Gujarat Drip Irrigation Approach

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Presentation on
Gujarat Drip Irrigation Approach

Ahmedabad
Date: 07/05/2016
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Climate Smart Agriculture

- Climate-smart agriculture, forestry and fisheries (CSA), as defined and presented by FAO at the Hague Conference on Agriculture, Food Security and Climate Change in 2010, contributes to the achievement of sustainable development goals. It integrates the three dimensions of sustainable development (economic, social and environmental) by jointly addressing food security and climate challenges. It is composed of three main pillars:
  - sustainably increasing agricultural productivity and incomes;
  - adapting and building resilience to climate change;
  - reducing and/or removing greenhouse gas emissions, where possible.
Cont...

• CSA is an approach to developing the technical, policy and investment conditions to achieve sustainable agricultural development for food security under climate change.

• The magnitude, immediacy and broad scope of the effects of climate change on agricultural systems create a compelling need to ensure comprehensive integration of these effects into national agricultural planning, investments and programs.

• The CSA approach is designed to identify and operationalize sustainable agricultural development within the explicit parameters of climate change.
Reason for Gujarat State Intervention in MIS Scheme

- Subsidy for Micro Irrigation System (MIS) was available under different schemes and sub-schemes.

- Varying subsidy assistance norms and implemented by multiple Govt. Depts. creating confusion among farmers.

- No integrated approach, it was in piecemeal.
- Confusion among the farmers at ground level.
- Taking a long time to disperse the subsidy.
- Progress of MIS was very minimal.

- The Government wanted to put all efforts into an integrated approach in uniform manner to remove anomalies.

- Integrate all available funds in one head to utilize efficiently and extend benefits to more and more farmers of the State.
State Intervention led to: Formation of GGRC in Vibrant Gujarat 2005, announced by the Hon’able CM of Gujarat.

- GNFC: Equity 46%
- GSFC: Equity 46%
- GAIC: Equity 8%

GAPC

Govt. of Gujarat

Gujarat Green Revolution Company Limited
Best practices followed by GGRC

A unique GR was issued by the GoG in 2005 different from other States, wherein any farmer can go for

✓ Any area; Any crop; Any type of Micro Irrigation System
✓ Choice of MIS Supplier

Other features
✓ Electricity connection on overriding priority.
✓ No subsidy ceiling

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Category of Farmer</th>
<th>Non Dark Zone area</th>
<th>Dark Zone area for 57 talukas</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>General Farmer: Small and Marginal farmer (Landholders of less than 2 hectares)</td>
<td>Up to 60% of MIS Unit Cost or Rs. 70,000/- per hectares, whichever is less</td>
<td>Up to 70% of MIS Unit Cost or Rs. 70,000/- per hectares, whichever is less</td>
</tr>
<tr>
<td>2</td>
<td>General Farmer: (Land holders of more than 2 hectares)</td>
<td>Up to 50% of MIS Unit Cost or Rs. 60,000/- per hectares, whichever is less</td>
<td>Up to 60% of MIS Unit Cost or Rs. 60,000/- per hectares, whichever is less</td>
</tr>
<tr>
<td>3</td>
<td>SC/ST Farmers</td>
<td>Up to 75% of MIS Unit Cost or Rs. 90,000/- per hectares, whichever is less</td>
<td>Up to 85% of MIS Unit Cost or Rs. 90,000/- per hectares, whichever is less</td>
</tr>
</tbody>
</table>
Gujarat Model
Business based Approach

- Decides to adopt MIS and Chooses MIS Supplier
- MIS Supplier Does field Survey and Prepare Design and Cost estimate of MIS as per GGRC approved rates
- Farmer approves design & Signs on all relevant documents for online submission to GGRC
- GGRC Process the file online as well as physical, issue work order, verify the installed MIS and disburse the subsidy

✓ Beneficiary treated as a Customer
✓ Subsidy treated as an Investment.
Gujarat Model of Application Processing at GGRC

- Agronomical & SMS Services
- Insurance Coverage to MIS

Submission of Verification & Trial Run Report Along with Subsidy Release Form for Final Payment

- QR Code/GPS based Mobile Application for MIS Installation Verification
- Installation of System & Verification by Third Party

Reconciliation of Farmer’s Share & Advance Payment to MIS Supplier

Registration of MI Application with Geo-Tagging & Issuance of work order

Submission of Signed TPA & Deposition of Farmers Share
NABCONS observations

The practices and approach followed by GGRC was evaluated by NABARD Consultancy Services (NABCONS) engaged by Govt. of India during the year 2009 and identified the Best Practices in the Country for implementing MIS Scheme.
Major IT Intervention for speedy and accurate processing

- Incorporation of Barcode System
- Biometric System

For easy retrieval of the data and to track the status/movement of the file for online processing at GGRC.

To ascertain genuineness of the beneficiary farmer and to create database to prevent duplication of applicant.
Scientific way of file Management

- Introduction of Colour code system for easy identification of files.
- GGRC have a 5 years colour code management policy.
- Each file have unique ID number starting with the corresponding financial year.
- Location of the each district file has been fixed so that can be traced easily at any time of processing.
- Annexure number is fixed for each document and is printed on back side of the file for easy reference.
- Compact Storage System is followed to maintain the files for 10 years.
Geo-fencing based Design and Cost estimate Preparation

Use of Geo points (Lat – Long) on Google Map / Bhuvan Map to get real size and shape of the field for preparing design and cost estimate.

Transferring Geo-points as per the shape and size of the field to AUTOCAD for preparing Irrigation System Design.
Use of QR Code in Geo-tagging for verification and Monitoring of installation of MIS

✓ Third Party Inspection is conducted on every farmers Micro Irrigation System installed on his field by using QR (Quick Response) code System with Geo locations.
A New Initiative of Showing Schematic Diagram through picture to farmer

✔ Farmer can understand what MI Component he will be provided by the MIS Supplier and at the time of verification he will count quantity of MI Components comparing with the images provided to them.
Unique Features responsible for Success of GGRC Model

I. Simple and Flexible in its Approach
II. Transparency in its Approach
III. Effective Quality Monitoring and Assurance System

IV. Use of IT based application to prepare cost and design and to monitor the installed MIS
V. Basket of Services

- Maintenance, Warranty and Guarantee of MI Components for five years
- Inbuilt agronomic as well as system maintenance advisory services through SMS services
- Inbuilt insurance of the MI System as well as farmer’s life
- Effective Complaint Redressel System and toll free helpline number
- Promotion of high nutrient use efficiency - Water Soluble Fertilizers

VI. Implementation cost for the Government is nil.

Above all implementation is based on the concept of PPP Mode and overall improvement in the quality of the service.
Result of State Effectiveness

Before establishment of GGRC

- The achievement under MIS Scheme was 2.26 lakh hectares with approximate 1.41 lakh beneficiary farmers (From 1991 to 2005).

- Average Annual Achievement was 15,000 ha./year

After establishment of GGRC

- The achievement under MIS Scheme is 13,08,143 hectares with 8,13,499 beneficiary farmers (From 2005 to March-2016)

- Average Annual Achievement is 1.19 lakh ha./year

- Gujarat ranking continuously first since last three years in terms of bringing area under Micro irrigation per annum among various States of India.
### Classification of Farmers on the basis of land holding in the State

<table>
<thead>
<tr>
<th>Category</th>
<th>No. of farmers</th>
<th>Mis Area in ha.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marginal Farmer (up to 1 Ha.)</td>
<td>34695 (4%)</td>
<td>78057 (10%)</td>
</tr>
<tr>
<td>Small Farmer (&gt;1 to ≤ 2Ha.)</td>
<td>455273 (56%)</td>
<td>245474 (30%)</td>
</tr>
<tr>
<td>Medium Farmer (&gt;2 to ≤10 Ha.)</td>
<td>92685 (7%)</td>
<td>55442 (4%)</td>
</tr>
<tr>
<td>Large Farmer (More than 10 ha.)</td>
<td>864219 (66%)</td>
<td>295797 (23%)</td>
</tr>
</tbody>
</table>

#### Summary

- 40% Small and Marginal Farmers have adopted MIS
- 27% of total area is covered by Marginal & Small Farmers
Cumulative Crop wise Progress from May-2005 to March-2016

Total Area under Agricultural Crops is 11,30,289 hectares (86%).

Total Area under Horticultural Crops is 1,77,854 hectares (14%)

Vegetables (26) and Other Horti. Crops (59)  Other Agri. Crops (26)
Socio-Economic Impact Assessment of the Micro Irrigation Scheme – Findings of the AFC

The Agricultural Finance Corporation (GoI) has been commissioned by GGRC to conduct a Socio-Economic Impact Assessment of the MI Scheme on an annual basis.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Findings of the AFC report</th>
<th>Result (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Saving in Water</td>
<td>20-48 %</td>
</tr>
<tr>
<td>2</td>
<td>Saving in Electricity Cost</td>
<td>10-17%</td>
</tr>
<tr>
<td>3</td>
<td>Saving in Labour Cost</td>
<td>30-40%</td>
</tr>
<tr>
<td>4</td>
<td>Saving in Fertilizers</td>
<td>11-19%</td>
</tr>
<tr>
<td>5</td>
<td>Increase in Crop Yield</td>
<td>20-38%</td>
</tr>
<tr>
<td>6</td>
<td>Increase in net return Rs./ ha due to micro irrigation (Based on annualized cost)</td>
<td>17,000/-</td>
</tr>
</tbody>
</table>

Based on the above findings, the pay back period for the beneficiary farmers and for the Government has been estimated at 2 cropping seasons.
Additional Income to Farmer due to Major State Intervention in MI Scheme

Considering per hectar average additional income of Rs.17000/-. 

Considering the area covered under micro irrigation during the period 2005-06 to 2015-16; now onwards there will be increase of annual income of 8473 crore among the farmers adopted MIS.

Considering 100% MI System is in use by the farmers who have adopted MIS within last 5 years, and 60% is in use by the farmers who have adopted MI System before 5 years back.

Major contributor for the Agricultural Growth (avg. more than 10%).
Implementation modality for Protected Cultivation Scheme – on Pilot Scale

- **Area of Operation:** Gujarat State.
- **Subsidy** – 50% of the Project cost as subsidy and 50% to be borne by the beneficiary.
- Handholding for one year (mandatory) - subsequently phase out.
- **Structural Design** compatible with crop / agro climate – unit size ranging from 250 sq. meter to 2000 sq. meter.
- **Training** to the farmers.
- **Market linkages** for produce.
- **Operational modality** similar to implementation modality of Micro Irrigation Scheme.
- **Type of approved structures:**
  i. Naturally Ventilated Poly House
  ii. Poly Shade Net House
  iii. Dome type Shade Net House
  iv. Flat type Shade Net House
Cost Benefit Analysis Study – Pilot Project on Protected Cultivation

A Success Story:

Cost benefit analysis for the beneficiary farmers who have adopted Naturally Ventilated Poly House under the Pilot Project on Protected Cultivation

<table>
<thead>
<tr>
<th>GGRC Reg. No.</th>
<th>Name of Farmer</th>
<th>Area under GH (sq. m)</th>
<th>Total Cost (Rs.)</th>
<th>Subsidy @ 50% (Rs.)</th>
<th>Crop Grown</th>
<th>Cost of Cultivation # (Rs.)</th>
<th>Yield (Kg)</th>
<th>Avg. market rate (Rs.) *</th>
<th>Total Income (Rs.)</th>
<th>Net Profit (Rs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AND-PC-01</td>
<td>Chandrakantbhai Dahyabhai Patel</td>
<td>1848</td>
<td>1582792</td>
<td>791396</td>
<td>Cucumber</td>
<td>107000</td>
<td>15500</td>
<td>20.61</td>
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<td>AND-PC-02</td>
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<td>17500</td>
<td>20.61</td>
<td>360675</td>
<td>257675</td>
</tr>
</tbody>
</table>

# Cost of Cultivation is inclusive of expenditures incurred by farmer for Soil preparation, Seeds, Fertilizers, Pesticides Control and packing of produce and other miscellaneous cost.

The income received is of the period of 3 months only (during one crop season only) which can be trippled in a year period.

* Avg. rate considered based on the total income generated out of selling of his produce by farmers.

Based on the above fact, the pay-back period for the farmer is estimated at 3-4 cropping seasons i.e. approx. 1.5 years.
Promotion of Solar Irrigation Pump with Drip

- Increasing use of Diesel Pumpset to lift water.
- Limited availability of grid.
- Promotion of green energy of source i.e. Solar Pump (3/5 HP) in irrigation.
- The beneficiary farmers will be entitled to avail Central Fin. Assistance (GoI Contribution) of Rs. 40,500/- per HP for DC pumps and Rs. 32,400/- per HP for AC pumps for Project cost of erection and commissioning of SPV water pump for irrigation on his field

Realizing “Urja Shakti, Jal Shakti” with “Mahila Shakti” as per our PM Vision
Promotion and Distribution of Water Soluble Fertilizers (WSF)

- Water-soluble fertilizers are fertilizers that can be dissolved in water and added or leached out of the soil easily. It is easy to control the precise quantity of nutrients application to plants with the help of water soluble fertilizers.

- WSF are high analysis soluble speciality fertilizers. These are available in mono, double and multi nutrient combinations and available in liquid and crystalline forms.

- Water Soluble Fertilizer (WSF) have higher fertilizer use efficiency 45-95% compared to traditional fertilizers 20-50%.

- WSF is highly compatible to use with Micro Irrigation through fertigation (application of fertilizer solution along with irrigation water through Micro irrigation to crop plants) and foliar spray enhancing further fertilizer use efficiency up to 95% as fertilizer is applied directly to root zone in case of Drip Irrigation and on foliage in case of Sprinkler Irrigation System.
Project on Sustainable (Better) Cotton Initiatives in Gujarat

GGRC Ltd.

WWF India

Synergy......Eco system and farmers Prosperity
Integration of Drip Irrigation System with Holiyu - a Traditional water storage technology

A new Initiative by GGRC to increase the agricultural activities in saline affected areas

Problems faced by the farmers in salinity affected areas of North Gujarat

Summer (Dry Season) - Drought

Deteriorating Soil Quality and Salinity, Poor Soil Permeability

Water logged condition during monsoon
Solution

An **Innovative Technology** that helps to:

- Prevents water logging condition during monsoon and Stores Rainwater underground (Holiyu) thereby ensuring cultivation of crops during monsoon.
- With the help of Drip ensuring cultivation crop during rabi thereby increasing agricultural activities in off season.

GGRC under **CSR** has approved **Rs.40.00 lakh** to implement this project by erecting and commissioning 10 Holiyus.
GGRC Consultancy Services

GGRC has implemented successfully their in-house developed IT Business Module (C-MIMS) popularly known as Gujarat Model for Micro Irrigation Scheme. Based on this, GGRC has started providing Customised Enterprise Resource Package (ERP) for Water Management and Agro Business or any business based project or Scheme in Government or Private Sector. Looking at the wider acceptability of the Module followed by GGRC:

I. Sardar Sarovar Narmada Nigam Limited, Gandhinagar appointed GGRC as a consultant to develop Application based on GGRC module for their Under Ground Pipeline Sub-minor Scheme. Software will be rolled shortly.

II. Govt. of Karnataka and Chhatisgadh, has approached GGRC as consultant to develop Scheme implementation module. The matter is at preliminary dialogue stage.

III. Scheme implementation module preparation for the Govt. of Haryana and Rajasthan is under discussion.
**Sardar Krushi Package** Conceptualized to promote Agro Services & Products offered by GGRC/GSFC to the farmers under one roof

- Promotion of Micro Irrigation, Protected cultivation and Solar pumping Scheme, WSF as a part of Sardar Krushi Package:
Awards and Recognition

✓ Nominated and shortlisted for the United Nations Public Service Award during Nov-2014.
✓ Nominated for Prime Minister’s Award for Excellence in Public Administration during the year 2014-15.
✓ Nominated for E-Governance Award in the category Government to Citizen Project of the Year during 2014-15.
✓ Paper on “Micro Irrigation for Higher Productivity” was published and presented during FAI Annual Seminar 2014.
Cont...

✓ Paper on “Ensuring Food Security through Adopting Smart Agricultural Technology in the light of Climate Change by GGRC in Gujarat, India” was accepted and published in the DNC Conference, - 2015, Dresdan, Germany.

✓ Presentation on “Micro Irrigation in Gujarat: A Case Study of State Effectiveness” has been presented at Anand during Indian Economic Policy Strategy conference, Jan-2015 and published on you-tube by National Institute of Public Finance & Policy-DEA, Min. of Finance, Delhi.

✓ Presentation on “Gujarat State Experience in implementation of the Micro Irrigation Scheme was made during the workshop on “Micro Irrigation – The Way Forward” organized by Dept of Agriculture, GoK at Banglore.
Still, a lot to be done to realise

“Taakat Ek Boond Ki”

To achieve per Drop More Crop as per our Hon’able PM’s vision to achieve more State Effectiveness
Thank you!
Geo-tagging System
QR Code Scanning
This screen is shown after the QR CODE is scanned. It includes the Farm profile i.e. general information regarding the registration no, farmer, supplier and location of the farm.
MAT GROUP-HEAD

This screen lists all items from the Mat Group – Head.

Functions:
- Search Item
- Check all “OK”
Lastly, the user can upload one or more photographs of:

- Farmer
- Unit
- Supplier
GREM APP

User can choose to Submit Now or Save and Submit Later.
INCOMPLETE INSPECTIONS

This screen shows all the incomplete inspections. The user can simply go to edit and resume the testing from where they left.

PAST INSPECTIONS

This screen shows a list of all the past inspections completed by an inspector.
Verification by Engineers at GGRC through Google Map

<table>
<thead>
<tr>
<th>ID</th>
<th>Regno</th>
<th>LATITUDE</th>
<th>LONGITUDE</th>
<th>Images</th>
<th>IMGLocation</th>
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<tbody>
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<td>1415-ARV.3360</td>
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<td><img src="image8.png" alt="Image" /></td>
<td>View Map</td>
</tr>
</tbody>
</table>
Verification by Engineers at GGRC through Google Map
Innovative Initiatives

• With a view to empower the farmer, GGRC facilitates **SMS Services**, on a daily basis on Agronomic advisory in the vernacular (Gujarati) language, through SMS, on the mobile phones of all farmers who have adopted Drip Irrigation.

• Since 2011 till 31/03/2016; **2,18,700** farmers have subscribed to this service.

• The information provided under this facility includes
  ✓ Daily Taluka specific **weather** forecasts,
  ✓ **Rates of two crops** from **two mandies** of the farmers choice
  ✓ Crop advisory and
  ✓ Important **news** pertaining to the **Agriculture sector**.

This facilitates **informed decision making** at the level of farmers.
Best Practices at GGRC

Self Sustaining Set-Up

- Profit generation while implementing Government schemes.
- No dependence on State Government for maintenance
- Basis for complete autonomy in decision making including staffing

Effective use of Information Technology

- Effective integration of Project Management, Financial Management, and Management Information System MIS.
- Integrity of data is very high
- On-line access to beneficiaries and other stakeholders
- Lean and thin support staff required for sustaining operations – very low administrative and transaction costs
- Dedicated – Interactive Website
Effective Checks and Balances
- Zero level misutilization of subsidy funds
- Third Party Inspection
- Audit of Third Party
- Structured Surveillance by GGRC
- Standalone Monitoring and Evaluation Consultant for yearly field monitoring study.

Innovative package
- Insurance of equipment and beneficiary
- Agronomical Support Services in post-implementation period
- Hand-holding for bank finance.
Cont...

Objective and Consultative Unit-Cost Revision Methodology

- In revision of unit cost of MI Systems the GGRC considers cost escalation in cost of MI components, secondary transportation and Installation Expenses (Skilled and unskilled manpower cost) separately.
- The revised unit cost is the sum of the revised unit cost of materials used, components used, secondary transportation and installation expenses. The methodology is made known to stakeholders.
- Water Storage Sump has also been incorporated in the Scheme.

- **Involvement of NGOs in Tribal Areas**
- **Exclusive Training Programmes for Tribal Youth**
  - Training in MIS Installation and Maintenance
Cont...

- Inclusion of MIS in SSNNL canal command area as Pilot Project - Convergence with major irrigation scheme
- Dovetailing of Tribal Development Funds and MIS Scheme with the Provision of discriminatory subsidy up to 75%
- Digitalization of MIS beneficiary files and records underway
- Subsidy based on actual unit cost – support for balance difference between actual cost and CSS subsidy
- Preferential Power Connections to Farmers
  - The GoG have envisaged innovative schemes for providing preferential power connection to those farmers who have installed MI Systems through GGRCL.
  - These Schemes are named GUVNL – 2000, GUVNL – Tribal Area, GUVNL PDC/RC
File Colour Code System

DIS File 2015
SIS File 2015
DIS File 2014
SIS File 2014
Solar File 2015
Compact File Storage System
National Seminar on
“Climate Change, Water Resource Management and Livelihood Adaptation”

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RK Sugoor, IFS
Jt. Managing Director

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