Government of Tamil Nadu

AGRICULTURAL ENGINEERING DEPARTMENT

TN IAMWARM PROJECT

PENNAIYAR UPTO KRISHNAGIRI SUB BASIN

4. AGRICULTURAL ENGINEERING DEPARTMENT

4.1. Objectives

The foremost Objective of Agricultural Engineering Department is to **increase the income** of the farming community. The second objective is **Water savings** and the third one is **Labour savings.** These three goals are achieved by adopting the following methodologies.

- Introduction of Micro Irrigation System
- Laying Drip Irrigation system with Fertigation and Fogger in Poly House
- Introducing gender friendly implements & machineries for ergonometric farm operations.
- Aquaculture in the Farm Ponds

4.2. Approaches

4.2.1. Micro Irrigation

Water application efficiency is improved by promoting water saving technologies like **Micro Irrigation** systems

- By introduction of Micro Irrigation System, i.e. Laying Drip & Sprinkler Irrigation systems

- Water is applied to the root zone of the crop, at required quantity, at required interval. By this, total vigor of the crop and hence the **Yield is increased.**

- Weed growth is limited around the plant and hence **expenditure on Weeding is reduced.**

- **Cost of Labour** for irrigation is **reduced.**

- Capital investment can be returned within 3 crop seasons.

Drip Irrigation system is proposed in **44%** of the existing Horticulture crops, **15%** Coconut areas (Due to Border Planting) i.e. [**Without project]** and for 56% of

the Horticulture crops under area expansion i.e. [**with project**] **subject to the assurance of crop Diversification by the concerned departments and availability of water sources.** Detailed discussions with Agriculture and Horticulture Department staff were made in this regard to finalise the areas.

4.5.2. Farm Mechanisation

- Promoting labour saving and gender friendly implements & machineries for easy farm operations.
- Banana Plantation is proposed over an area of 98 Ha adding 60 Ha to the existing 38 Ha. Out of which 45 Ha is proposed to be brought under Drip Irrigation which requires Broad bed & furrow type of irrigation under precision farming. Hence 15 Nos of Broad bed & furrow formers are proposed to purchase and distribute among WUAs for letting to farmers at economical rates.
- In Banana and Vegetable cropping area clumps are to be uprooted and disintegrated and ploughed. Rotavators are being used for the above purpose. Hence 15 Nos of Rotavators are proposed to purchase and distribute one each to the WUAs for letting to farmers at economical rates.
- Chisel plough cuts opens virgin soil up to a depth of 45 cms. Hence every water drop that falls on soil is captured & moisture is conserved insitu. Hence 15 Nos of Chisel ploughs are proposed to purchase and distribute one each to the WUAs for letting to farmers at economical rates.
- Water User's Associations, Agricultural Department and TNAU were consulted before proposing labour saving and gender friendly implements and machineries. The machineries and implements which are purchased will be handed over the WUAs according the cropping area. They will assure efficient operation and maintenance of the machineries and implements besides letting them to farmers at reduced tariff rate.
- Due to this, the farmers will effectively carry out the farm operations without excess dependence on labour force, since the urbanization and industrialization being occurred in the sub-basin area.

4.5.3. Farm Ponds

Construction of Farm Ponds in the farmer's field to harvest the excess run-off. Water input will be augmented through Open/Tube wells to the farm ponds. Aquaculture is done with the technical and input assistance from Fisheries Department for additional income of Rs 10,000/- per crop.

- 15 Nos of Farm Ponds are proposed @ Rs 40,000/-
- Joint inspection of the Farm Pond sites was done along with the Fisheries Department staff to assess the availability of Open well / Bore well for supplemental water supply during dry season. This will ensure low mortality rate and higher fish production. Marketing mechanism for fish has also been ascertained.
- The Farm Ponds are constructed normally in the dimension of 30Mx30Mx1.50M (subject to change according to the field suitability). The capacity of a farm pond would be 1350 Cubic meters, with the help of 13.50 lakhs liters of water, an extent of 3.70.0 hectares under dry irrigated crops like maize, millets, and pulses shall be given life saving irrigation. The Farm Ponds will have 4 to 6 fillings of rainwater during one-year period due to all monsoonal rains

4.6. Information, Education, Communication and Capacity Building:

Agricultural Engineering Department (AED) has planned to reach 400 farmers in Ponnaiyar – Upto Krishnagiri Sub-basin though IEC and Capacity Building Activities. The IEC and Capacity building programmes would aim at transforming the technical aspects of micro-irrigation to farmers to achieve "more profit per drop of water". Through initiating and facilitating transformation process from Conventional Irrigation to Modern Irrigation methods among farmers, the gap area is reduced to nil thus ensuring Irrigated Water to all farmers.

Capacity building programmes for this Sub-basin would focus on two major components, viz, 1. Change Behaviour and 2. Technical input. Both the components would find their respective places at two levels namely village and cluster. However, training efforts at village level would focus more on "Change Behaviour", while training programmes at cluster level would give priority for "Technical input". "On

field training” will be organized at regular intervals to ensure proper maintenance of MIS (Micro Irrigation System).

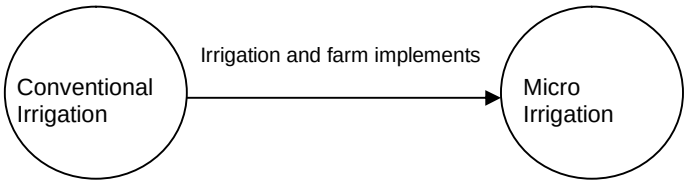
Village meetings and campaigns have been proposed for sensitizing farmers on the need for Micro Irrigation Methods and practices. Exposure visits at cluster level would be appropriate to facilitate farmers to be convinced that it is possible to change their Irrigation practices for sustainable usage of water resources. Demonstrations and on the site trainings at the village level would be organized to introduce Micro Irrigation Systems followed by workshop at cluster level to impart pertinent skills.

Follow-up visits have been proposed at regular intervals to substantiate and fine-tune the skills that have been imparted in exposure visits and on the spot trainings. Follow-up visits would also be focused on enhancing the confidence levels of farmers in order to motivate them for continuous application of new skills and methods in their fields.

The sequence of the IEC and Capacity Building Prgrammes is as enlisted below.

1. Village meetings and Campaigns for sensitizing farmers through IEC (Local Cable TV, Posters and Hoarding, Pamphlets and leaflets etc)
2. Exposure visits to places where MIS has been successful and fetching farmers good profit. Exposure visits will also be organized to places of “Farm Ponds”.
3. Workshop / Seminar for selected farmers to be trained as trainers. These farmers would function as Change Agents at the villages level and will be resource persons for all village level training programmes.
4. On site trainings will be organized at villages to train farmers on “Operations and Maintenance of MIS”.
5. Besides farmers, youth and SHG members will be identified to be trained in “Operations and Maintenance of MIS” as it would provide them opportunities for their livelihood.

4.6.1. Village Level, Component 1, Change Behaviour



One day awareness campaigns have been planned in sub-basin villages of focus crops to cover as many farmers as possible. The campaigns will be organized in the evenings in order to cover more farmers. IEC materials will be of greater use for campaigns and village meetings. Guidelines will be provided for this purpose. Field level demonstrations with modern farm implements and IEC materials have also been planned. These demonstrations will be organized at selected villages.

4.6.2. Village level, Component 2, Technical Input

The next stage of the Capacity building process would be to introduce Micro Irrigation System in the villages and equip farmers on its operation and maintenance. One day workshop will be organized at selected villages, where Drip and Sprinkler Irrigation Systems have already been installed and functioning well, for farmers to impart skills pertaining to Operation and maintenance. Followed by one day workshop, “On the site” training programmes will be organized at regular intervals at selected villages to cover as many farmers as possible to impart skills pertaining to Operation and Maintenance of Micro Irrigation System and utilization of modern farm implements.

4.6.3. Cluster level, Component 1, Change behaviour

To strengthen the “Change Behaviour Efforts”, Exposure visits will be organized in collaboration with Horticulture Department for different batches.

4.6.4. Cluster level, Component 2, Technical Input

Farmers will be selected to be trained as Master trainers and consultants on Operation and Maintenance of Micro Irrigation System. These farmers will be involved as Resource persons along with AED Officers for Capacity Building Programmes for technical input at village level. An exposure visit will also be organized for facilitating farmers to have Farm Ponds in their agriculture fields. Unemployed youth and SHG members will be identified to be trained in workshop to

impart skills on Operation and Maintenance of Micro Irrigation System and Modern Farm Implements. The Assistant Engineers and Junior Engineers will have to ensure the inclusion of small and marginal farmers from marginalized communities in all their capacity building farmers will be identified and motivated to participate in the training programmes.

4.7.Training Matrix

Component 1. Change Behaviour

	Training content	Time frame	No.of trainees	Type of CB Programme	Who will do it	Duration and Location
Village Level	Sensitizing farmers on the need for "Water Conservation – Micro Irrigation.	February 2008	All villages in Sub-basin	Village Campaign, Village level meetings.	Asst. Engineer And Junior Engineer.	One day, at selected villages.
	Further Sensitising farmers on the need for water conservation – Micro irrigation.	March 2008	600 farmers	Filed Demonstrations with IEC materials.	Asst. Engineer and Junior Engineer	One day, at a village that accessible to all trainees.
Cluster Level	Facilitating farmers to have Farm Ponds in their fields.		100 farmers	Exposure visit		Two days,
	"Seeing is believing" – Micro Irrigation Fields(Flowers)	April 2008	80 farmers in 4 batches	Training Exposure visit	Asst. Engineer and Junior Engineer.	One day, Saragapalli (within the district).
	"Seeing is believing" – Micro Irrigation Fields (Vegitables with drip)	April 2008	80 farmers in 2 batches	Training Exposure visit	Asst. Engineer and Junior Engineer.	Two days, Somanahalli(Out side district)
	"Seeing is believing" – Micro Irrigation Fields (Vegetable with Sprinkler)	May 2008	40 farmers	Training Exposure visit	Asst. Engineer and Junior Engineer.	Two days, Kuppam, Andhra(Out side State)
Component 2: Technical						
Village level	Use of Improved Farm Implements	April 2008	400	On the site training.	Asst.Engineer and Junior Engineer.	One day at selected villages.
	Operation and maintenance of Drip and Sprinklers.	April 2008	400	On the site training	Asst.Engineer and Junior Engineer.	One day at selected villages.
	Follow-up of Capacity building programmes.	June – July 2008	400	On the site training.	Asst.Engineer and Junior Engineer.	At the focused crop villages.
Cluster Level	Operation and maintenance of Agricultural implements and machinery	May 2008	60 in two batches.	Workshop	Asst.Engineer and Junior Engineer.	One or two days at selected village.
	Operation and maintenance of Farm Implements and MIS to Unemployed youth, SHG members.	October – November 2008	50 in two batches.	Workshop	Asst.Engineer and Junior Engineer.	One or two days at selected villages.

4.7.3. Estimated Budget

	Training content	Description of the cost		Total in Rs
Component 1. Change Behaviour				
	Sensitising farmers on the need for water conservation – Micro irrigation.	IEC materials		62500
		Telecasting in Local Cable TV	30000	
		Printing of Pamphlets	20000	
		Wall Paintings	5000	
		Hiring of Street theatre team	5000	
		Others	2500	
Cluster Level	Two days exposure visit for 25 farmers – to facilitate them to have Farm Ponds.	Food: 25 farmers x Rs 100 x 2 days	5000	22500
		Accommodation: 25 farmers x Rs 100 x 2 days.	5000	
		Travel: 25 farmers x Rs 300	7500	
		Incidental: 25 farmers x Rs 100 x 2 days	5000	
	Exposure visit to Micro Irrigation Fields – One day (Tapioca with drip) Within the district.	Traveling expenses 80 farmers x Rs 100	8000	24000
		Food expenses 80 farmers x Rs 100	8000	
		Incidentals: 80 farmers x Rs 100	8000	
	Exposure visit to Micro Irrigation Fields – two days. (Turmeric with drip) Outside the district.	Food: 80 farmers x Rs 100 x 2 days	16000	56000
		Traveling: 80 farmers x Rs 100	8000	
		Accommodation: 80 farmers x Rs 100 x 2 days.	16000	
		Incidentals: 80 farmers x Rs 200	16000	
	Exposure visit to Micro Irrigation Fields – 3 days. (Vegetable with Sprinkler) Outside the State.	Food: 40 farmers x Rs 100 x 3 days	12000	48000
		Travel: 40 farmers x Rs 300	12000	
		Accommodation: 40 farmers x Rs 100 x 3 days	12000	
		Incidentals: 40 farmers x Rs 300	12000	
Component 2: Technical				
Village level	On the site training on Use of Improved Farm Implements and Operations and maintenance of MIS	Incidentals: 400 farmers x Rs 30	120000	120000
Cluster level	Two days Workshop on Operation and maintenance of Agricultural implements and machinery – 30 farmers	Food: 30 farmers x Rs 100 x 2 days	12000	45000
		Travel: 30 farmers x Rs 50	3000	
		Incidentals: 30 farmers x Rs 200	12000	
		Hall Rent: Rs 5000 x 2 batches	10000	
		Training materials: 30 farmers x Rs 100	6000	
		Resource Persons: Rs 500 x 4	2000	
	Two days Workshop on Operation and maintenance of Farm Implements and MIS to Unemployed youth, SHG members.	Food for 50 participants X Rs 100 x 2 days	10000	22000
		Traveling expenses 50 participants x Rs 40	2000	
		Incidentals: 50 participants x Rs 200	10000	
Grand Total				400000

4.8. Expected outcome:

The following benefits will be derived from ayacut area development works under IAMWARM project.

- Improved irrigation efficiency upto 40% resulting in enhanced farm productivity Per unit of irrigation water
- The gap area 2173 Ha will be bridged up.
- Sustained farm income to the farming community through Fish culture and by introducing high yielding crops
- The farm productivity per unit area will be increased by introducing modern Irrigation practices
- Improvement in socio-economic status of the farmers as their income is increased, technical knowledge of information is improved. And their mind set is changed due to exposure visits.

The tables showing the crop wise proposed area for micro irrigation system he abstract of work components, component / year wise proposals are enclosed in the annexure 4.9 to 4.11.

4.9. Cropwise Micro Irrigation proposed for Pennnaiyar upto Krishnagiri

Sl. No.	Name of Crop	Without project area in Ha	Area under crop diversification in Ha	With Project area in Ha	Existing area under Drip/Sprinkler (Ha)	Area proposed by TNAU (Ha)	Balance area available (Ha)	Proposed by AED for micro irrigation (Ha)	
								Drip	Sprinkler
1	2	3	4	5	6	7	8	9	10
I	ANNUAL CROP								
1	Coconut	69	0	69	0	0	69	10	0
3	Banana	38	60	98	0	25	73	45	0
4	Mango	36	110	146	0	0	146	78	0
	TOTAL	143	170	313	0	25	288	133	0
II	I CROP			0			0		
1	vegetables	150	174	324	0	40	284	120	70
2	Flowers	0	80	80		20	60	30	20
	TOTAL	150	254	404	0	60	344	150	90
	GRAND TOTAL	293	424	717	0	85	632	283	90

4.10 COST ESTIMATE FOR PENNAIYAR UPTO KRISHNAGIRI

Components Proposed	Unit	Unit Cost (Rs.)	Physical (Ha./Nos.)	Total Project Cost (Rs. In Lakhs)	Project expenditure (Rs. In Lakhs)	Farmers' co financing
MICRO IRRIGATION						
Drip Irrigation with fertigation for Horticultural Crops						
Without Project Area						
Fruit crops						
Banana (2X2M)	Ha	49,800	20	9.96	4.98	4.98
Mango(10mX10m)	Ha	18,000	18	3.24	1.62	1.62
Hybrid Vegetables						
Vegetable (1MX1M)	Ha.	57,600	60	34.56	17.28	17.28
Total			**98**	**47.76**	**23.88**	**23.88**
Area Expansion Program						
Fruit Crops						
T.C.Banana (1.5X1.5M)	Ha	55,000	25	13.75	6.88	6.88
Mango(10mX10m)	Ha	18,000	60	10.80	5.40	5.40
Hybrid Vegetables		57,600	60	34.56	17.28	17.28
Flowers		57,600	30	17.28	8.64	8.64
Total			**175**	**76.39**	**38.20**	**38.20**
Total For drip Irrigation			**273**	**124.15**	**62.08**	**62.08**
Sprinkler Irrigation System						
Without Project Area						
Vegetable (1MX1M)	Ha.	15,000	30	4.50	2.25	2.25
Total			**30**	**4.50**	**2.25**	**2.25**
Area Expansion Programme/ Impact Area						
Hybrid Vegetables		15,000	40	6.00	3.00	3.00
Flowers		15,000	20	3.00	1.50	1.50
Total			**60**	**9.00**	**4.50**	**4.50**
Total For Sprinkler Irrigation			**90**	**13.50**	**6.75**	**6.75**
Drip Irrigation with fetigation for Agricultural Crops						
Coconut(8Mx8M)	Ha	19900	10	1.99	1.00	1.00
Total			**10**	**1.99**	**1.00**	**1.00**
Grand Total for Micro Irrigation			**373**	**139.64**	**69.82**	**69.82**
FARM MECHANISATION						
Broad Bed Furrow Former	No.	55,000	15	8.25	8.25	
Rotavator	No.	90,000	15	13.50	13.50	
Chisel Plough	No.	16,000	15	2.40	2.40	
Total			**45**	**24.15**	**24.15**	
Farm Ponds	**No.**	**50,000**	**50**	**25.00**	**22.50**	**2.50**
IEC & CB-Components				**4.00**	**4.00**	
GRAND TOTAL				**192.790**	**120.470**	**72.320**
Ayacut Area	**Ha.**		**4481.53**	`		
Project Investment(Rs. In lakhs)			**120.470**			
Cost Per Ha.(Rs.)			**2688**			

4.11 ACTION PROGRAME FORPENNAIYAR UPTO KRISHNAGIRI

Financial in Rs Lakhs

Sl. No	Name of Work component	Proposed Area (Ha)/ Nos.	Financial in Rs.lakhs	I Year		II Year		III Year	
				PHY	FIN	PHY	FIN	PHY	FIN
1a	DRIP IRRIGATION SYSTEM (Ha)	283.00	126.14	108.00	49.75	100	39.17	75	37.22
1b	SPRINKLER IRRIGATION SYSTEM (Ha)	90.00	13.50	30.00	4.50	30	4.50	30	4.50
I	MIS Total	373.00	139.64	138.00	54.25	130.00	43.67	105.00	41.72
II	FARM MECHANISATION	45	24.15	45	24.15	-	-	-	-
III	FARM PONDS	50	25.00	50	25.00				
IV	INFORMATION,EDUCATION & COMMUNICATION AND CAPACITY BUILDING		4.00		2.00	-	1.50	-	0.50
	GRAND TOTAL		**192.79**		**105.40**	**130.00**	**45.17**	**105.00**	**42.22**

for Chief Engineer(AE)