reports into monthly physical and financial progress report for a district and submit it to the SPMU for review through the project MIS.

184. At **State Level**, with in the SPMU dedicated persons for ASS component will monitor progress in implementation of ASS activities based on the physical and financial progress report submitted by the DPMU. SPMU will also assess ASS performance through periodic field visits. The SPMU will prepare quarterly, half yearly and annual progress reports to be submitted to the Project Steering Committee, GoWB and the World Bank for review through the Project MIS. SPMU will also undertake case study and document best practices of ASS activities every year.

Implementation Arrangements

185. At the **State Level**, the implementation responsibility will be shared between SPMU Specialists dedicated for the component and Nodal Units of the participating line departments. The implementation responsibility and monitoring will hence be shared between the permanent government mechanism and consultancy arrangement to supplement line departments. Hence, strategic planning, visioning and building partnerships form a core function at the project level.

186. At the SPMU Level it is planned to hire one Expert each to look after the agriculture, horticulture and fisheries activities proposed under the project. Developing the ASS strategy for the project, capacity building of SO and DPMU project staff and monitoring ASS activities will be the main function at the SPMU ASS specialist. The SPMU will also be responsible for overall coordination of the entire agricultural support services activities with the respective line departments.

187. The line departments at the state and district level are envisaged to provide technical back stopping to the project for ASS activities. It is therefore proposed to set up nodal units in the respective departments at state level for smooth coordination with the SPMU for overall planning, implementation and monitoring of ASS activities under the project and for co-ordination at the district and sub-divisional level with the DPMU and SOs for smooth planning, implementation and monitoring of ASS activities at the field level. The SPMU will coordinate with the Nodal Units at the state level while the DPMU will coordinate with the nodal unit at the district level.

188. Accordingly, it is proposed to set-up a State Level Nodal Unit at the Head Quarter of the Departments of Agriculture, Horticulture and Fishery with one senior officer as a Nodal Officer and with at least two Deputy Director or Assistant Director level officers (only one Deputy Director or Assistant Director level officers for Fishery Department) devoted to planning, supervision and monitoring of project ASS activities from the State level. The activities which are to be executed by the State Nodal Unit include preparing the respective overall ASS strategy and action plan for the project in consultation with the SPMU, conducting training of line departmental and SO and DPMU staff, organizing inter-state exposure visits for farmers and overseas trainings for departmental staff / officers, selection of technologies for demonstrations / adaptive trials, monitoring and review of respective ASS activity implementation and outcomes and overall assist the project in

achieving its proposed ASS results. Consequently, out of the two proposed Deputy Director level officers at the Nodal Unit of the line departments one is proposed to be from the Administrative Wing and one from the Research Wing of the department. Moreover, for follow-up activities on surveying on adoption of the demonstrated technologies in the project area, the Evaluation Wing of the departments is proposed to be involved at the State as well as district level.

189. The State Nodal Unit in the line departments will keep close liaison with SPMU to prepare project action plan and technically support execution. All ASS works will be implemented through the district level offices of the line department in coordination and support of the DPMU and SO. The Nodal Units at the State Level will also monitor implementation of ASS activities through the district level offices. They will also act on the feedback from the district level offices and follow it up with the SPMU. The Nodal Unit will also help assist in ASS activity documentation and adaptive research.

190. It is also proposed to hire contractual staff at the Nodal Unit in the line departments during the implementation stage of the project who will be paid out of the project funds.

- For the Agriculture Department one Agriculture Coordinator, one Monitoring and Evaluation Specialist, two Accountants and three Computer Operators are proposed to be hired at the Implementation stage of the project and placed in the Nodal Unit under the Nodal Officer.
- For Horticulture Department it is proposed one Horticulture Coordinator and one Accountant cum Computer Operator is proposed to be hired at the Implementation stage of the project and placed in the Nodal Unit under the Nodal Officer.

191. For Fishery Department it is proposed one Accountant cum Computer Operator and one Grade IV staff is proposed to be hired at the Implementation stage of the project and placed in the Nodal Unit under the Nodal Officer.

192. At the **District Level,** similar to the arrangement at the State Level the implementation and monitoring responsibility will be shared between district level line department units, a DPMU and Support Organization.

193. The district level officers of line departments will have a critical role in implementing ASS activities under the Project. They will operate through their existing staffs and the Project Program Promoters (PPPs) who will be hired for the Project by the DPMU and be placed at the sub divisional offices of the line departments (Agriculture / Horticulture). The district line departments' officers will provide his technical expertise and guidance to the DPMU in identifying the type of demonstrations to be taken up, quantify and assist in procurement of needed good quality inputs required for the demonstrations and provide technical support in conducting the demonstrations. They will also assist in the identifying and selection of lead farmers / Matsya Mitra in coordination with the SO Agriculture Coordinator and the WUA and then assist in providing them with training. They will assist in monitoring ASS activities by reviewing the demonstration Fact Sheets prepared by the lead farmers and suggest review and re orientation of demonstration technologies to the DPMU as well as the State Nodal Units. They will take part in the seasonal workshops and assist plan and implement adaptive trails. In performing all these activities the district line department officers will coordinate with the DPMU ASS expert and the SO Agricultural Coordinators.

194. The DPMU will have one Agriculture Expert AND one Fisheries Expert who will work as district level coordinators for the agriculture / horticulture and fishery activities respectively. The

DPMU ASS experts will have the primary responsibility of planning and implementing the MI scheme based ASS activities. This includes design, and development of the district level ASS strategy covering identification of ASS opportunities, linking them to operational areas, capacity building of farmers and SO staff, identification of resource persons for FFS, allotment of demonstrations to resource persons, reviewing progress of works, identification of partner organizations such as KVKs, ATMAs and agriculture research stations and working out the area and operational modalities for the partnership, liaison with district line department nodal units and monitoring and reporting ASS activity progress to SPMU. The DPMU ASS experts will be in continuous interactions with the Agriculture Coordinator of the SOs and the WUAs while performing these responsibilities.

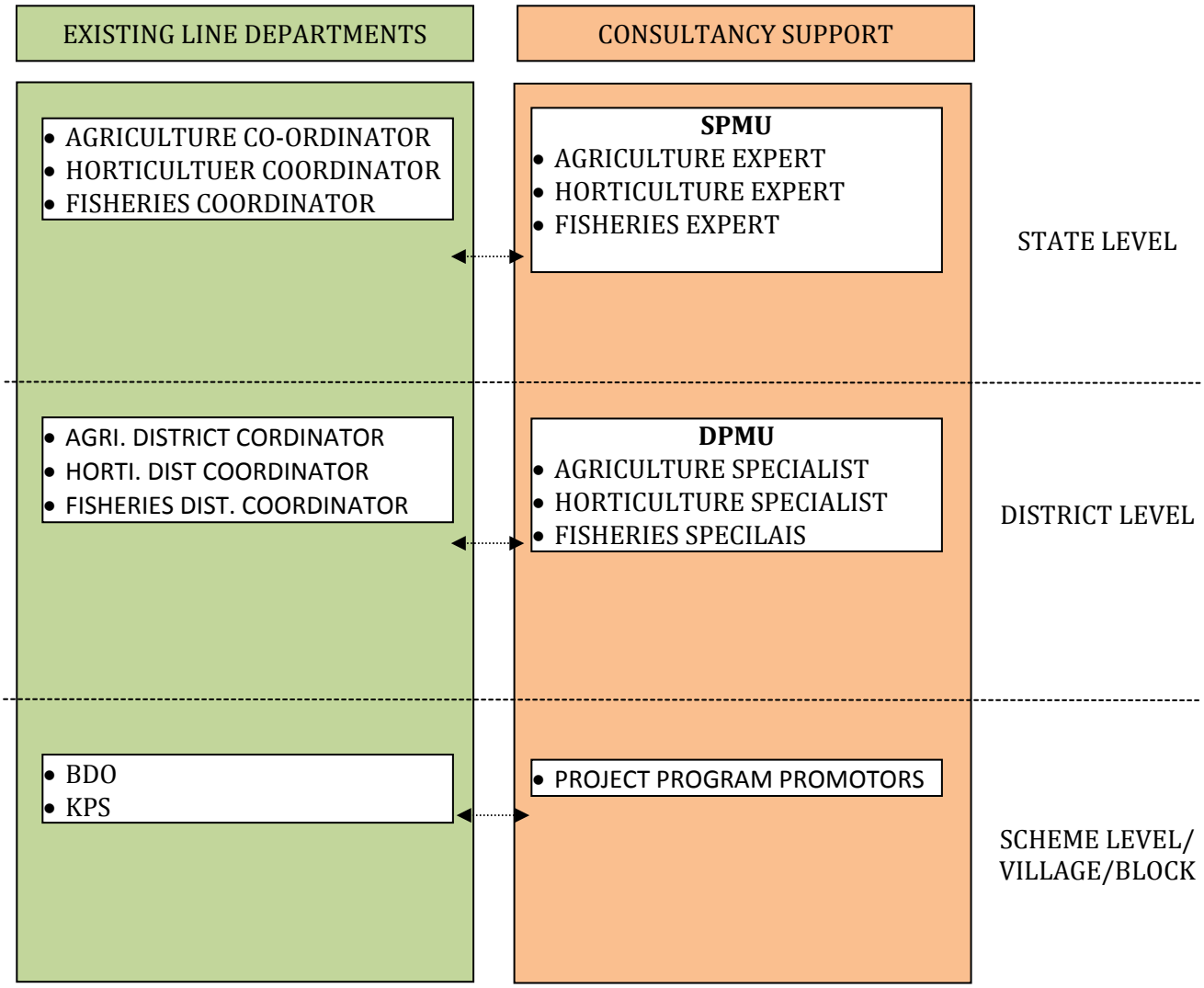
195. The DPMU ASS experts will finally be responsible for procurement of all goods and services for ASS activities as per the project (World Bank) procurement norms and procedures and distribute them to the demonstration site under the custody of the WUA well in advance of the crop-growing season. This will also be done in coordination and with the help of SO Agriculture Coordinator.

196. Support Organization (SO) will be hired at district level to work directly with the WUAs and farmers in the field. Each SO will have one Agriculture Coordinator who will be responsible for supporting WUAs in planning, implementing and monitoring ASS activities at the MI scheme level. They will be responsible for organizing the demonstrations, FFS, farmer intra-state exposure visits, conducting field level awareness campaigns, conducting regular meetings with WUAs on ASS activities, monitoring and reporting progress to DPMU on a regular basis. They will also be responsible for assisting the WUAs in preparing the ASS Action Plan, the seasonal crop and irrigation plan, forming common interest groups for fishery and conducting self monitoring of ASS activities by the WUAs.

197. To supplement the human resources of the district line departments, the project will hire and place Project Program Promoters (PPPs) at the sub-divisional level as ASS facilitators at the disposal of the district line department offices. The PPPs will keep liaison with the ASS experts in the DPMU, the district line departments' office, the SO Agriculture Specialist and the WUAs / farmers in conducting demonstrations / FFS as well as farmer trainings. The work of the PPPs will be jointly monitored by the DPMU and the district line department officers. The reporting relationship is yet to be defined with DPMU.

198. The overall implementation arrangement for the component is given in **Figure – 5.2.**

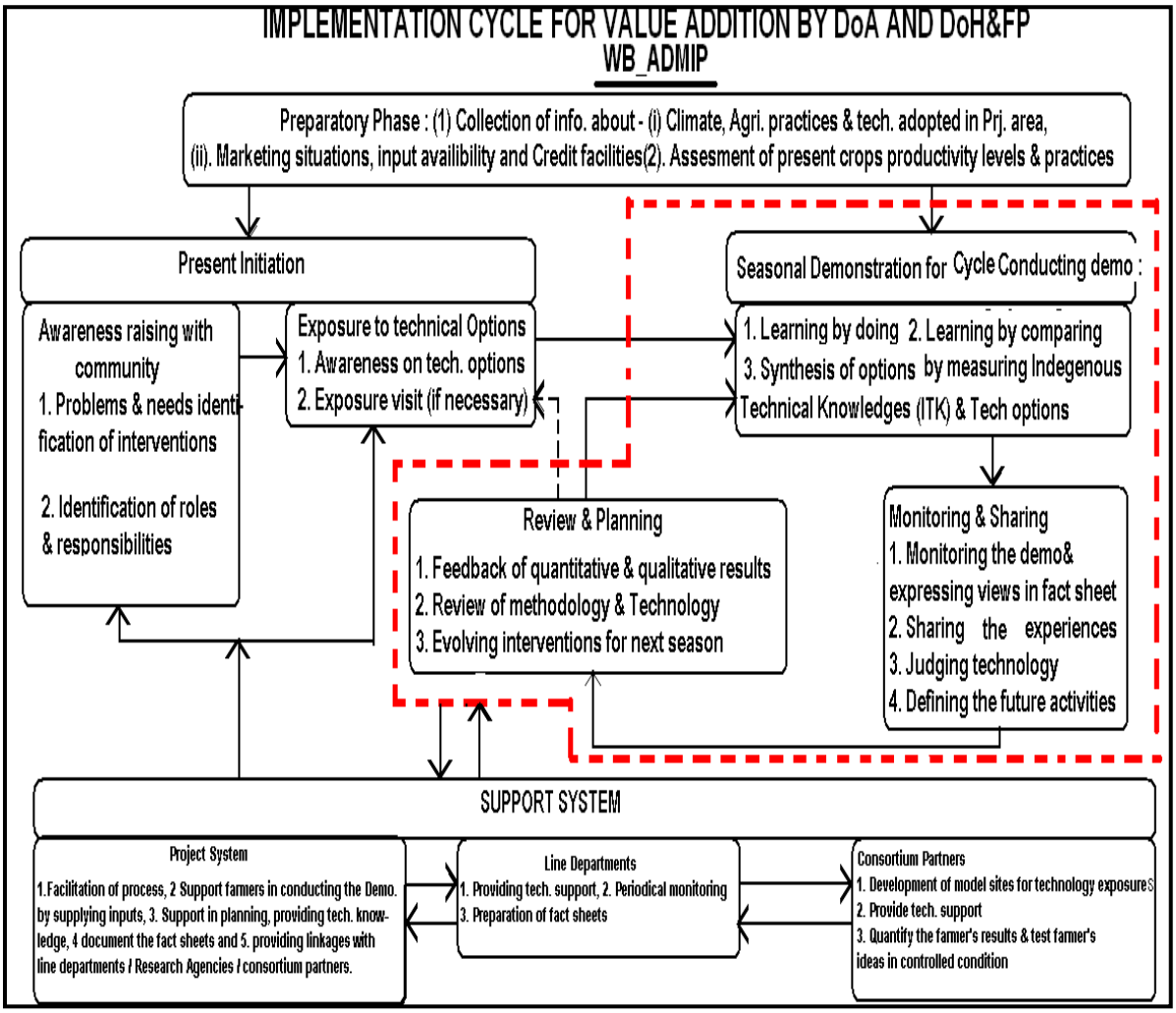
Figure - 5.2 Overall Implementation Arrangement for the Component *[to be finalized]*



Agriculture Development Cycle

199. The implementation of agriculture component will follow a process approach and the flow chart for implementation is given in **Figure – 5.3.**

Figure – 5.3



CHAPTER –06 COMPONENTS D – PROJECT MANAGEMENT

200. The project would be implemented by Department of Water Resource investigation and development (DWRID) Government of West Bengal. In addition departments of Agriculture, Food Processing Industries and Horticulture and Fisheries are also involved in implementation. The project management component would facilitate overall coordination, implementation, monitoring and learning of the project at state, district and scheme level.

201. The policy of GOB has been to handover completed MI schemes to be beneficiaries for management operation and maintenance. The DWRID has been implementing MI schemes with an average annual spending of USD 50 million envisaging construction of up to 70 MI schemes. Though the department possesses the capacity to implement MI schemes, the project design calls for intensive technical assistance especially in surface flow based schemes. Departing from the usual implementation modalities the project envisages a community based implementation approach which require additional capacities in the areas of social, community institutions, monitoring etc. Hence the component would aim at strengthening the man power support to the DWRID in areas where the department lacks necessary skills and functional areas.

Objectives

202. The objective of the component is to ensure smooth implementation of project activities, monitoring of project implementation progress and outputs/outcomes achieved and learning from project experience.

Main Component Activities

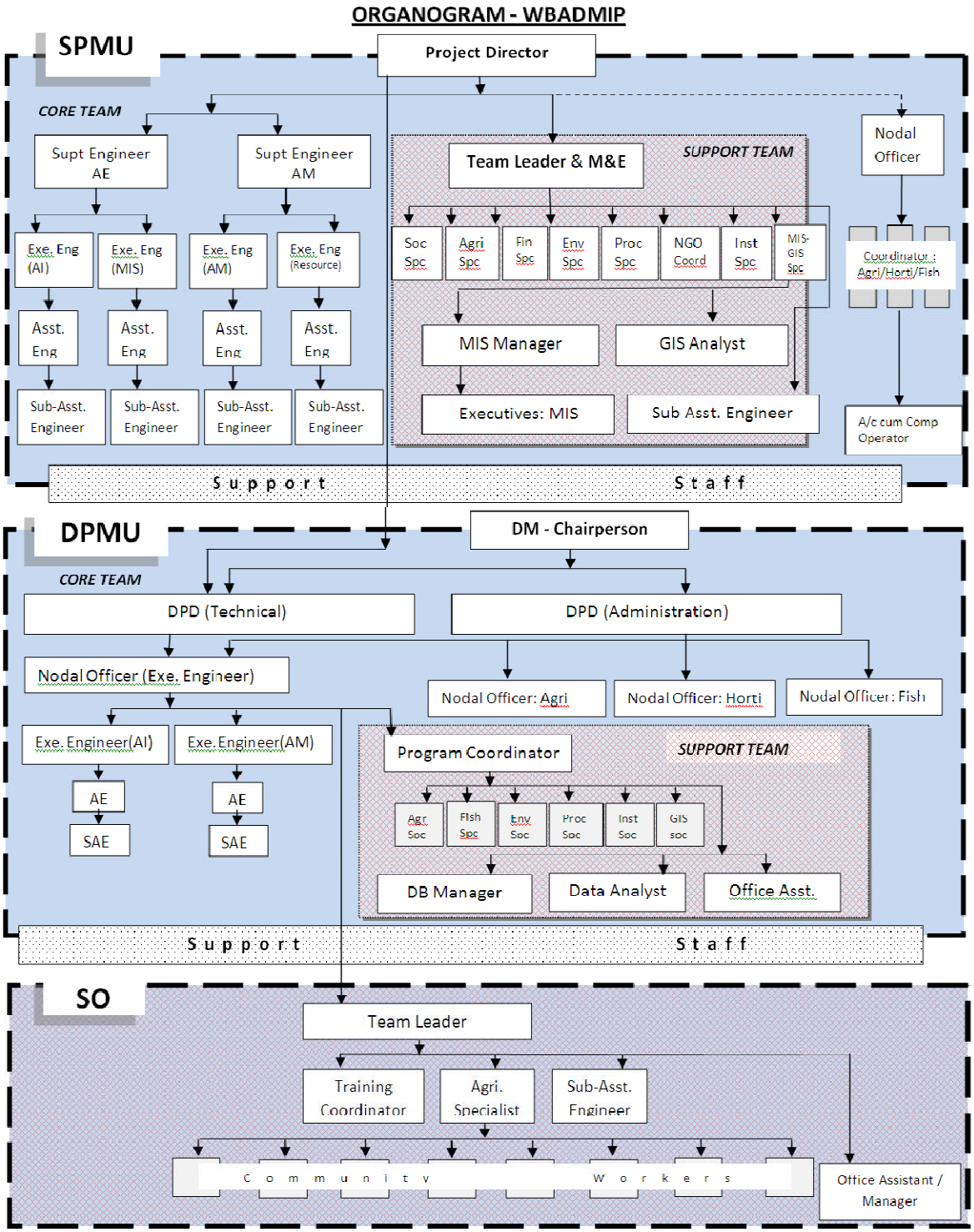
203. The component would help setting up and strengthening state and district level implementation support arrangements, providing office infrastructure and logistic support and setting up of monitoring evaluation and learning systems. Specifically the component activities are:

- Supporting State Project Management Unit (SPMU) and District Project Management Units within (DWRID);
- Supporting Co-ordination Units within Departments of Agriculture, Food Processing Industries and Horticulture and Fisheries for liaison and conversion activities;
- Contracting Resource Agencies to provide a support team of specialists within SPMU and DPMU to supplement DWRID skills during the project period;
- Designing and establishing a project specific Management Information System (MIS);
- Setting up and running the project monitoring learning and evaluation activities including M and E consultants;
- Developing and disseminating IEC and other communication material;
- Establishing water quality labs, remote sensing GIS labs etc. to strengthen DWRID; and
- Designing and implementing evaluation studies including special studies.

Project Implementation Arrangement

204. The overall implementation arrangement is shown in **Figure – 6.1.**

Figure – 6.1 Overall Project Implementation Arrangement



Note: SPMU: State Project Monitoring Unit; DPMU: District Project Monitoring Unit; SO: Support Organization

205. The project institutional arrangement has been put in place through the government order No. 2039-MI/2R-7/99 dated 1.6.99 issued by DWRID, Government of West Bengal. The arrangement consists of a State Level Project Steering Committee headed by Principal Secretary DWRID for overall monitoring and oversight, a State Project Management Unit (SPMU) headed by Project Director for overall project implementation. The SPMU consists of a combination of seconded government staff and a team of contractual staff provided through a consulting firm. The arrangement at the district level correspondingly includes the District Level Implementation Committee (DLIC) headed by the District Magistrate and District Project Management Unit (DPMU) headed by District Project Directors. The DPMUs are staffed with seconded officers from the department and contracts staff provided by the consulting firm. The scheme level support and facilitation to WUA is provided by Support Organizations, which are NGO hired for the purpose. The cost and other support for SOs are provided for in the Component A - Institutional Strengthening.

State level Project Steering Committee

206. The project at the state level will be reviewed by a Project Steering Committee with the Chief Secretary as the Chairperson. The Project Director will be the Member Convener of Project Steering Committee. The other members of the Project Steering Committee will be:

- Principal Secretary, DWRID
- Engineer-in-Chief & EO Secretary, DWRID
- Secretary Finance
- Secretary, Agriculture
- Secretary, Horticulture
- Secretary, Fisheries
- Secretary, Animal Husbandry
- Secretary, I&WD
- Secretary, Panchayat & Rural Development

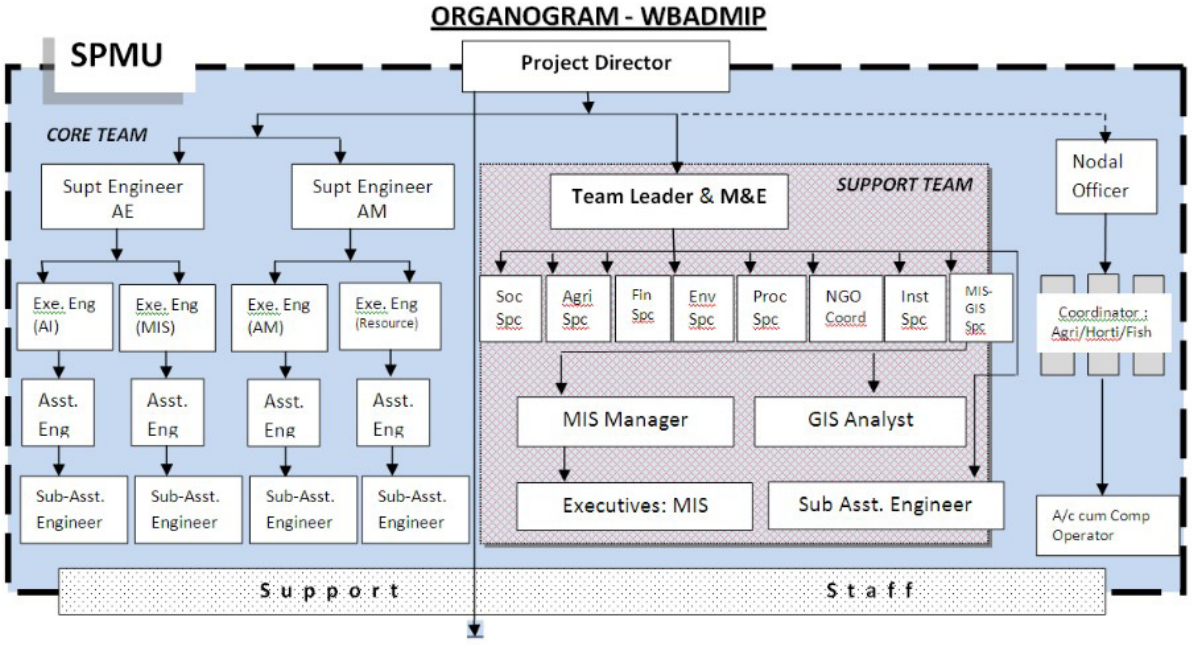
207. The State Level Project Steering Committee will review the project progress every six months and provide strategic directions, guidance on policy matters and resolve inter-agency issues, if any, amongst the implementation partners.

State Project Management Unit

208. The state level agency responsible for implementation of the project will be the DWRID, Government of West Bengal. The Engineer-in-Chief & EO Secretary, DWRID will be the Project Coordinator. For the day to day management of the project, the DWRID will establish a dedicated State Project Management Unit (SPMU) with a State Project Director with the rank of a Chief Engineer as its head. The SPD will be supported by a team of staff both with engineering and non engineering expertise in implementation of the project.

209. The **composition** of the SPMU consists of: (i) Core Team of seconded DWRID staff; (ii) the Nodal Officers specially assigned by the coordinating departments; and (iii) contract staff fielded by the consulting agency. The overall composition of SPMU is shown in **Figure – 6.2.**

Figure – 6.2 Composition of SPMU



Note: SPMU: State Project Monitoring Unit;

210. The **Core Team** constitutes Government staff on deputation primarily from DWRID. The **Contract Staff** hired through a Consulting Firm compliment the Government Staff with additional skills and expertise required for project implementation. At full strength the SPMU is expected to have about 30 professional staff of which roughly half will be government staff on deputation and the rest will be specialists contracted from the market. The SPMU is organized into 5 subject matter unit and 2 administration units and the detailed staff positions are summarized in **Table – 6.1.**

Table – 6.1 SPMU Personnel Position Summary

Sl. No.	Unit Name	Position Name	No. of Positions	Mode of Recruitment
1	Project Director	Chief Engineer DWRID	1	Core Staff
2	Technical & Procurement Unit	Superintendent Engineer AI/AM	2	
		Executive Engineer AI/AM	2	
		Assistant Engineer AI/AM	2	
		Sub-Assistant Engineer AI/AM	4	
		Procurement Specialist	1	
3	Institution Development	Institutional Development Coordinator	1	Contract Staff
		NGO Coordinator	1	
4	Agriculture Support Services (ASS)	Agriculture Specialist	1	Contract Staff
		Agriculture Coordinator	1	
		Horticulture Coordinator	1	

5	Monitoring and Learning	Monitoring & Evaluation Specialist cum Team Leader	1	Contract Staff
		MIS Specialist	1	
		GIS Specialist	1	
		Training cum Documentation Coordinator	1	
		MIS Manager	1	
		GIS Analyst	1	
6	Social and Environment Safeguard	Environment Management Specialist	1	Contract Staff
		Social Development Specialist	1	
7	Financial Management	Controller Finance	1	Core Staff
		Drawing & Disbursement Officer (DDO)	1	
		Finance Management Specialist	1	Contract Staff
8	General Management	Support Team of DEO / Office Assistant and Office Attendant	7	Contract Staff

211. At full strength SPMU will have about 30 professional staff out of whom half will be seconded from department and rest hired contracted through consulting firm. In addition short term expertise will be hired through the SPMU whenever required. The job descriptions for SPMU staff are given in **Attachment – 6.1.**

212. The main **responsibilities** of the SPMU are:

- Responsible for collectively delivering the results of the program;
- Project planning and scheduling;
- Coordination with other implementing partners;
- Project-wide budget control and financial management;
- Quality assurance and control; monitoring of the project inputs, outputs, and outcomes;
- Providing timely and quality resources as well as technical assistance and guidance to other project implementing agencies including project management support;
- Developing implementation strategies, operational guidelines, packaging them as project manuals; and
- Capacity building and providing trainings to support the implementing staff, field functionaries, WUAs and Support Organizations.

District Level Implementation Committee (DLIC)

213. At the district level, the project will be regularly monitored and reviewed by a District Level Implementation Committee (DLIC) chaired by the District Magistrate. The District Project Director, Administration (DPD-A) will be the member secretary of the DLIC. The other members include the District Project Director, Technical (DPD-T), the Krishi Karmadhaksa, Zila Parisad members (Agriculture Activity Manager of the District Board and elected member), senior district level representatives from the Departments of Agriculture, Food Processing Industries & Horticulture, and Fisheries, concerned Executive Engineers, staff of the Electricity Distribution Company and WUA representatives. The SO will be invited to provide information to DLIC.

214. The DLIC will be the main forum for district level coordination of project activities with other ongoing government programs, approval of annual action plans, monitoring of project progress, and

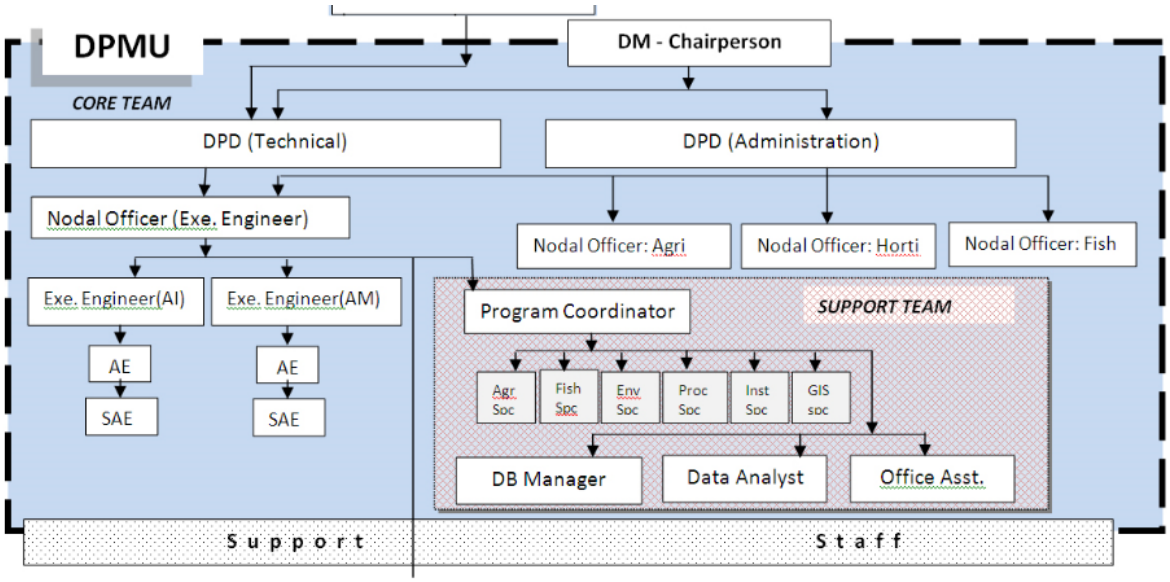
grievance redressal and resolution of conflicts, if any, amongst the implementing partners. The DLIC will review project progress at least once every quarter.

District Project Management Units (DPMU)

215. The District Project Management Units (DPMU) located at district headquarters will be responsible for the implementation of the project at the field level. The DPMUs will be headed by a team of District Project Directors, one Technical (DPD-T) and one Administrative (DPD-A) and will have corresponding but smaller dedicated multi-disciplinary teams similar to the SPMU.

216. The composition of the DPMU, like SPMU will consists of Core Team of the seconded staff, Nodal Officers of the coordinating departments and Contract Staff fielded by the consulting agencies. The overall composition of DPMU is shown in **Figure 6.3.**

Figure 6.3



Note: DPMU: District Project Monitoring Unit;

217. The DPMU personnel position summary is given in **Table – 6.2.**

Table – 6.2 DPMU Personnel Position Summary

Sl. No.	Unit Name	Position Name	No. of Positions	Mode of Recruitment
1	DPD Technical	Superintending Engineer SE	1	Core Staff
	DPD Administration	Additional District Magistrate	1	
	Technical Assistant/Nodal Officer	Executive Engineer	1	
	DDO	Executive Engineer AI/AM	1	
	Program Coordinator	Program Coordinator	1	

2	Technical & Procurement Unit	Executive Engineer AI	1	
		Executive Engineer AM	1	
		Procurement Engineer	1	
		Assistant Executive Engineer AI/AM	1	
		Sub Assistant Engineer	1	
		Surveyor	1	
3	Institutional Development Unit	Project Officer - Institutional Development	1	**Contract Staff**
4	Agriculture Support Services	Agriculture Specialist	1	
		Fishery Specialist	1	
5	Monitoring & Learning Unit including Environment Management Unit	GIS Specialist	1	
		Database Manager	1	
		Data Analyst	1	
		Environment Specialist	1	
6	Fiduciary Unit	Divisional Accounts Officer	1	
		Office Assistant	1	

218. The DPMUs will be **responsible** for the implementation of district programs; achievement of physical and financial milestones; quality assurance; and working closely with communities to achieve the project development objective. Requisite authority will be delegated to the DPMUs for planning, decision making, use and allocation of funds and monitoring in their districts. The focus is on creating a participatory institutional structure that will ensure accountable and efficient governance for project implementation.

219. The DPD-T will be responsible to accord necessary technical sanction for the projects in the district within the financial powers delegated to him / her and provide all sorts of technical assistance to the field level implementation units, oversee all technical activities under the project in the district and also assist the SPMU in day to day monitoring of progress of the projects in the district.

220. DPD-A will be empowered with general administrative functions of the DPMU and also the coordination functions with the line departments. The DPD-A will remain responsible for all functions of the DPMU including its establishment matters etc. and will act as coordinator between the DLIC and the field level implementation units including those with the line department's nodal units. The DPD-A will also be responsible for all communication with the SPMU on day-to-day matters and reporting.

221. DPD-T will be in the rank of Superintending Engineer of DWRID, holding this assignment as additional charge for two districts. The DPD-T will be assisted by one Technical Assistant in the rank of Executive Engineer from DWRID for the day to day work of the project and who will be full time dedicated to the project. The DPD-A will be in the rank of an Additional District Magistrate of the Department of Personnel and Administrative Reforms. The DPD-A will be nominated by the District Magistrate and will hold the function as additional charge.

The DPMU will have subject specific cells that are very similar to that of the SPMU. Key staff in the

Technical Cell will comprise a team of engineers from the DWRID. There will also be a Fiduciary Cell, an Agricultural Cell, an Institutional Development Cell and a Monitoring, Learning and Evaluation Cell (including the safeguard staff) and a General Management Cell. If adequate numbers of technical officers are not available in a district, there will be an option to hire technical staff on contract to augment the strength of the DPMUs, as and where required. The staff of the units other than Technical Unit will be a combination of existing government staff deputed to the DPMU and contracts staff hired through consultancy firm. The job description for the DPMU staffs is given in **Attachment – 6.2.**

Line Departments

222. Project implementation support for Component C Agricultural Support Services will be provided by the Departments of Agriculture, Food Processing Industries & Horticulture, and Fisheries. For coordination and oversight, each department will set up a Nodal Unit at state level that will operate from within the mother department, but will liaise regularly with SPMU staff. The departments will also designate senior district level officers as focal persons for coordination of project activities at the district level. The nodal district level officers will participate in the DLIC meetings and will act as the main departmental contact points for the DPMUs.

Support Organizations

223. Support Organizations (NGOs) will be recruited by the project to facilitate community mobilization, participation and institutional strengthening of the WUAs. Each SO team will consisting of staff with expertise in community mobilization, technical works and agriculture and will be assigned a cluster of MI schemes in a district. The team will be responsible for building capacities of the WUAs and facilitate their participation in all aspects of project implementation.

224. The SO team will constitute of three units, each comprising of one Community Mobilization Specialist, one Agriculture and Water Management Expert, one Sub Assistant Engineer and one Training Coordinator and Facilitator. These key experts will be supported by one Office Manager-cum Computer Operator and eight Community workers. The Community Mobilization Specialist of the unit will be the Unit Team Leader and take the responsibilities for deliverables of all other members of his / her unit. He / she will also report to the DPMU/SPMU for all purposes related to the services for the unit.

225. The detailed qualification and experience as well as key responsibilities of the SO staff are given in **Attachment 6.3.**The composition of SO is given in **Figure – 6.4** and the details of personnel to be deployed by SO are given in **Table – 6.3.**

Figure – 6.4 SO Composition

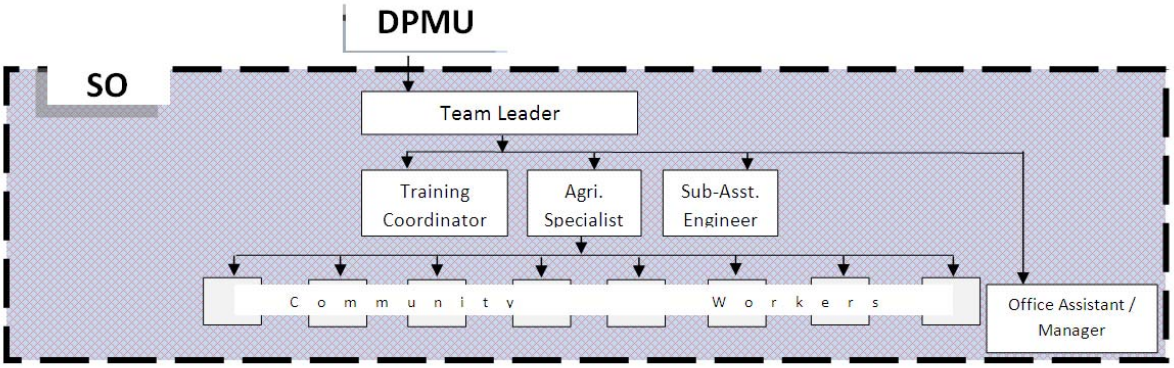


Table – 6.3 SO Personnel Deployment Summary

Sl. No.	Position Name	No. of Positions
1	Community Mobilization Specialist / Team Leader	1
2	Agriculture & Water Management Expert	1
3	Sub Assistant Engineer	1
4	Training Coordinator and Facilitator	1
5	Community Workers	1
6	Office Manager-cum Computer Operator	1

226. The scope and description of services to be provided by the SO is given in **Attachment – 6.4.**

Scheme Level Farmer Organization

227. At the MI scheme level, the focal point will be the Water Users Association (WUA) to which all command area farmers will belong. The WUA will be expected to play an active role in the planning and management, operation, and maintenance of its MI scheme and participatory monitoring of the MI scheme effectiveness and sustainability. Each WUA will have a Governing Body and four Sob-Committees, e.g. for works and water management, etc. to carry out its responsibilities. The legal status of a WUA proposed under the project is that of a society registered under the West Bengal Societies Registration Act, 1961. The detailed composition structure roles and responsibilities are described in Chapter – 03 Component A Strengthening Community Based Institutions.

Project Annual Action Plan

228. The SPMU and DPMU members will prepare the annual action plans for the project and set up implementation targets to be achieved in a particular financial year. Based on the annual plans, each unit of the SPMU will prepare their own action plans in consultation with the DPMU staff. The DPMU staff will initiate their work along with the SO by assessing the district situation in terms of extension needs, development potential and emerging opportunities. Planning at the district level

will also include brainstorming, discussions and planning of collaborative working with the WUAs, various line departments and partner agencies. Based on this assessment first a draft SO annual plan will be prepared by each SO. Based on these SO plans each DPMU will further develop a district annual action plan covering institutional development, technical works (infrastructure development) and agricultural support services promotion. This plan will be discussed and reviewed in the DPMU and DLIC and then finally submitted to the SPMU. The SPMU sub-units will develop project level plans and will review the progress of works on a quarterly basis with the Project Director. The state annual action plan of the project will be submitted to the Project Steering Committee and the World Bank for approval.

229. The processes and systems set for project implementation planning will be continued in subsequent years with addition of annual review workshops linked to the planning process. These will be useful in understanding the gaps in implementation, challenges of scaling up interventions in subsequent years and the learning's generated through the implementation process. The annual shedule for AAP preparation is given in **Table – 6.4.**

Table – 6.4 Schedule of Annual Plan Preparation

Step	Schedule	Responsibility
Annual Planning Workshop	Oct-Nov	SPMU
Annual Plan of WUA	Nov-Dec	Support Organization
SO Wise District Annual Plan	Dec	Support Organization
Consolidated District Annual Plan	Dec-Jan	DPMU and Line Department Ag/ Horti/ Fishery/ Backward Welfare department
District Annual Action Plan Workshop	Jan-Feb	SPMU and Ag/ Horti/ Fishery/ Backward Welfare department
State Annual Action Plan	Feb	SPMU
Approval of State Annual Action Plan	Mar	PSC & World Bank
Sharing the plan with the respective teams SO & DPMU	March-April	SPMU

Project Progress Reporting System

230. **Reporting Arrangement:** The SPMU will develop a comprehensive result based monitoring, learning and evaluation system for the project. Hence, the thrust of the project reporting system will be on generating information and knowledge for learning and informed decision making through various sources and methodologies. The overall reporting arrangement of the project is given in **Table - 6.5.**

Table - 6.5 Project Progress Reporting Arrangement

Sl. No.	Type of Information	Nature	Frequency of Reporting	Link to MLE Component
1	Information on inputs and outputs	Quantitative	Quarterly	MIS & GMIS
2	Information on results and outcomes	Quantitative	Annual	Six Monthly Reviews and Concurrent monitoring
3	Information on impacts on the target population	Quantitative	Once in two years	Baseline, Mid Term Assessment and Final Assessment
4	Information on processes	Quantitative	Six monthly	Field Based Monitoring
5	Information on institutional development	Quantitative & Qualitative	Quarterly	WUA Self Rating linked to MIS, Theme based reports
6	Information on progress of works	Quantitative	Six monthly	Six Monthly Reviews and MIS
7	Information on sequencing of events	Quantitative	Six monthly	Six monthly Reviews and MIS

231. **Progress Reports and Frequency:** The various project implementing agencies will adhere to an agreed schedule of reporting as prepared by the SPMU in consultation with them. The proposed reporting schedule is given in **Table – 6.6.**

Table – 6.6. Project Progress Schedule

Reporting Agency	Report Submitted To				
	SO	DPMU	SPMU	State Government	World Bank
WUA	M / S*				
SO		M	M Social Audit		
DPMU			M		
Line Department			M	M	
SPMU				M / Q / S / A / Other as required	M / Q / S / A / Other as required
External Agencies			As per agreement		

M - Monthly Progress Report; Q - Quarterly Progress Report; S - Six Monthly Progress Report; A - Annual Progress Report; * SR&A – Self-rating / Self-assessment by WUA

232. **Project Management Information System:** Project reporting and monitoring will be carried out through a dedicated MIS specially developed for the project. The Project MIS will be combination of followings:

- Web Based
- GIS based

- Mobile App
- Excel based reports
- Other reports as specified

233. The formats for the MIS will be developed and accordingly MIS & GIS software and Mobile apps will be designed and developed by the project through a specialist vendor. The vendor will define the necessary guideline, systems and procedures in consultation with the SPMU. The vendor will also train the project teams members in field based documentation, data collection, data entries, its validation and report generation.

Monitoring and Learning System

234. The project monitoring, learning, and evaluation framework will be designed to facilitate:

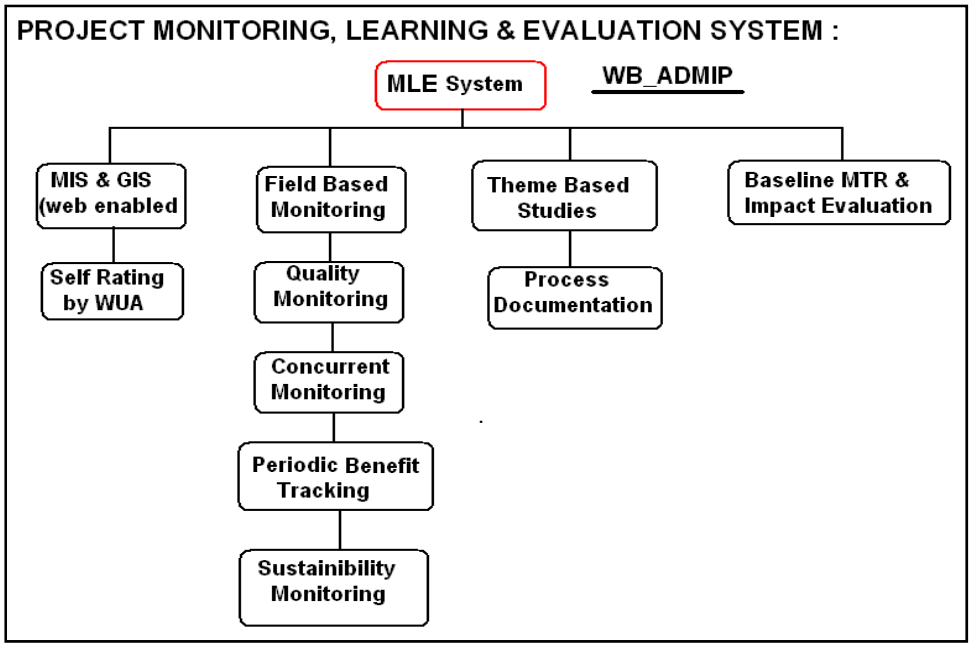
- Results-based management through timely monitoring, analysis, and feedback of relevant indicators;
- Learning for process enhancement, through a mix of participatory assessments, Self-ratings and reviews, and special thematic studies; and
- Impact evaluation, through measurement of specific performance indicators, including use of appropriate baseline and controls.

235. The focus of the project‟s MLE system is to enable appropriate oversight and management, self-learning by project staff and beneficiaries, and full evaluation of project experience. Management action at various levels will be guided by the following reports:

- District-level monthly MIS reports on the status of implementation activities collated and produced by DPMUs;
- Regular reports by external M&E agency on its concurrent monitoring activities;
- Six-monthly consolidated reports produced by DPMU at district levels and by SPMU at the project level - these will form an important basis for the six monthly performance review to be undertaken jointly by the Bank and GoWB;
- Consolidated mid-term implementation report by SPMU and mid-term impact assessment report by the external agency, which will form the basis of the Mid-Term Review to be undertaken by the Bank and GoWB around March 2014; and
- Consolidated project implementation and assessment report by SPMU and overall project evaluation report by external agency at project completion, to be used for the preparation of the project Implementation Completion Report (ICR).

236. The overall project MLE Framework will have distinct but inter-related aspects or “constituents” and the schematic diagram is given in **Figure – 6.5.**

Figure – 6.5. Schematic Diagram on MLE Frame Work



237. The project MLE Framework will have five distinct components, namely: (i) the project will regularly monitor the project's physical and financial inputs and outputs through the **project MIS**. The MIS information will be used for project management through a Progress Review System (PRS) on a regular basis; (ii) **field based monitoring** is planned to concurrently monitor project progress and processes for institutional strengthening and measure output, outcome and impacts. Monitoring of quality of civil, mechanical, electrical works will be one of the important activities under field based monitoring. Field level implementation is planned to be monitored by selecting a sample of MI schemes within each district for intensive monthly visits and monitoring. Six monthly reviews are proposed under the system; (iii) there will be a system of **participatory MLE** to engage the beneficiaries in assessing progress and achievements of the project. Going beyond extraction of information through group-based methods, the participatory MLE process will aim to involve the key stakeholders in developing a framework measuring results, evaluating achievements and learning from the project experience. This will also help build up local capacity to reflect, analyze, propose solutions and take actions. Where possible, the process would try to ensure that marginal voices are heard; (iv) the project would also undertake issue and **theme based studies** as identified by the joint reviews and six monthly reviews. These themes / issues are likely to relate, inter-alia, to implementation processes, identification of constraints (technical, administrative, financial) and estimation of project output / impact. Impact of the project on poverty status and changes will be covered through a longitudinal study on sample sub-project and households tracking in command areas; (v) an **independent MLE agency** will carry out a baseline survey to benchmark the pre-project situation and will undertake impact evaluations at mid-point and at completion of project implementation. Annual evaluations will be also undertaken to review project performance and assess key implementation issues arising.

Implementation Arrangement for MLE

238. The SPMU, through its dedicated MLE unit, comprising of a minimum of one MLE expert and one data analysis and documentation expert will have overall responsibility for planning and coordinating MLE activities. In this role, the SPMU will coordinate MLE activities with three sets of entities that will undertake the bulk of the data collection and analysis work: (i) the field implementing units at the district levels; (ii) an external M&E agency; and (iii) beneficiaries, primarily WUAs. The process of participatory MLE by beneficiaries will be facilitated by the SO. The SPMU will have overall responsibility for developing the systems and procedures for appropriate analysis and presentation of the collected MLE data (including participatory MLE data) to ensure their use for project monitoring, management, learning, and beneficiary capacity building.

239. All implementing agencies (field level project staff, line department staff, service providers contracted by the project, etc.) will be responsible for collecting and reporting information on physical and financial input and output indicators as part of their regular implementation work. This data will be fed into and assimilated by a computerized MIS which will be set-up and managed by the SPMU. The MIS will be designed to help consolidate, analyze, and use the data for management feedback at different levels, from MI scheme level to block, district, and State levels.

240. An external M&E agency will collect primary data about project implementation and impact through four types of data collection exercises: (i) baseline survey; (ii) special monitoring of implementation progress studies on relevant themes and in a format agreed in advance with the SPMU; (iii) outcome-focused impact evaluations, especially at Mid-Term Evaluation and Final Evaluation; and (iv) systematic („panel data" type) evaluation of project impacts through repeated monitoring of the same sample set of households from the beginning to the end of the project. For each data collection exercise, information will also be collected from appropriate "control" or reference sites in order to help assess the incremental impact of project interventions vis-a-vis generic growth influences over time.

241. A complementary set of information on quality and effectiveness of implementation processes and on project impacts, from the beneficiaries" point of view, will be gathered through a structured process of participatory monitoring and learning (PML). Project interventions at the field level will be primarily group-based (through e.g. WUAs, fishermen cooperative societies, and farmers" producer groups). As part of their implementation experience, each group will provide feedback on themes and through media and format understood and agreed in advance on their participatory experiences. The SO will record these self-assessments as well as quantified participatory assessments, and feed them into the overall project MLE system. The information will be monitored and used by project management at district and other relevant levels for improving: (i) effectiveness of project interventions and processes with regard to the communities; and (ii) management and capacity building of the communities themselves.

242. Quality control will be given priority in project planning and implementation process. The project will follow the DWRID / other line departmental SoR and BIS guidelines for quality control. The bidding document will incorporate suitable clauses for ensuring quality control and performance. There will be a two-tier quality control mechanism for materials (3rd party inspection by GoI authorized inspecting Agency followed by Departmental inspection) and one tier inspection by district WRDD installation team for civil, mechanical and electrical works of MI schemes.

243. Project MLE activities will include baseline studies, regular performance tracking of inputs and outputs by concerned implementing agencies, concurrent performance monitoring (on a sample basis) by external M&E agency, systematic ("panel data" type) analysis of project impacts through repeated monitoring of the same sample set of households through project lifetime, mid- term and

final impact evaluations and continuous participatory monitoring and learning by WUAs. Reports from these MLE activities will be generated in agreed format according to a set schedule and compiled into the project MIS to facilitate a comprehensive integrated project reporting and monitoring system.

244. The project will have a dedicated website where all relevant information and data will be posted for a wider audience. The website will be designed to serve as a one-stop information place with user friendly features on different aspects of the project. It will be updated regularly to make the information as current as possible. Updating and managing the information flow shall be the responsibility of the MLE Unit under the SPMU. The website will also have a mechanism to handle feedback from the audience. Other mechanisms of feedback will be used as well, including mail and phone.

245. The detailed summary of project MLE activities and operational plan for each of the tools covering type of monitoring, methodology and responsibilities is given in **Attachment – 6.5.**

Results Chain

246. The project has finalized the results frame work which is included in project appraisal document. In order to monitor the results, activities, processes, outputs and outcomes, indicators have been developed as a result chain. The component wise presentation of these indicators is given in **Attachment – 6.6.**

Capacity Building for MLE

247. The MEL framework of the project envisages active role of different project stakeholders in the process of carrying monitoring, evaluation and learning from the project. This will require building the capacities of the different stakeholders involving project staff, line department staff, SO staff, WUAs and other key agencies and personals in project implementation.

248. Some local capacity regarding awareness, understanding, and use of MLE and PML exists and the project will seek to build upon this in order to ensure availability of adequate expertise as well as methods and tools for data collection and analysis. The SPMU, with the assistance of a specialized consultant, will develop a standardized format for data collection and reporting, with special attention paid to user friendliness and capacity for the collected data to be integrated into a project-wide MIS. Second, basic training in data collection and reporting will be provided to all field level implementation staff, with repeater trainings on special themes as necessary.

249. Capacity building interventions for MLE will cover training programs on overall MLE approach, RBM approach, participatory monitoring and learning, process monitoring, concurrent input-output-outcome monitoring, quality assurance and control monitoring, etc. Orientation training on MLE framework will be provided to all project staff. However, specific skill trainings such as use of various MLE tools will be provided specifically to the MLE team and the staff who are going to use them so as to cater to the project needs. The major focus of capacity building for MLE will therefore be on creating and facilitating capacities at various levels of project implementation in data collection, analysis and interpretation, generating learning and using the learning to improve performance. For sharing and disseminating learning from the MLE process the project will hold a number of theme based workshops and experience sharing sessions not only for project staff but also for external participants for cross learning and bringing in new ideas.

250. The SPMU in collaboration with the DPMUs and concerned departments will organize experience sharing and exposure visits for beneficiary groups and implementing agencies. The SPMU will also use available media (e.g. video conferencing, teleconferencing) to organize discussions and communicate experiences on how implementation is facilitated and how topical issues are addressed by different units. The various training programs for different stakeholders being planned under MLE are summarized in **Table – 6.7.**

Table – 6.7 Project MLE Training

Stakeholders	**MLE Components**			
	Six Monthly Reviews	**MIS**	**Participatory Monitoring and Learning**	**Baseline and Impact Assessment**
SPMU Staff	Orientation	Training	Orientation	Workshop
DPMU Staff	Orientation	Training	Orientation	Workshop
District MLE staff	Training	Training	Training	Workshop
Line Department Staff	Orientation	Exposure visits	Orientation	Workshop
SO Staff	Orientation	Training	Training	Workshop
WUA Governing Body & Office Bearers	Orientation		Exposure visits, Training	Workshop
WUA Members	Orientation		Orientation	

CHAPTER –07 PROJECT SOCIAL AND ENVIRONMENTAL MANAGEMENT FRAMEWORKS

251. The project The Social Assessment study conducted for the project as part of project preparation identified participation, inclusion and equity, decentralization and human and institutional development as key social development issues / principles, which should underpin the project's strategy and implementation. Specific attention would be required to facilitate and support participation and equitable distribution of benefits to tribal and women. The assessment also showed that in some of the project areas the OP 4.10 of the World Bank on Indigenous Peoples (Tribal) is triggered. Consequently, it is proposed to prepare Tribal Development Plans (TDP) for these project areas and an overall project Gender Development Plan (GDP) to ensure these social safeguards.

252. The assessment also brought out that while there is no need to acquire lands involuntarily and OP 4.12 of the World Bank is not triggered, there will be need for some land for installation of the MI scheme, namely for source works, mainly head works and pump houses, spouts, which are water outlets for regulating distribution, and distribution systems, mainly field channels for transmitting water to the plots. The size of the land required for each MI scheme is so small that it is proposed that the land be made available to the project through voluntary donation by the beneficiaries whose contribution will be recognized and gratitude in some agreed ways extended by the WUA.

Stake holder Involvement

253. The project implementation arrangement as outlined in chapter 06, project management outlines the balanced involvement of all key stakeholders in project implementation. The state Project Management unit (SPMU) is the nodal department at state level for implementing the West Bengal Accelerated Development of Minor irrigation Project" (WBADMIP). A technical steering committee (TSC) established at state level, chaired by chief secretary, Project Director is the convener& secretary of the committee. The committee (TSC) will review project progress every six month on average and provide strategic direction, guidance on policy matters, and will resolves conflicts, if any among the implementing partner. At district level the actual implementation of the day-to-day project activities will be carried out by the staff of DWRID and departments of Agriculture, Food Processing Industries & Horticulture , Fisheries and Rural Development and Panchayat Raj Department will participate in the planning implementation, regular monitoring, providing data and mid course correction if required with consultation of SPMU. At district level project will reviewed at least once every quarter by a District Level Implementation Committee, chaired by the District Magistrate.18 District Project Management Units (DPMU) has set up with Government order in each in one of its respected implementing district. The DPMU will comprise a combination of key staff from government agencies, supplemented with qualified individually selected specialists. The team will be guide by District Project Director and one District Project Director (Technical, rank of Superintend Engineer of DWRID) in each District. District Project Director (Administration) will serve as the secretary of the DLIC which will include District Project Director (Technical) and have representative from senior district level staff from involved departments, and on invitation basis, representatives of SOs, WUAs etc. The DLIC will be the main forum for district level coordination of project activities with other ongoing government programmers, approval of annual action plans monitoring of project progress, redressing of grievances, and resolution of conflicts, if any, among the implementing partners. Each Water User Association (WUA) will be responsible for monitoring and coordinating of the activities related to the planning of the schemes, implementation, crop planning, and water management with the hand holding support from Support Organization (SO).Other water users such as fisherman also be there member of water user Association. It is noted that fishing will be feasible in selected tank only and

that agriculture water use has preference.

254. The WBADMIP consultant team support SPMU/DPMU by providing all necessary technical assistance, advising on over all coordination, institutional, environmental, scientific and technical aspects as well as capacity building and monitoring of the project. The SO will do the necessary facilitation support, handholding and capacity support to WUA.

Social Development Plan

255. The project will be executed with the full involvement and cooperation of villagers, ensure community involvement in site selection, design, installation, maintenance and water distribution. The main elements of the Social Development aspects are summarized in **Figure- 7.1**

Figure 7.1: Components of Social development Plan

Inclusive and Accounrtable WUA	Location of Village	Locating Command Area	Rules for Water Charges and Distribution	Community Operation and Maintenance	Capacity Building and Monitoring
• Nurturing a collective vision of a better life among the member; • Developing a strong sense of ownership for new initiative • Facilitate the realization for the positive change, group effort is required • Develop appropriate attitude among members about working together in a group • Imparting the necessary skills in operating and managing the system	• The presence of a large number of small and marginal farmers • Caste- wise and hamlet-wise homogeneity • Potential to impact on large number of poor families • Priority to be given to tribal villages • Communities are ready to WUAs willing to participate in the planning and to take over management, ope ration and maintenance irrigation	• Consider upstream and downstream issue • the distribution of plots under the command area is fair or not skewed in favors of few members • Consider all possible command areas options for a source and select the best suitable starting from the coverage of family, coverage of land, cost effectiveness, and technicalities ,upstream and downstream issues.	• **Equitable distribution** of Water by fixing timing for each area of opening the spout to ensure the full pressure of water for tail end farmers • The WUA will decide the water rate per hour from members. • Introduce Coupon syatem • Ccalculate the water demand both for Agriculture and fisheries and availability of water in the command area at planning stage	• Select and train the operator among the group member to exclusively run and maintain the pump. • Water users pay the pump operator for the services • Pump operators attend a refresher course to upgrade the knowledge and skills • Water user pay for repair and maintenance of pump • A pump log book will maintain by the pump operator and follow the maintenance schedule provide during training.	• Mobilizing communities into local level institution • Developing knowledge, skills & management practices in them • Linking them with the external world.

Involvement of Women

In the command area of project schemes, if the women headed households have land ownership they should invite to join in managing committee of WUA. One third of its managing committee member should be women. Prospective female dominated SHGs should be identified. The experiences of women in managing finance in SHGs help them to carry out the task of collecting rental and keeping accounts. The familiarity of managing SHGs has also help of supervising the service providers such as pump operator and accountant and to resolve conflict. Working in a group is a distinctive competency that the women posses which help them in make adjustments, resolve conflicts amicably and developed synergy. Important part is to impart proper skills for

Leadership development and in the technical tasks related to managing assets of minor irrigation. In addition Membership of Water User Association should be household basis and hence both husband and wife automatically are members of WUA.

256. Specifically the project will ensure women participation through:

- Women in Managing committee (At least 3 women in managing committee)
- Women member in (4) sub-committees (works, water management, finance and monitoring)
- Women headed household (HH) member of WUA
- Demo plot managed by women Member
- Promote women managed Water User association

Land Requirement

257. Requirement of land in the Project is very small i.e. construction of pump house, laying pipe line, trench preparation etc, in those cases where private land is required it can be secured on a volunteer basis as donations. The opportunity of installation of pump house should offer to small and marginal farmers in order to avoid centralization of power and the pump house size has decided to keep to the minimum .Water User Association will responsible for coordination with the members and make a resolution among them who can donate land as required to schemes for common benefit, considering the following stipulation and ensure proper documentation. The land requirement for different technology/ Scheme types are summarized in **Table-7.1**

Table-7.1 Land Requirement for Different Scheme Types

Scheme Type	Minimum Land Required
1.RLI (MIDI &Mini)	30 sq m /322.92 sq. ft
2.MDTW	30 sq m /322.92 sq. ft
3.LDTW	10 sq m /107.64 sq. ft
4.STW	10 sq m approx per point /107.64 sq. ft
5.PDW	5 sq m approx per point /53.82 sq. ft

258. The arrangements for making available required land are:

- Water User Association will be responsible to ensure the ownership of agreed donated land that the said property is belongs to his/her in respect of title and firm without any ambiguity. It is easy for them as they familiar with each other. The land in question must be free of squatter, encroachers, share cropping or other claims or encumbrance.

- The whole process of discussion of land donation should be documented in the meeting minutes of the Water Users Association. Support organization should facilitate the process; ensure voluntariness of the donor and donor's commitment to WUA that he/she shall not create any pressure to other members (those are using the land) directly or indirectly

- Support Organization and Assistant Engineer of the Department shall conduct enquiries as deemed necessary, to understand the land user's 'interest' / 'motive' behind the offer

to donate land for the scheme.

- The land donation will be for the sake of common benefit and with commitment to provide benefit to others and should not result in any physical relocation.

- Water user Association will accountable for complete the legal land transfer of land, land title will be vested in the government; and provision will be made for redress of grievances if any. The model declaration of donor is given in **Attachment 7.1**

- District Water Resources and Investigation Department will ensure that there shall be no adverse impacts on the livelihood of household donating the land. To avoid any adverse effect, land donated shall not be more than, 1.500sq ft viz,0.035 Acre from individual donor.(Please see the reference: Social Assessment of WBADMIP, WAPCOS)

- Redress of Grievances. The Executive Engineer, District Water Resources and Investigation Department shall address grievances, if any. If an amicable solution cannot be found at Executive Engineer level, the same shall be referred to the Superintending Engineer whose decision shall be final and binding. The State Project Management Unit will function as a supervisory in the process grievance redressed.

- It is the courtesy of Water user Association to express their gratitude note to the donor. With the consent of all members of WUA may entail some cash, location of spout or employment as pump operator etc. This gratitude note shall find a reference in and annexed to the MOU as and when it is signed.

- WUA may set Preference to waive some water charges annually considering his/her income from the particular land (donated) or some cash one time. Selection of pump operator is discouraging to connect with the land donation to avoid centralization of power (privatization of scheme).

- DPMUs will maintain records of all land donations in the format given in Table 7.2. The information needs to update for each scheme after DLIC approval.

Table 7.2: The format for keeping Record of land donation

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Project year	District	Block	Mouza	Scheme name & ID	Type of scheme	Cause of land required (i.e.pump ,house, spout, channel etc)	If it is on private land name of the owner	ST/SC/obc/Gen	Total area of land in (ha)	Plot no	Donated area in Sq m /Ac	Pl.mention type of document attached with SDMP for land transfer	Date of availability of the donated land for common use	What advantage(s) WUA is offering to the donor please mention

Tribal development plan

259. West Bengal is inhabited by a substantial number of Scheduled Tribe (ST) communities, which constitute about 5.8% of the total population of the State and about 7.8% of the rural population of the State. Tribal communities are found almost in all the districts of the State, though they are predominantly present in the seven districts of West Midinipur, Purulia, Dakshin Dinajpur, Malda, Jalpaiguri, Birbhum and Burdwan. There are in all 38 notified ST communities in the state, including the Santhal who represent more than half of the total ST population of the State. The State has three tribe communities, namely Lodha, Birhor and Toto, who have been declared as Primitive Tribal Groups (PTGs). The Lodhas are domicile of Paschim Medinipur and Sagar Block of South 24 Parganas, the Totos are domicile of Jalpaiguri district and the Birhors are found in only six villages spread across three Blocks, namely Baghmundi, Balarampur and Jhalda-I of Puruliya district. Based on predominance of ST population, the Government of West Bengal has identified 4,568 villages as tribal villages, which have at 40% of its total population as ST population and the details are given in **Attachment-7.2** Considering the relatively under developed situation of these ST villages and the need to bridge this gap, the project has proposed preparation of Tribal Development Plan (TDP) exclusively for the identified tribal villages.

260. The **Objectives** of Tribal development Plan are: (i) to ensure equitable access of project benefits to the tribal farmers in the project area; and (ii) to enhance tribal participation in WUA decision making.

261. **TDP- Coverage and Fund Outlay:** To ensure 'inclusion' of Tribal, in accordance with the World Bank's policy, a separate Tribal Development Plan (TDP) has been prepared. 13% of the total project cost should be spent for the tribal community. Details of which are available in a separate Report. Out of 4568 tribal villages 450 or 10% already covered under minor irrigation facilities thus the remaining 90% or 4000 is coming under the project purview. However seeing the resource limitation it is not possible to cover 100% tribal villages from project. Moreover there are a number of non tribal habitations uncovered (*reference TDP of WBADMIP, WAPCOS*).Considering the situation, it is called for a prioritization. The details of Fund allocation and coverage for the proposed Tribal Development Plan for WBADMIP are given in **Attachment -7.3**

262. **Special Conditions** In the TDP are :

- 13% of the total project outlay will spend for Tribal community
- In Tribal villages Chairperson and Secretary of WUA will be ST
- Ensure Tribal representative in Managing committee of WUA
- Tribal representative in (4) sub-committee (works, water management, finance and monitoring)
- 6% Lead farmer for crop demonstration should select from ST community (as per population sharing of state)
- Identify Women tribal SHG; link them with different government schemes and the guidelines to tap the fund for their own development.
- Promote Tribal women managed Water User association

263. **Convergence with other Programs and Departments:** Many Government of India (GoI) and Govt. of West Bengal sponsored programs are under implementation in the state have provisions

for supporting livelihood promotion activities. Specific emphasis has been laid in this project to achieve inter departmental coordination so that an integrated development approach can be adopted under the project by effective channelization and dovetail of funds and resources for promotion of MI based livelihoods. District Project Management unit will liaison with different department Agriculture, fisheries, SC&ST development department channelizing infrastructural and resource support from the department as well as required administrative support for the benefit of common mass under the MI system. Support organization should work as a catalyst to strengthen the process of coordination.

264. **Seeding the concept of irrigated Agriculture (Post Implementation Stage):** Generating awareness and creating a demand for participation by tribal is the key to success. Once have gathered the preliminary information about the caste composition, land distribution, agricultural practices etc encouraged people to think ways to increase their incomes. If Agriculture is the primary means of livelihood of most of the residents, it is likely that they would discuss possibilities of farm based interventions /if fisherman they would plan for aquaculture or can be mixed on farm /off farm. Encourage people who have some experience of irrigated agriculture using well/river water to express their opinion. An Exposure visit to a nearby community managed minor irrigation project can be effective for the opinion leaders to create awareness and demand among the targeted people. Establishing demonstration plot for agriculture/fisheries/horticulture linking with line department will ensure support services.

265. **Livelihood Promotion plan apart from Irrigated Agriculture:** The livelihood option of tribal's by and large divided into on-farm and non- farm based. Increasing the potential of irrigation alone may not lead the economic development as in most of the cases as their land holdings are very small. Focused on best utilization of the small land holding hence ; need to crop planning with farmers, secondary crop i.e. vegetable, and moisture induce horticulture, Agro-forestry, need to plan for common property resources i.e. grazing land for fodder, seasonal village pond for fisheries, minor forest produce they collecting like sal ,kendu leaf etc. Some of the key intervention can be sabai grass & rope making, vermin composting, kitchen garden, grafting, nursery raising, back yard poultry, goat rearing etc as per need and the expertise they have of the local area. Many Government sponsored (GoI & WB Govt.) schemes are implementing in the Project district for tribal development, need to enhance the knowledge of WUA about the different government schemes and the guidelines to tap the fund for their own development.

266. **Ensure Involvement of Women (tribal) in the Project:** In tribal society women generally play a significant role in the livelihood system as compared to other castes. Ask to the women who have land in the command area/ fishing community should involve in WUA .Women are mostly travelling long distance for collect fuel wood ask if they can plan for fuel wood with agricultural crop adopt WADI model (through convergence. Through National Rural Livelihood Mission they can tap the fund potential for livelihood in the area. Strong SHG in the command area will be supportive for regular savings, community contribution. Support organization should make conscious effort to enhance involvement of Tribal women through convergence with central sponsored scheme in the respective district.

267. The project envisages construction and installation of around 4,660 MI schemes in 333 blocks of 18 districts of West Bengal. These blocks are dispersed over four agro climatic zones of the state, viz., the Teesta-Terai zone, the Gangetic and Vindhyan alluvial zone, the undulated red lateritic zone, and the coastal saline zone. The Environmental Assessment Study for the project has shown that the projects need to address environmental issues arising out of project implementation that may have adverse impacts. The project is assessed to fall into the Environmental Category A as per World Bank OP. The EA assessed that the environmental impacts of the individual MI schemes are expected to be low and limited. Further, impacts will vary as the environmental context varies and so the direct and indirect impacts in different contexts of sensitive natural resources receptors had been analyzed by the EA. Overall, the EA assessment suggested that the project will not have any significant adverse and/or irreversible environmental impact.

268. The Environmental Assessment however identified a few sources of potential negative impacts, which include construction activities impacting flora; stream or riverside construction accelerating erosion of stream banks; increasing command areas resulting in conversion of unprotected natural habitats and wildlife corridors; lack of drainage, salinity increase, and health impacts of inundation; enhanced use of chemical and synthetic fertilizers and pesticides; and possibility of using industrial waste water for irrigation in urban fringe. The major issues related to incremental water use related to direct and indirect impacts on water quality, the issue of downstream flow, specifically in case of river lift irrigation schemes and ground water use profiles and unsustainable ground water extraction. The EA also assess the need to ensure safety of the small tanks to be created by the project.

269. The major possible project interventions creating negative impacts include the following:

- Ground water depletion due overexploitation;
- Downstream impact due to overexploitation of river water upstream;
- Lack of drainage, salinity increase, Arsenic and Fluoride contamination;
- Enhanced use of chemical and synthetic fertilizers and pesticides;
- Impacts of inundation;
- Use of diesel operated pump may resulted in air pollution;
- Protection of historical and other important remains and sites;
- Increasing command areas resulting in conversion of unprotected natural habitats and wildlife corridors;
- Construction activities Impacting flora;
- Stream or riverside construction accelerating erosion of stream banks;
- Possibility of using industrial waste water for irrigation in urban fringes; and
- Safety of the small tanks to be created by the project.

270. To prevent and protect against the above identified environmental concerns there is a need to implement mitigating measures, especially in the MI schemes that will be relatively big in size and will involving larger surface storage and construction activities. Towards this the project has developed an Environmental Management Plan (EMP) that incorporates the key findings and recommendations of the EA. The EMP contains a set of procedures for environmental management including specimen EMPs and Environmental Codes of Practice (ECoP) that will be used during project implementation.

271. The **objectives** of the EMP are: (i) to mitigate and prevent adverse environmental impacts of project implementation; and (ii) Reinforce and strengthen the beneficial environmental impacts of

project outcomes.

Statutory and Legal Compliance

272. **Central and State Government Compliance:** The project does not attract the Environment Impact Assessment Notification, 2006 of Government of India. The project or any activities proposed under the project also does not attract the provision for prior environmental clearance either from the Union or the State Government Regulators. The project has been planned in accordance to the principles set out in the following statutes: the National Environmental Policy (2006), the National Agricultural Policy (2002), the National Water Policy (2002), the National Farmers‟ Policy (2007), and the West Bengal Environmental Policy (1985).

273. However, according to the prevailing procedures, the project may require: (i) forestry clearances if any forest land is used in the construction of MI schemes; and (ii) permission for ground water use from the State Water Investigation Directorate (SWID), for all MI schemes that will use ground water. While the environmental screening criteria for the MI scheme will ensure avoiding any use of forest land it will make provision that each ground water MI scheme obtains necessary permissions from SWID for abstraction before being approved for financing. The relevant clearances / permits required before execution of a MI scheme are:

- Approvals from SWID for ground water abstraction for any groundwater MI scheme; and
- Clearance from the Divisional Forest Officer for felling and removal of trees for construction of MI schemes:

274. **World Bank OP Compliance:** The project is classified as a Category A under the World Bank environmental screening procedures specified in Operational Policy 4.01. The project triggers six of the ten World Bank safeguard policies and requires partial environmental assessments. These are:

- Environmental Assessment (OP/BP 4.01)
- Environmental Assessment (OP/BP 4.01)
- Pest Management (OP 4.09
- Physical Cultural Resources (OP/BP 4.11
- Indigenous Peoples (OP/BP 4.10)
- Safety of Dams (OP/BP 4.37)
- Projects on International Waterways (OP/BP 7.50)

Expected Output and Outcome

275. A summary of the expected output and outcome of the project EMP is given in the table below.

Table 7.3: Summary of Expected Output and Outcome of Project EMP

Outcome	Output	Activities
Environmentally Safe Site Selection	Completed Environmental Screening	• Collection of baseline environmental data • Environment Screening based on criterion and relative scoring. • Categorization of the Subproject based on scoring • Identification of subprojects on the basis of low impact & medium impact category

Outcome	Output	Activities
Environmental Mitigation Measures	Safeguard for Water Environment Protection of Water Resource	• Surface water schemes will be chosen wherever feasible over ground water. • Ground water recharge by rain water harvesting • Ensure less than 50% water abstraction for surface water flow
	Maintain Aquatic Ecology • Increased aquaculture practices like production Fish • Ground water Recharge • Employment Generation	• Water body maintenance • Aquaculture like fisheries • Restoration of existing water body
	Enhancement of Soil Quality & Productivity • Increased soil fertility • Increase food production • Employment Generation	• Soil quality testing • Soil profile base farming • Use organic fertilizer and pesticide • Balance use of chemical fertilizer
	Better Agro-Chemical Management • Increased adoption of integrated pest management practices • Reduced soil and water pollution by fertilizer and Pesticides • Better understanding on optimum use of pesticide and fertilizer	• Optimum mix of inorganic and organic fertilizer • Maximum use of Bio fertilizer and bio Pesticide • Adoption of good agriculture practices • Awareness development and training on implementation of the IPM
	Protection of Ecology • Protection of flora and fauna • Compliance as per stipulated legal provisions.	• Tree felling will be compensated by twice number of tree plantation
	Energy Efficiency Culture • This will negate the chances of pollution/losses. • Energy as well as money savings	• Installation of electric operated pump • procurement system of the pump set and other accessories will ensure highest standard of efficiency • Proper Maintenance • Promoting energy efficient pumps
	Bio-Village Program/ Good Agricultural Practices (GAP) • Increased the demand of organic fertilizer & pesticide • Comprehensive	• Production of organic fertilizer • Judicious mix of inorganic and organic fertilizer • Avoid use of synthetic pesticide as much as possible • Use of Bio- pesticide

Outcome	Output	Activities
	approach toward organic farming • Employment Generation • local entrepreneurship development • Production of organic as well as safe food	• Increase awareness of community on organic farming
	Unconventional practices • Implementation of new ideas for irrigation & agriculture • Sustainable irrigation and agriculture	• Solar power passed pump operation • Unconventional irrigation practices • Unconventional agricultural practices • Introduction of solar /sprinkler /drip /low-cost Technology
Institutional Setup, Capacity Building and Empowering Community on Environmental Management Practises	Modernization and strengthening of SWID Laboratory for water and soil testing	• Testing and Monitoring of water and soil quality
	Involvement of WUA for implementation of Mitigation Measures WUA as water regulatory authority for this subproject	• Water budgeting • Judicious use of water/water allocation • Manage crop pattern & maintenance of subprojects • Use of bio fertilizer and pesticides
	Integration Convergence of all activities in the micro and macro level	• Convergence of different activities of environments • Convergence of different activities for irrigation and agriculture • Stake holder's consultation on each activity.
	Capacity Building for Environmental Sustainability	• Training on environmental aspects • Exposure visit • Work shop • Awareness Campaign with in various stake holders

Project Interventions

276. **Environmentally Safe Site Selection:** The environment screening of MI schemes will be based on the collected baseline data. The site will be selected for the proposed MI scheme on the basis of the environmental screening criterion including exclusion criterion and relative scoring of the criterions. The selection criteria will reduce the chance of negative impact on ground water and on surface water environment and will also address all other issues related to site selection and impact of the MI scheme on the environment.

277. **Environmental Mitigation Measures:** The EMP for a typical scheme contains a set of procedures which will be implemented during the preconstruction / construction as well as in the operation phase. The EMP will be implemented through the environmental codes of practice (ECoP). A multi level structure of responsibility has been stipulated in the EMP. It will ensure mitigation and reduced negative impact on the environment caused by the MI scheme. The EMP will

deal with various attributes of environment in this regards.

278. **Safeguard for Water Environment:** At the time of selection of MI schemes, most prominent among these is the choice between the use of surface water or ground water. For each site this selection will be done carefully and surface water schemes will be preferred over ground water wherever feasible, provided that small storage schemes will be undertaken only when there is no need for acquisition of private land. There will be several cases where there will be alternative sites within the same locality. The final sites will be chosen in consultation with the local communities and depending on the environmental and hydrological characteristics.

279. In case of ground water, fall of water table is not anticipated in any of the MI schemes selected for execution as the exclusion criteria will not permit extraction of ground water in critical or semi-critical blocks. The distance between two irrigation pumps will be maintained as per SWID norms. Apart from the SWID norms and approval, options for ground water recharge will be taken up as necessary to ensure that the project is also involved in ground water recharge to protect the water environment.

280. Adverse impacts of low flow regime may occur when the same flowing waters of a stream are proposed to be used by a number of river lift irrigation schemes of minor and medium types. To mitigate the degree of impact on downstream flow-regime affecting riparian habitat and livelihood of downstream users, condition is imposed in the selection criteria to avoid any surface water based MI scheme where more than 50% stream discharge is used for irrigation.

281. **Air Environment:** During the construction of MI schemes negative impact on air quality may be felt in the construction area because of operation of machinery and movement of vehicles transporting construction materials. However, the impact is expected to be very limited and localized. Air quality is not expected to be affected much due to operation of the MI schemes since they will mostly be electric power operated.

282. **Ecology:** Sensitive areas like protected areas of wildlife sanctuaries, national parks, wetlands with rich biodiversity and reserved and protected forests etc. will not be impacted by the project as the site selection criteria will ensure that such areas are not selected for project intervention. However, tree felling during MI scheme construction may be required. If tree felling is required, it will be compensated through plantation of double the number of trees felled in the command area as per the operative regulatory framework of the State.

283. **Maintain Aquatic Ecology:** The project has provision for aquaculture intervention by creating or restoring existing surface water body. This will increase the richness of the aquatic ecology of the area as the selected species for aquaculture will be local and it will not create any stress to the existing ecology. These surface water bodies will also recharge the ground water table of the area and poise a positive impact on the water environment.

284. **Enhancement of Soil Quality and Productivity:** The project will increase soil fertility in the proposed command areas. The outcome of the increased soil fertility will impact positively on the production of food grains and employment and as a whole on the sustainable economic development of the project area. But it might also increase the use of fertilizer and pesticide and in the long run some cumulative adverse impact may be observed. The project under its ASS interventions will promote balance use of chemical fertilizer and use of bio-fertilizer, pesticide to reduce the chances of soil pollution by the project.

285. **Agro-Chemical Management:** The impact of agro-chemical pollution through intensive use of fertilizers and pesticides will require mitigation through judicious use and sustainable agriculture practices under the project. This will optimize inputs of water, fertilizer and pesticides and make the farmers aware of use of an optimum mix of inorganic and organic fertilizer and adoption of good agriculture practices. Awareness generation and training on implementation of the IPM etc. will be the deciding factor in addressing the problem of agro-chemical pollution.

286. **Pest Management:** Irrigated agriculture introduced under the project may potentially increase the use of chemical pesticides for pest control, which in turn may affect water quality at large. The project will propose a series of activities aimed to improve pest management in the project area, including discourage use of WHO Class 1B and Class 2 pesticides, encourage use of organic farming, support production and entrepreneurship development in supplying bio-fertilizers and bio-pesticides, and "Bio-village/GAP" program implementation.

287. **Study of accumulation of pesticides in food crops:** The project intends to bring approximate 139,000 ha of cultivated land to be brought under the command of surface and ground water irrigation schemes. The project will also support intensification and diversification of agricultural systems. Through the execution of this program, the cropping intensity has been proposed to be raised to the level of 200% on an average in 6 agro-climatic regions of the state, which currently is at the level of 180%. The intensification of agriculture may result in increasing use of fertilizer and pesticide which may create problem of the environment. In view of the above the WBADMIP has decided to launch a systematic study of bio-accumulation of synthetic and persistent chemicals in popular agricultural crops.

288. **Bio-Village Program / Good Agricultural Practices:** Augmenting minor irrigation in the state may potentially increase the use of chemical fertilizers (and pesticides), in turn affecting water quality at large. The rate of use of fertilizers in the state is below the national average and the recommended maximum dose is 450 kg per ha. The ratio of NPK fertilizer use in the state is balanced (2.3: 1.3: 1). Given these baseline scenarios, incremental fertilizer use induced by the project is not expected to have any significant impact. However, as a positive environmental enhancement measure, the project will support increased use of bio inputs through awareness campaigns, improved agriculture extension services and training, and through the "GAP" activities. GAP will be the means of achieving, implementation of Bio-Village program identified in the EMP.

289. The GAP will be implemented in up to 50 villages in the various agro-climatic zones in the state. In each village the targets will include converting at least 10 ha of agricultural land to organic farms. Implementation of the GAP will accelerate a shift towards enhanced use of bio-pesticides & bio-fertilizers. GAP program will have the components of (i) awareness generation of beneficiaries & their capacity building, (ii) production of bio-fertilizer and bio pesticides & (iii) supply of bio-inputs.

290. This assignment will undertake promotion of application of bio-inputs particularly bio-pesticides and production, wherever possible in the state and a series of activities aimed to improve pest management in the state, including discouraging use of WHO Class 1B and Class 2 pesticides, encouraging GAP through the use of bio-inputs, supporting production and entrepreneurship development in supplying bio-fertilizers and bio-pesticides.

291. It is expected that every household in the target area will get the benefit of latest technologies. These interventions will help to utilize the available natural resources in a better way; the environment will be free from the hazardous chemicals, hence the food safety will be ensured.

Apart from this, the effort will initiate few more activities so the productivity of the crops will increase, income of the farmers will also increase.

292. Further, the agricultural service providers –the knowledge workers will be the model entrepreneurs, thus the employment generation will be another outcome of the program. As the agricultural productivity will increase, secondary employment also will be generated for a large number of people. he program is for the village as a whole. Training will be provided to local villagers (focusing on unemployed or partially employed youth, especially from the scheduled castes and scheduled tribe communities if present in the particular village) so that they become village level service providers in implementation of the GAP program for the intended 4 years, and with an aim to continue providing the required good agricultural practice services in future. The entire activity for the implementation of the GAP is to be completed within 4 years' time. Continuation of the activities in any particular village will be dependent on achieving the annual outcomes which will be evaluated on the basis of annual report for each village (covered under the GAP) in each year. The Terms of Reference for Good Agriculture Practices (GAP) is given in Attachment 7.4

293. **Energy Efficiency Culture:** The project will preferably use electric operated pumps instead of diesel operated ones. The project procurement procedure for pump set and other accessories will ensure procurement of pumps with high standards of efficiency. In this way energy efficiency will be achieved at each individual MI scheme level. It will also negate the chances of pollution at the time of MI scheme operation. The project also provides a unique opportunity to adopt some unconventional or special interventions such as use of solar powered pump, drip / sprinkler irrigation for farming to boost for energy efficiency under the project.

Institutional Setup, Capacity Building and Empowering Community on Environmental Management Practices

294. **Modernization and Strengthening of SWID Laboratories:** Modernization and strengthening of central SWID laboratory which will provide services for testing of water and soil quality will be undertaken by the project. The tests will facilitate planning for optimal use of fertilizers and bio-chemicals under the project.

295. **Awareness Campaign:** A special drive on awareness building on environment and various related issues will be propagated in a systematic manner with in the various groups. And in totality it will help to improve environmental quality as a whole.

Involvement of WUA: WUA will be responsible to prepare and maintain crop plans and water budget for their command area, which will show the total water abstraction and production of crops in a season. They will be the authority who will allocate water to the farmers in accordance with the crop type and water availability. They will also manage the cropping pattern in their command area on the basis of the soil profile and availability of water for irrigation. Ultimately the WUA will need to manage demand supply of the water and act as the water regulatory authority in their command areas.

296. **Capacity Building of Project Staff for Environmental Sustainability:** To effectively implement the project EMP training and capacity building of project staff and WUAs will constitute an integral and critical project intervention under the EMP. This will enhance the awareness, knowledge and skill level for all project stakeholders. Ultimately training and capacity building will help in implementation of efficient irrigation, good agriculture practices and maintain

environmental sustainability.

Intervention Area Selection Criteria

297. MI schemes included under the project will not require environmental clearance either from the Ministry of Environment and Forests, Government of India or the Department of Environment in the State Government. The project may however require some permission under the regulatory framework of the State such as for ground water abstraction or tree felling. To ensure that the MI schemes being constructed under the project do not under any circumstances cause any significant adverse impact on the environment the project will adopt strict MI scheme site selection criteria.

298. **Selection of MI Scheme Site:** The selection of a MI scheme site will be guided by the site screening criteria developed for the project.

Socioeconomic criteria:

- There is demand from farmers for development of a subproject of minor irrigation at the site and beneficiaries are willing to take over operation of such projects.
- Farmers with the support of the Agriculture Department are well disposed towards implementation of integrated pest and nutrient management
- Abstraction of water from water bodies coming under the definition of 'debottar land' need to be avoided unless the local communities permit use of such water voluntarily.
- The proposed sub-project at the site normally should not involve any land acquisition

Ecological criteria:

- The reservoir and water detention structures do not impact any wildlife protected area. Water bodies identified as habitats of good population of wetland birds or waterfowl should not be proposed for development of surface irrigation sub-projects under this program.
- The site should not encroach into the protected area around preserved archaeological monuments and historical sites.

Technical criteria:

- In case of gravity surface flow schemes the catchments of the proposed reservoir should be reasonably free from signs of rilll, sheet or gulley erosion
- Signs of impeded drainage, water-logging or flooding normally be absent at the proposed site of reservoir/ water detention structures and the CCA.
- Construction of major access roads for haulage of materials for construction can be avoided for execution of the sub-project
- The magnitude of excavation works is manageable keeping in view the problem of disposal of solid waste in the immediate project surround.
- In case of river lift schemes , sites close to banks with signs of bank erosion normally should be avoided

299. **Selection Criteria:** All MI scheme sites identified under the project will be selected on the following criteria.

Table 7.4: MI Scheme Selection Criteria

Criterion	Particulars
Criterion I	Siting of the project with reference to environmentally sensitive areas which will include protected area network including wildlife

	sanctuaries, national parks, natural habitats including reserved forests/protected forests, wetlands of national and international importance, sacred groves of significant bio-diversity, wild elephant corridors etc.
Criterion II	Status of ground water availability
Criterion III	Degree of Arsenic contamination in the aquifers/Block
Criterion IV	Degree of Fluoride contamination in the aquifers/Block
Criterion V	Irrigation water quality determined by parameters of pH, EC (electrical conductivity), SAR (Sodium absorption ratio) and Boron as set by Central Pollution Control Board,
Criterion VI	Degree of impact on downstream flow-regime affecting riparian habitat and livelihood of down- stream users
Criterion VII	Presence or absence of historic and archaeological remains preserved under the provisions of the Ancient Monuments and Archaeological Sites and Remains (Act), 1958
Criterion VIII	Possibility of energisation with electrical sources of power

Classification of criteria by MI scheme type:

- Criterion I, II, III, IV, V, VII & VIII are relevant for MI schemes proposing ground water abstraction;
- Criterion I, V, VI, VII & VIII are relevant for surface flow or river lift irrigation MI schemes.

Each selection criteria may be rated on the scales suggested below.

Table 7.5: Rating Scale for MI Selection Criteria

Criterion	**Scale**			
	0	**1**	**2**	**3**
Criterion I	Present beyond 500m	present within 251m to 500m of CCA or Head works and the reservoir	Present within 101m to 250m	Present within 100m
Criterion II	Safe	Semi critical	Critical	
Criterion III	Present within permissible limits of 10µg/l as approved by WHO	present within permissible limits of 50 µg/L as approved by the country	present beyond permissible limits of 50µg/l as approved by the country	
Criterion IV	present within permissible limits of 1mg/l as approved by BIS	present within limits of > 1.mg/l < 1.5mg/l	present beyond > 1.5mg/l	
Criterion V	All parameters well within CPCB	SAR > 20 and < 26 and EC at 25º C	one or more of parameters	

Criterion	Scale			
	0	1	2	3
	standards; EC at 25º C < 2000 micromhos /cm and SAR < 20	>2000 and < 2250 micromhos/cm and other parameters within CPCB standards	exceed CPCB standards	
Criterion VI	less than 10% stream discharge is used: adverse impact imperceptible	11-30% stream discharge is used: adverse impact low	31-50% stream discharge is used: adverse impact moderate	more than 50% stream discharge is used: adverse impact irreversible and significant
Criterion VII	present beyond 500m	present within 251m to 500m	present within 101m to 250m	present within 100m
Criterion VIII	Available	Available on short term of 2 years	Available on midterm of 5 years	likely to be available beyond 5 years

300. **Categorization of MI Schemes**

Ground Water based MI schemes:

- Low Impact Category: Ground water abstraction MI schemes having score of 0 to 10 can be categorized as low impact category scheme;
- Medium Impact Category: MI schemes scoring 11 to 13 will be categorized as medium impact category scheme.

Surface Water based MI schemes:

- Low Impact Category: Surface water MI schemes having scores of 0 to 8 will be categorized as low impact category scheme;
- Medium Impact Category: Surface water MI schemes having scores of 9 to 10 will get categorized as medium impact category scheme.

301. **Exclusion Criteria**

Based on selection Criteria:

- All ground water abstraction MI schemes having scores of 2 against one or more of criteria II , III, IV , V shall not be taken up for execution because of likely adverse impacts on ground water depletion, soil quality and on human and livestock health through arsenic and fluoride intake through food chain;
- All surface water MI schemes (surface flow or river lift) having scores of 2 against criterion V shall not be taken up for execution. Similarly all surface water MI schemes having scores of 3 against criterion VI will be avoided as execution of such sub-projects may have irreversible adverse impact on down stream flow regime, infiltration rate and crop productivity;
- All MI schemes requiring diversion of areas included in protected areas like sanctuaries and national parks should not be considered for execution as diversion of such areas is a very sensitive issue with the Ministry of Environment and Forests of the GOI and getting clearance for such projects is a time consuming process involving even the Supreme Court

of the country under the orders in force.

Apart from above listed exclusion criteria:

- No MI scheme will be located within any natural habitat, protected or not, such as wetlands, elephant corridors, mangroves, or community forests;
- No MI scheme will be located within or within one km of any protected natural habitats, such as reserved forests, national parks, or wildlife sanctuaries;
- The traditional common property resources or ponds (which may contain niche habitats of wetland birds or rare, endemic, or threatened flora and fauna) will be identified and avoided;
- Any MI scheme, particularly river lift irrigation schemes will be avoided if the relevant river / rivulet enter a downstream protected natural habitat within 2 km of its abstraction point, so as not to disturb flow of water into the protected natural habitat.

302. **Mitigation Measures for Low Impact Category MI Schemes:** The Generic Environment Management Plan (EMP) and the Environmental Code of Practice developed for project execution suggesting mitigation measures for low impact category MI schemes both at the construction and the operation phase. However, specific EMP will need to be prepared for each individual low impact category MI scheme to address the specific issue related to the scheme.

303. **Mitigation Measures for Medium Impact Category MI Schemes:** MI schemes categorized as medium impact category will require limited Environmental Assessment and terms of reference for the assessment have been stipulated in the project ECoP keeping in view the guidelines of the World Bank. Under this EA a MI scheme specific EMP will be prepared for mitigation of the identified environmental impacts.

Reporting and Monitoring

304. Reporting and monitoring will play an important role for effective implementation of the EMP. Proper reporting will ensure smooth functioning and implementation of the multi level EMP. Regular monitoring will provide updated status on EMP implementation and also it will be instrumental to find out deviation and required corrective measures. Based on monitoring system a MIS based reporting system for the EMP will be developed. The EMP includes two types of monitoring viz. one for implementation of different types of activities involved in environment management and second on monitoring of environmental parameters to ensure that there are no adverse impacts. The environmental parameters monitoring will supplement different activities under the environment management as an instrument.

305. **Steps of Monitoring**

The first step in monitoring will be the implementation of mitigation measures included in the EMP to ensure that the MI scheme has minimally effect on the environment in the project area both during the construction and in the operation phase. The second step will be the monitoring of key environmental parameters to assess the effectiveness of mitigation measures suggested in the EMP to avoid contingent situations arising in the future because of commissioning of the MI scheme.

306. **Monitoring of Mitigation Measures:** Monitoring of mitigation measures has to be undertaken during the pre-construction and construction phase as well as during the initial years of MI scheme operation. In the pre-construction phase monitoring will lay stress on the following issues:

- Siting of the project with reference to criteria as suggested in the ECoP;

- If required, establishment of construction camps and storage areas keeping in view the provisions under ECoP;
- Site preparation works have to be monitored primarily with reference to ECoP.

307. **Activities in the Construction Phase:** Activities in the construction phase will revolve around procurement of raw material from identified sources, their transportation and storage at the site of construction and undertaking construction of intake, head works, water detention structures, pump house, distribution towers, laying of conveyance pipes with attendant spouts, construction of surface channels for distribution, etc. Construction activities will also include excavation and construction of embankments. All these activities will generate some adverse impacts on the environment, which can be mitigated through the implementation of MI scheme specific EMP. In accordance with ECop provisions, monitoring during construction phase will focus on the following;

- Procurement, transportation and storage of materials;
- Erosion and sediment control: This may be an issue in gravity surface flow projects of medium and major category and this activity has to be guided by the norms;
- Water Quality: This will be an important issue for all ground water and surface water projects particularly in cases where the MI schemes are located in an existing surround of intense agriculture development or located close to industrial and urban areas. As many of the MI schemes will also get located in identified blocks affected by arsenic and fluoride, there is need to create benchmarks for water quality criteria before taking up implementation of scheme. The ECoP has prescribed norms for prevention of degradation of water quality, which will be monitored;
- Flora and fauna: This will be a minor issue for low impact category projects and if required it will be addressed by compensatory plantation on identified lands in the project influence area as per guidelines of the regulatory framework of the State;
- Air Quality: ECoP has suggested measures for control of air pollution. This impact will be localized, temporary and low;
- Noise level: This impact will also be low, localized both during the construction and the operation phase.

308. Decommissioning and operation phase monitoring activities will concentrate on:

- Closure and rehabilitation of borrow pits and quarries opened up for the project;
- Closure and rehabilitation of construction camps opened up at the project site;
- Monitoring of environmental quality parameters like water quality, siltation rate at the reservoir site.

309. **Environmental Parameter Monitoring:** Monitoring of environmental quality has to be carried out during the construction and operation phase. Monitoring needs to be conducted in accordance with the MI scheme type and the environmental condition prevailing in the scheme site. The environmental parameters that need to be monitored including the site of monitoring, frequency and responsibilities for carrying out such monitoring are detailed out in the EA report and will be included in the MI scheme EMP as part of the SDMP.

Environmental Audit

310. Environmental Audit will be carried out in the project to find whether all EMPs have been implemented properly. The audit will cover all districts where project is being implemented. The

audit report will be used to improve the implementation of EMP. The EMP may be modified as per findings of the audit report. This audit will be undertaken by an external agency before the end of the second and the fourth year of the project.

Implementation Arrangements

311. **Environmental Screening for Site Selection:** Before selection of a MI scheme a survey will be conducted using the Rapid Environmental Checklist annexed with ECoP. This Checklist needs to be filled up by the SO and DPMU staff as the first step for proposing a MI scheme site for implementation. The area covered during this survey should be 3 to 6 times of the command area of the proposed MI scheme. For small isolated ground water structures like shallow tube wells, light capacity tube wells, dug wells, tanks and mini RLIs or surface flow schemes it should normally be 3 times whereas for medium /major RLIs or surface flow schemes the area covered should be 6 times or more of the CCA depending on the environmental sensitivities of the project surround.

312. **Preparation of MI Scheme Proposal:** The DPMU engineers will prepare the MI scheme proposal using the rapid environmental survey steps and consultation with the local communities as detailed in the ECoP. Irrigation water quality parameters will be checked with the help of SWID. SAR may be determined only for MI schemes to be located in saline blocks.

313. **Verification of Proposal and Categorization:** The DPMU Executive Engineer will verify the checklist and carry out categorization of the MI scheme using the screening criteria and the scale of categorization. In undertaking this exercise he will obtain advice from the DPMU Environmental Engineer / Environmental Specialist where they are located.

314. **Permission for Implementation;** The DPMU will permit implementation of low impact category MI schemes and the appointed contractor will have the responsibility of implementing the provisions of the Generic EMP provided in the ECoP. For medium impact category MI schemes the DPMU will undertake a limited EA of the proposed scheme with the assistance of the DPMU Environmental Engineer / Environmental Specialist. MI scheme specific EMP will be prepared by the DPMU and stipulated. The contractor will be responsible for implementation of the MI scheme specific EMP as per stipulation in the construction phase.

315. **Incorporation of Environmental Management Requirement in Bidding Document:** While preparing the bid document, the DPMU will ensure that:

- The Environmental Management Plan is made as appendices to the bid document in case of low and medium impact category projects, respectively;
- The bid document has specific requirement for the contractor to implement all mitigation measures to minimize environmental impacts during the construction phase;
- The contractor shall have the responsibility of restoration of campsites, borrow pits and quarries opened up for procurement of materials at the stage of decommissioning. Abandoned bore wells will need to be filled up properly with proper filler materials by the contractor.

316. **Site Preparation Activities by the Contractor:** After the site has been handed over to the contractor by the DPMU, the contractor will be required to submit schedules and methods of operation of various items during the construction stage for approval by the DPMU. He shall also take care to keep the local communities and the Gram Panchayat informed. The contractor shall take up execution only on approval of schedules by the DPMU. During site preparation activities, following norms should be observed:

- The clearance of site shall involve removal of all materials such as trees, shrubs, roots, part of top soil and rubbish. The measures to be adopted by the contractor will include measures like limiting the surface area of erodible earth material exposed by clearing and grubbing and conservation of top soil and stock piling the same for future use;
- All trees above 30 cm bhg requiring removal shall be inventorised prior to taking up clearing and grubbing operation;
- To minimize adverse impact on flora and vegetation cutting of trees and vegetation will be restricted to the minimal area required for construction;
- The location for disposal of grubbing will be finalized well ahead of the date of actual construction works at the site. Where erosion or sedimentation is a problem, grubbing operations should be so scheduled so that erosion / sediment control plan can follow grubbing operations;
- Use of blasting for rock cutting will only be resorted to if absolutely necessary. This has to be carried out in such a manner so as to ensure that it does not destabilize slopes and initiates movement of rock mass. All precautions need be taken to avoid damage to any public or private properties. Proper dissemination of information amongst the communities has to be ensured and warning signs put up.

Responsibility for Implementation of EMP

317. EMP for low and medium impact category MI schemes are provided in the project ECoP. The DPMU and the appointed contractor will share the responsibility of carrying out such monitoring at the time of construction, while at the time of operation of the MI scheme the WUA and DPMU will be responsible for environmental monitoring.

Role of DPMU: In each DPMU, an Assistant Engineer or an Executive Engineer will be in-charge for implementing the EMP with support from a full-time environmental specialist who will ensure that all environmental mitigation and management measures are fully implemented.

Role of SPMU: At the SPMU, a distinct safeguard management unit will be formed with environmental (and social) specialists. The responsibility of the unit will be to:

- Review and inspect implementation of the EMP;
- Review and verify the environmental screening of the candidate MI schemes, including sample field verification;
- Implementation of the environmental capacity building and awareness activities;
- Coordinating with relevant departments with respect to the larger state-wide issues of water quality including heavy metal, arsenic and fluoride contamination; water efficiency, reducing energy use in irrigation, promoting renewable energy in irrigation, integrated pesticide and nutrition management; and Managing the environmental audit process.