Report on Best Practices being followed in Water Resources/Irrigation – Ramthal Micro Irrigation, Karnataka

1. *Introduction*

Ramthal is a village located in Hundgund Taluk, Bagalkote District of Indian State of Karnataka. Being a water-stressed state, the Government of Karnataka (GoK) realizes the significance of water conservation. In its quest to derive maximum benefit out of the limitedly available water resource, it is actively engaging with farmers and extending efforts for enhanced farm productivity by employing methodologies that increase water use efficiency.

Efficient use of water in command areas under canal irrigation will not only increase crop productivity but also increase its availability over a larger area of land. In view of this, the GoK has launched Asia's largest drip irrigation programme under Stage II of Ramthal (Marol) Lift Irrigation Project in 2017.

Figure 1 Location of Ramthal in Karnataka

The project is based on the unique concept of integrated micro irrigation. As per which, water is to be delivered directly using HDPE / PVC piping network to irrigate about 60,000 acres. About 20,000 farmers in Hungund taluk in Bagalkot district are benefited from this project. Whereas conventional irrigation system could have only irrigated 30,375 acres, the use of drip irrigation has almost doubled the area of irrigated land by an additional 29,625 acres.

2. *Salient Features of the project*

Ramthal (Marol) Micro Irrigation Project is the one of the largest of its kind Drip Irrigation Project in Asia. Implementation of this project will result in economical use of water, increase in irrigation potential and yield, and all these benefits will together contribute to improving the economic status of farmers in the region.

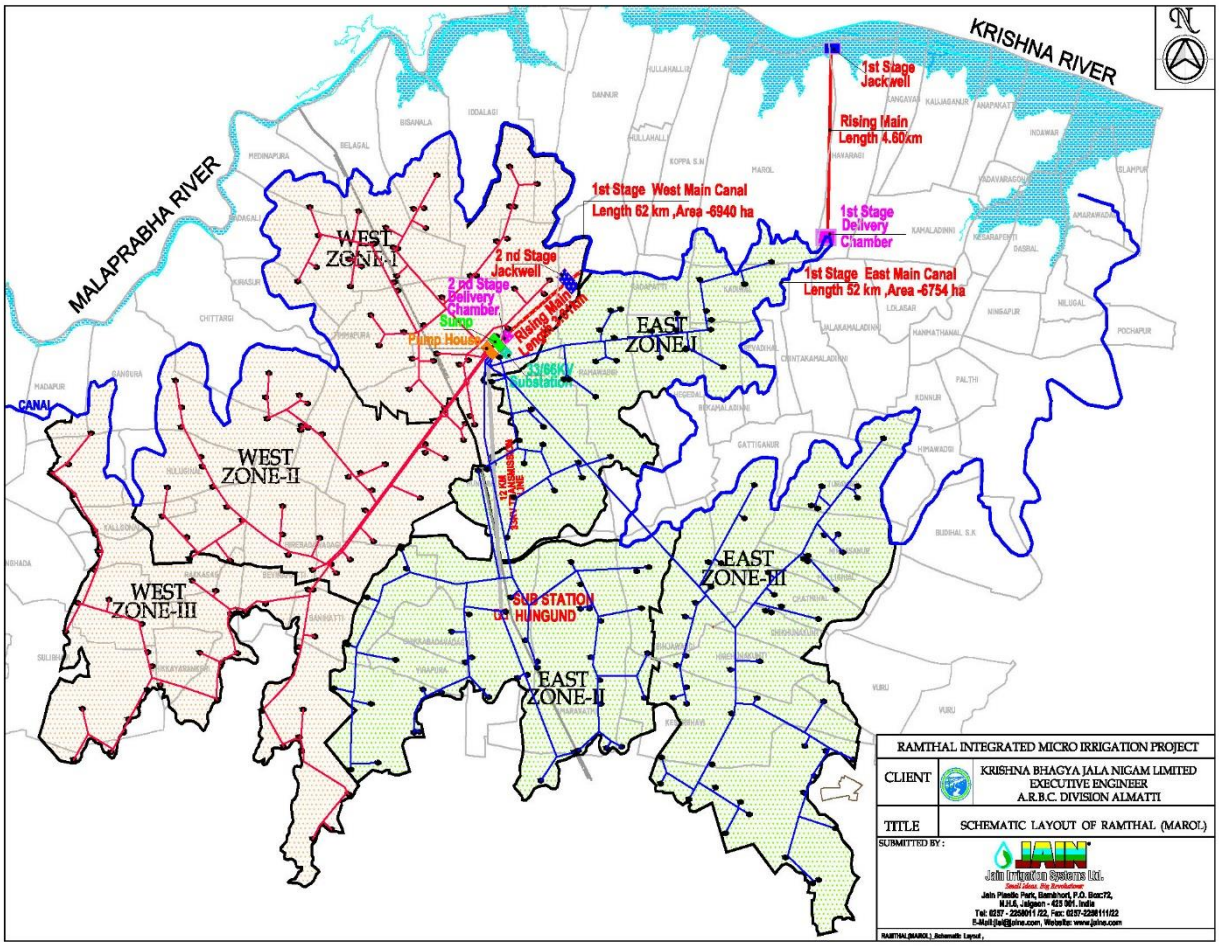

Figure 2 Ramthal Schematic Diagram

Table 1 Salient Features of Project

Location	On the foreshore of Narayanpur Reservoir.
Utilisation	5.84 TMC
Head Work	1st Head Work at Marol 2nd Head Work at Ramwadagi
Canal network	**1st Stage :** East Canal : 51.82 KM (20 distributaries) West Canal : 62.74 KM (25 distributaries) **2nd Stage :** East Canal : 19.00 Km (3 No. distributaries) West Canal : 10.00 Km (5 No. distributaries) Hungund Br. Canal – 31 Km (16 No. distributaries)
Command Area	26,200 Ha.
Potential created	4,000 Ha.
Taluka to be benefited	Hungund Taluk of Bagalkot Dist.

Status of work	Construction of 2 Head works completed. 1st Stage West Canal Km 0.00 to 21.00 & distributaries. No.1 to 6 completed. 1st Stage East Canal Km 0.00 to 6.00 in progress. Proposal of Drip Irrigation for 2nd Stage under finalisation

3. *Uniqueness of Project*

- Mega community Drip Irrigation Project
- Total Beneficiaries = 15,000 plus farmers
- Infrastructure cost borne by government
- System operation is through wireless automation
- O&M of the system for first 5 years is taken care by KBJNL
- Formation of WUA & Marketing Linkages

4. *Need for Drip Irrigation*

Existing Scenario

Before the development of this novel concept, irrigation was done by traditional methods of canal network and flow irrigation. In this method, about 60% water is lost due to conveyance, evaporation, percolation & seepage. Now, on the other hand, integrated micro irrigation solutions consist of closed piping networks right from the source to the root zone of crops. This results in huge savings of water and substantial increase in crop yields. The other advantages of these solutions are savings in input costs, fertilizers and energy. Considering the inherent advantages of micro irrigation, development of such a large scale integrated Micro Irrigation Projects seems to be the only effective and efficient way of distributing canal water among the farmers equitably, which will give social justice to the farmers across the entire network.

Canal Command Areas today are grappling with multiple problems viz.,

- Lower water use efficiency
- Inequitable distribution of water
- Salinity problems because of excess irrigation
- Gap in design and actual area & flow
- Poor drainage
- No water at tail end of canals (suffering Aycut)
- No measuring devices/control structures
- Soil deterioration at canal head ends due to water logging and poor drainage
- Uneven crop growth and yield
- Inadequate maintenance

MIS Solution for Canal Command Areas – Drip Irrigation System

5. *Drip Irrigation System*

Adoption of drip from canal system enables efficient use of precious water and improved yield & quality of farm produce. Also due to water savings the irrigation areas can be doubled.

Drip irrigation system has the following advantages

- *Enhanced yields, quality & uniformity*
  - Lowers dependence on weather, enabling greater control over yields
- *Significantly higher yields*
  - Irrigation uses resources more effectively, leading overall yield production
- *Increases profitability*
  - Increasing profits with enhanced crop planning, irrigation scheduling while reducing input and manpower costs.
- *Significant resource savings*
  - Drip uses 30%-50% less water and up to 30% less nutrients

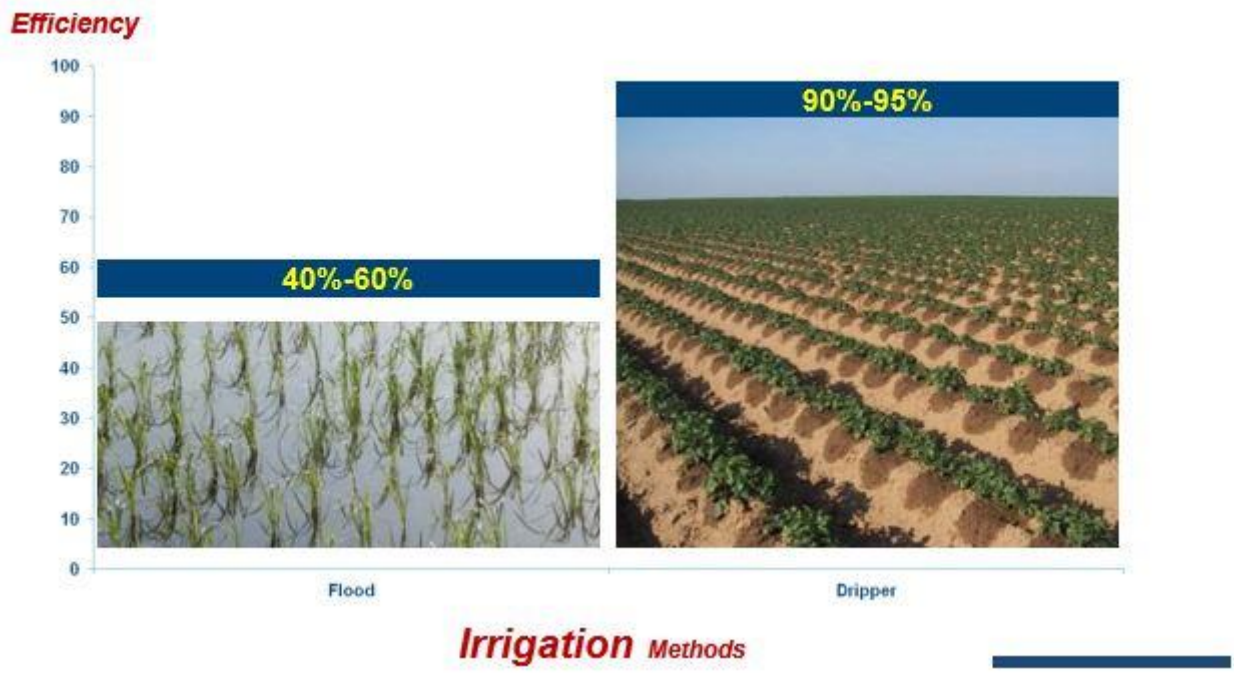

Figure 3 Comparison with different methods

6. *Water Practices followed in Ramthal Drip Irrigation Project*

Ramthal Micro Irrigation follows Drip Irrigation for irrigation 60,000 acres of land using just 2.77 TMC of water. The project layout is as under:

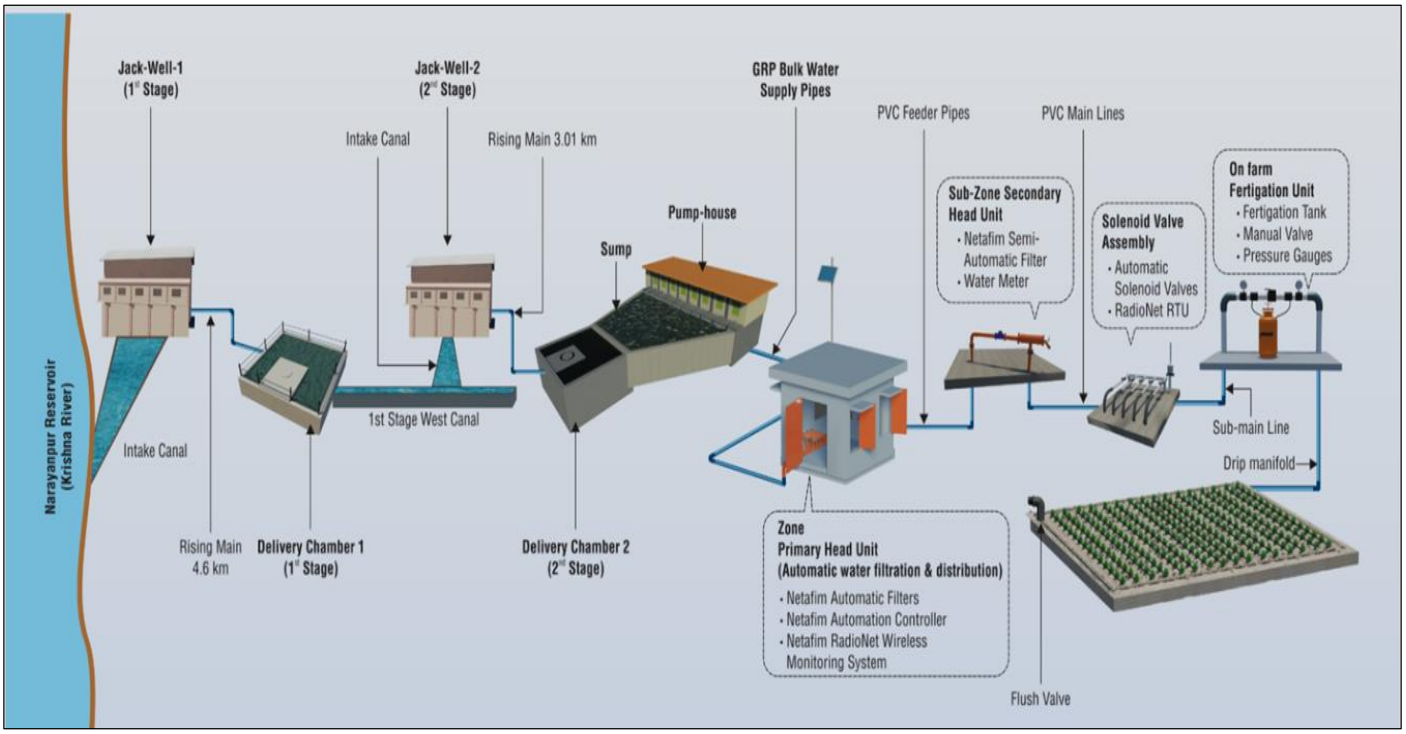

Figure 4 Project Layout

As Ramthal is community Drip Irrigation Project involving about 6700 beneficiaries, the operational mechanism should be simple, sturdy & technically viable with minimum no of control points. Accordingly, proposed automation system is as follows:

- **Zone Level Controls:**
  - Primary fully automatic filter, NMC XL Irrigation Controller with RTU, antenna, solar panel etc.
  - Every zone will have about 100 solenoid valves & 10 sub- zone level water meters. Other components like RTU, expansion cards, antenna etc. will be wherever necessary
- **Sub-Zone Level Controls:**
  - Water meter, RTU, antenna, lithium battery, group of solenoid (wherever possible)
  - Sub-zone will have 10 solenoids valves & a water meter with other automation components as necessary
- **Infield Automation:**
  - Group of 2-4 solenoid valves each serving 4-6 Ha area, RTU, antenna, lithium battery etc.

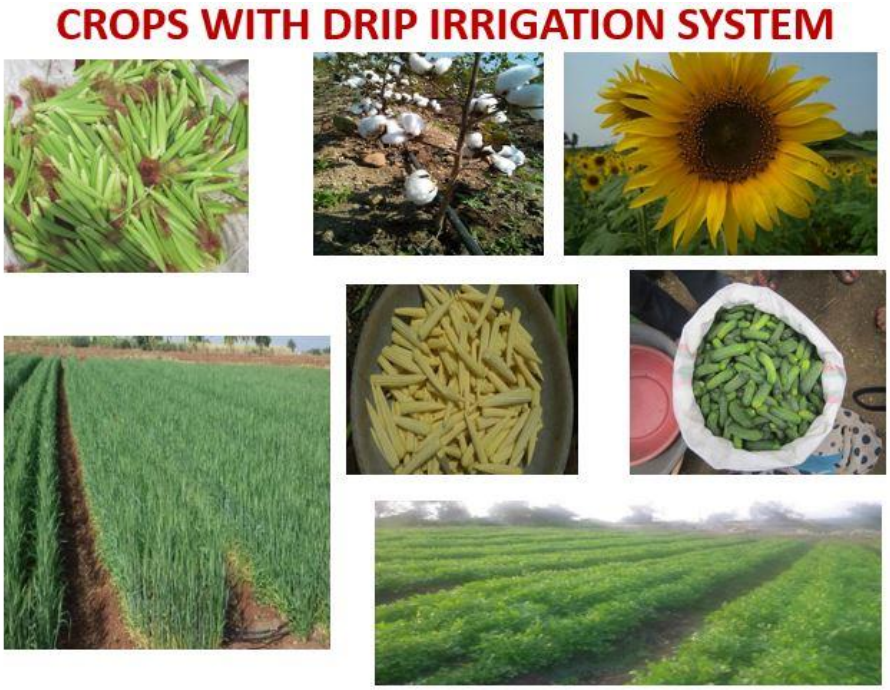

Figure 5 Crops

Table 2 Comparison between Traditional Methods & Drip Irrigation used in Ramthal Irrigation Project

Cost Benefits	Flood Irrigation through Canals	Ramthal, with integrated Drip Irrigation	Benefits with Drip Irrigation
Area (Ha)	12,571	24,000	90% increase in area
Water Requirement	2.77 TMC	2.77 TMC	Same amount of water
1 TMC	4,538 Ha	8,664 Ha	90% increase in area
Total Cost	307.9 Crore	750 Crore	
Cost/Hectare	2.5 Lakhs	3.13 Lakhs	25% increase in cost/ha

Admittedly, initial capital expenditure on this system is higher when compared to conventional systems. However, in the long term, this unique project is far superior. The fact that the water is transported through pipes means that the litigious and cumbersome process of land acquisition is avoided. Moreover, savings on electricity costs will be significant because the flow of water is powered by gravity.

Assurance of water supply will encourage farmers too, and provide them with the choice of cultivating high-value commercial crops, which will significantly change the economic landscape of the region. The drip irrigation will enable farmers to employ precision-farming techniques that result in significantly higher productivity while lowering expenses on fertilizers, and labour.

7. Ramthal Project – Impact

- Doubled the no of project beneficiaries with same resources
- With 2.77 TMC of water, irrigating 24,000 Ha area with Drip system as against 12,571 Ha in flood method.
- Improved standard of living of project beneficiaries
- Equitable Distribution of Water -Irrespective of topography & distance of farm from the water source
- Incremental returns to all the project associates.

8. Summary

Community Drip Irrigation Projects like Ramthal should be taken up to:

- Make judicious use of natural resources like Water and Energy.
- Equitable distribution of irrigation water among all the beneficiaries.
- Improve Water Use Efficiency (WUE) by 20% by 2020.
- Reduce the gap between IP created and actual irrigation by 15% by 2020.
- Sensible use and saving of fertilizers and manual labour.
- To irrigate more / almost double area with same amount of water
- allocated for flow irrigation
- Improve the crop quality and produce.
- Improve standard of living of all the project associates.