



GGRC - Culminating Prosperity Through
Smart Agriculture



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Gujarat Green Revolution Company Limited



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MESSAGE



Apro/jm/2014/08/26/dt

Date: 26-08-2014

Gujarat is harbinger of second green revolution through optimal use of natural resources. **Gujarat Revolution Company Limited** is special purpose medium created for implementation of micro Irrigation System by farmers in the State.

To spearhead and to sustain the agriculture growth, Government of Gujarat has taken a visionary approach to promote latest Irrigation Technology- **Micro Irrigation Systems (MIS)** amongst the farmer of Gujarat. The Micro irrigation is one of the most promising and proven irrigation technology to save the water, energy, fertilizers, labours cost coupled with increase in crop productivity and climate change resiliency. Thus, MIS has multiple benefits which translate into increase in agriculture productivity ultimately resulting in social and economic upliftment of the farmers, which shall lead the State and the Nation towards the food security. Let us nourish the Crop by each Drop of valuable water.

Anandiben Patel
(Anandiben Patel)



Anandiben Patel
Chief Minister, Gujarat State

MESSAGE

The State of Gujarat is always ahead in the country to use scarce water resources scientifically for agriculture, to maintain sustainable growth with minimum agro input cost. To promote the use of water judiciously in agriculture, the Government entrusted GGRC to implement Micro Irrigation Scheme uniformly throughout the state as a part of “Jal Sanchay Abhiyan”.

Many farmers of the state has taken the benefit of the Scheme and contributed to the State Government's “Jal Sanchay Abhiyan”. GGRC with its state-of-art IT platform has setup the unique way in its implementation process with a complete transparency. Because of it's unique way of implementation GGRC, in a shorter period has been able to cover an area of 10.29 lakh hectares with more than 6 lakh farmers as beneficiaries. This model has been well appreciated at National level and many other state Government. The other departments of the Government of Gujarat have come forward to adopt the similar model for their schemes. Meanwhile, to know the implementation modality of the GGRC, many Government officials from other states are visiting GGRC. To appraise them with the activities and the procedure followed by the GGRC, we are publishing this brochure, which I hope will be useful for them and other stakeholders including public.



A handwritten signature in black ink, appearing to read 'S. K. Nanda'.

Dr. S. K. Nanda, IAS
Chairman, GGRC

MESSAGE

Gujarat being the arid region and receives the rainfall most erratically compel the state to use water judiciously in agriculture to maintain the sustainable agriculture production to ensure the Nation food security at large and the state in particular. To achieve this objective, Government of Gujarat has started “Jal Sanchay Abhiyan” to create awareness among the farming community to conserve natural resources viz., Water for its judicious use in agriculture. To augment this activity, the State Government established Gujarat Green Revolution Company Limited to use water more judiciously with the help of Micro Irrigation System.

Gujarat Green Revolution Company Limited (GGRC) adopted a unique model in the country to implement the Micro Irrigation Scheme in the State. Owing to its success, later it was popularly known as the Gujarat Model. The Practices followed by GGRC is well acclaimed in the country and put it on record as a best practices by NABCONS in the year 2009, a NABARD Consultancy Services appointed by the Government of India. Many official delegates across the Country started visiting GGRC to study GGRC IT enabled implementation Module to process the MIS Applications in a uniform mode throughout the state. To acquaint the visiting delegates about the working pattern of GGRC, the management felt that there is a need to put this unique implementation modality on paper so that information can be disseminated in a systematic manner. Hope that, this handy brochure will prove useful for understanding the practices and procedures followed by GGRC over a period of time in implementing Micro Irrigation Scheme.




R. K. Sugoora, IFS
Jt. Managing Director, GGRC

Introduction

The efficient utilization of available water resources is crucial for country like India, which shares 17% of the global population with only 2.4% of land and 4% of the water resources. The per capita water availability, in terms of average utilizable water resource in the country, which was 6008 m³ in 1947, and presently 1250 m³ is expected to dwindle down to 760 m³ by 2050. All these emphasized the need for water conservation and improvement in water-use-efficiency. Large scale adoption of micro irrigation in Indian agriculture is one of the answers to this problem.

Water usage in different sectors

How the world uses fresh water:

- About 70 percent for Irrigation
- About 22 percent for industry
- About 8 percent for domestic use

Source: World Water Assessment Programme (WWAP) UNESCO

Water Scenario in the State of Gujarat

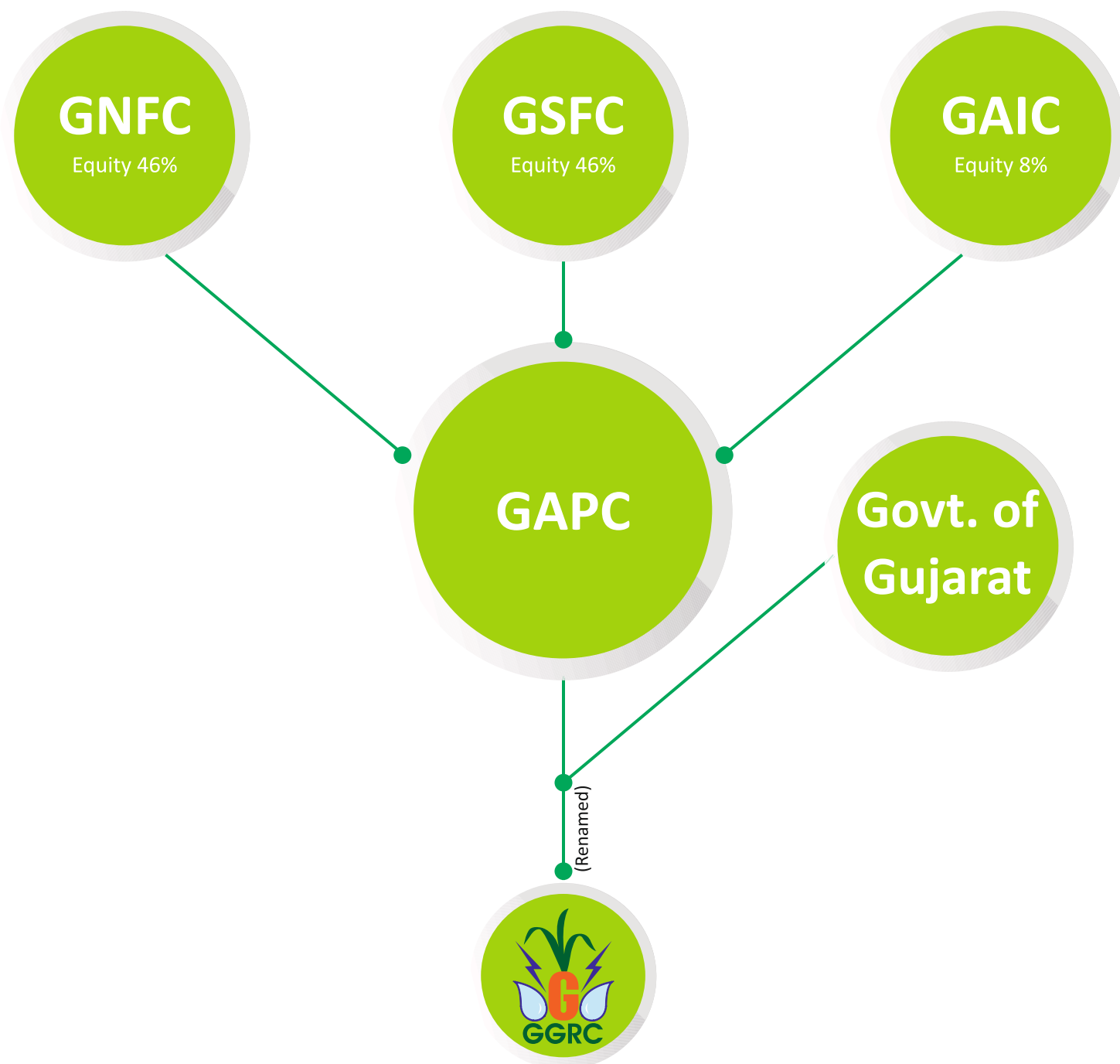
- In Gujarat, Agricultural sector consumes nearly 85 % available water.
- 80% of irrigated land area is through ground water and 20% through surface water

Particulars	Values
Total Geographical Area	195984 Sq. Km
Tribal area	20912 Sq. Km.
Drought Prone Area	53860 Sq. Km
Net cultivated area	9.795 Million Ha
Gross irrigated area	4.111 Million Ha
Net irrigated area	3.387 Million Ha
No. of Districts	33
No. of Talukas	250
No. of Villages	18584
Population	50.67 Million
Population density	258/ Sq.Km
Per capita water availability	1077 M³/year

Gujarat is nearly comes under water stressed condition and to mitigate the situation the Government of Gujarat took a new initiative by establishing a special purpose vehicle called GGRC to implement Micro Irrigation Scheme throughout the state in a uniform mode.

Govt. of Gujarat's Efforts to increase area under MIS

- Subsidy for MIS was available under different schemes and sub-schemes.
- Varying subsidy assistance norms and implemented by multiple Govt. Depts. creating confusion among farmers.
- 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.
- This led to major initiative during the closing ceremony of Vibrant Gujarat during January-2005, in which Honourable Chief Minister of Gujarat announced formation of Gujarat Green Revolution Company Limited (GGRC) with its Head Quarter at Vadodara and the Government issued the Resolution on 09/05/2005.



Gujarat Green Revolution Company Limited

Fig. 1- Formation of GGRC

Vision

- To achieve a sustainable natural resource management regime in agriculture sector in the State of Gujarat.

Mission

- To promote the concept of Micro Irrigation System amongst the farmers of Gujarat as a tool for wise usage of resources resulting in higher agricultural productivity, thus, improving their livelihood and empowering them to participate meaningfully in the growth of the Agriculture Sector in the State.
- As an implementing agency using state-of-the-art technology to process the Micro Irrigation Scheme on behalf of Government of India and Government of Gujarat.

We Stand by

- Renowned MIS Suppliers are already registered & working under MI Scheme of the State.
- New India Assurance Co. Ltd. (NIAC) is undertaking insurance of the system and the farmers at the nominal rate of insurance premium.
- Third Party Inspection Agencies are engaged to undertake inspection of each site before the payment released to the MIS Suppliers on behalf of the farmers.
- M/s. Gujarat Industrial Research & Development Agency (GIRDA) and M/s. Central Institute of Plastic Engineering & technology (CIPET) are designated as technical agencies to ensure BI standards and quality of the MIS components and certify the production capability of each MIS supplier once in 6 months.
- NGOs are appointed to carry out District - wise survey for assessing the impact of MIS on socio - economic aspect of the farmers.
- Agricultural Finance Corporation (AFC) is conducting survey every year to assess impact of MIS on farm economics.
- In order to meet increasing requirement of manpower to look after the maintenance of the system GGRC, envisages training program for Tribal Farmers and Village Level Workers.

Gujarat Model to Implement MI Scheme

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 limit for area under MI Scheme.

Type of Approved MI Systems



Drip Irrigation



Porous Pipe



Sprinkler Irrigation



Rain Gun

Subsidy Norms

Category of Farmer	Subsidy Norms (per ha. which ever is less)
All Farmers	Up to 50% of the MIS Unit Cost or Rs. 60,000/-
Tribal Farmers	Up to 75% of the MIS Unit Cost or Rs. 90,000/-
Dark Zone Farmers	Up to 60% of the MIS Unit Cost or Rs. 60,000/-

Gujarat Model: Business based Approach

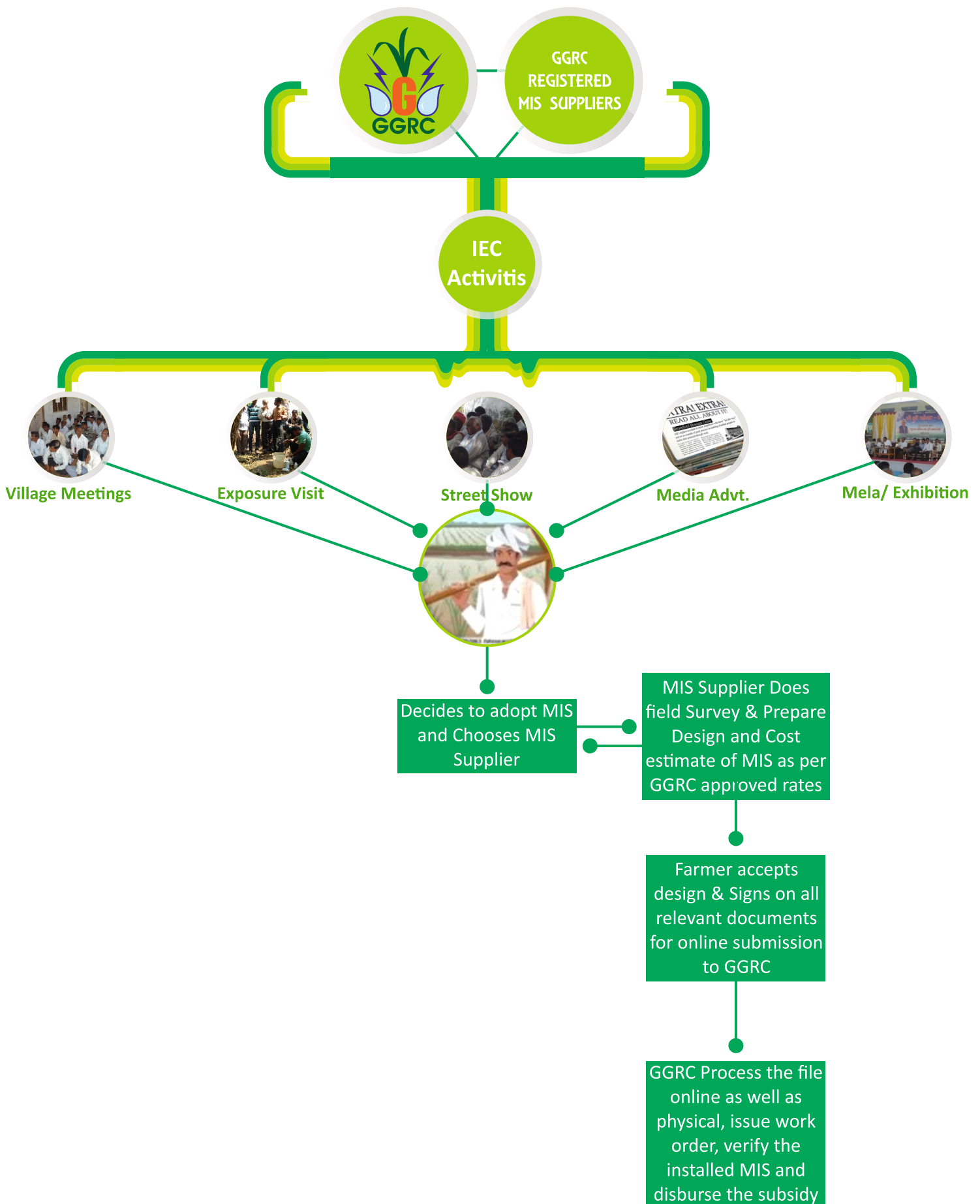


Fig. 2- Business Based Approach Model Followed in Gujarat Model

Gujarat Model of Application Processing at GGRC



Fig. 3- Application Processing Procedure at GGRC

Unique Features of the Gujarat Model

Simple and Flexible in its Approach

- Single window approach, farmer doesn't need to go pillar to pillar for application to sanctioning
- Farmer has the choice to choose MIS Supplier and type of MI System,
- Free access to Farmers of same quality product linked with market with a competitive edge.
- System design as per cropping pattern and as per farmer's/field requirement

Transparency in its Approach

- A state-of-art IT application called C-MIMS (GDRS, GWORKS, GSPRINK, FAS) has been put in place to process the MIS Application.
- Farmers can track progress of his application.
- Effective IT mechanism to prevent duplication of subsidy disbursement.
- MIS applications are processed centrally on Corporate mode with the use of web-based dedicated software.
- The processing of MIS applications, management of grants, receipts and disbursements have been integrated into a Business Module.
- Complete access of information to the participating stakeholders in the MI Scheme.

Effective Quality Monitoring and Assurance System

- Third Party inspection at the factory site of the MIS Supplier(s) is done on a regular basis to evaluate the quality of MI Components.
- Third Party Inspection is conducted on every farmers Micro Irrigation System installed on his field to verify that the Micro Irrigation System conforms to specifications and is operational.
- Concurrent evaluation of MI Scheme is ongoing process.

Use of IT based application to monitor the installed MIS

- Application of "Geo-tagging solutions" to capture and upload photographs of the MIS installation, at site, along with GPS coordinates, on a mobile phone for verification and monitoring of the site on Google Map.

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 Redressal System and toll free helpline number
- Promotion of high nutrient use efficiency - Water Soluble Fertilizers
- 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.

Best Practices at GGRC - As identified by NABCONS

The practices and approaches followed by GGRC were evaluated by NABARD Consultancy Services (NABCONS) engaged by Govt. of India during the year 2009 and identified the following as best practices of the Gujarat Model in implementing MI Scheme....

Self Sustaining Set-up

- Profit generation while implementing
- 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 - Financial Management, & 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.

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.
- **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 power connection on priority basis to those farmers who have adopted MI Systems through GGRC.

Achievement

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 10,11,840 hectares with 6,26,545 beneficiary farmers (2 0 0 5 t o Nov-2014)
- Average Annual Achievement is 1.04 lakh ha./year

Progress in Micro Irrigation Scheme

Over period of 10 years GGRC has achieved (Fig. 4) a remarkable Annual Growth Rate of 39% by covering 10.12 lacs hectares are under the Micro Irrigation System with 6.27 lacs beneficiary farmers from the year 2005-06 to 2014-15(Nov-14) with a Drip to Sprinkler Adoption ratio of 48:52.

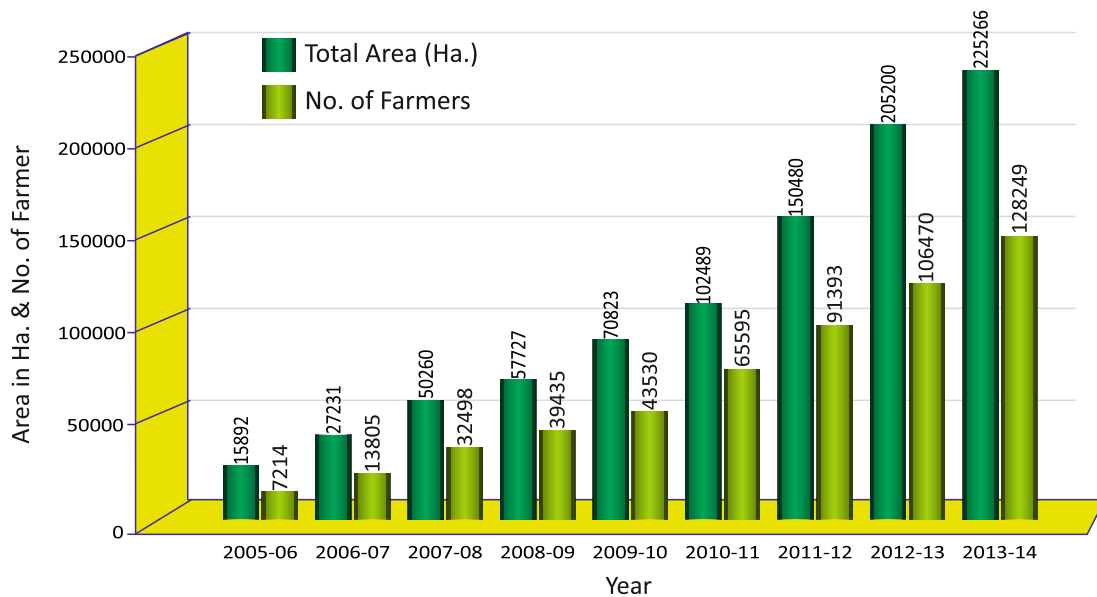
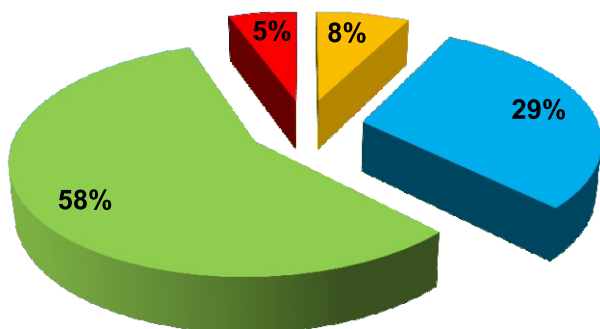


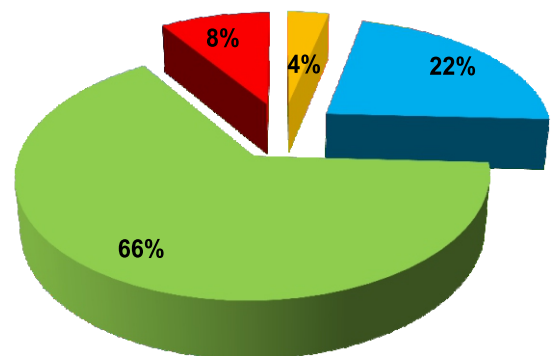
Fig. 4-Total area (Ha.) & beneficiaries covered under Micro Irrigation Scheme from May-2005 to Nov-2014

MIS Adoption Pattern

Out of the total farmers who have adopted the Micro Irrigation System, 8% are Marginal, 29% are Small, 58% are Medium and 5% are large farmers which corroborates the land holding pattern of the State(Fig. 5)



Total No.: 6,26,545



Total Hectare: 10,11,840

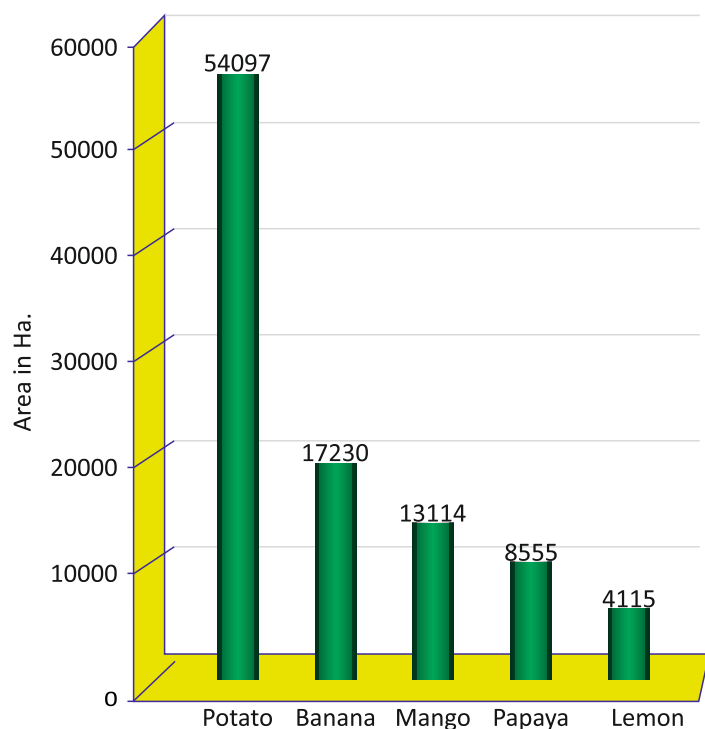
Land Holding Pattern in the State

- 5% Marginal Farmer (up to 1 Ha.)
- 65% Medium Farmer (>2 to ≤10 Ha.)
- 16% Small Farmer (>1 to ≤ 2Ha.)
- 14% Large Farmer (More than 10 ha.)

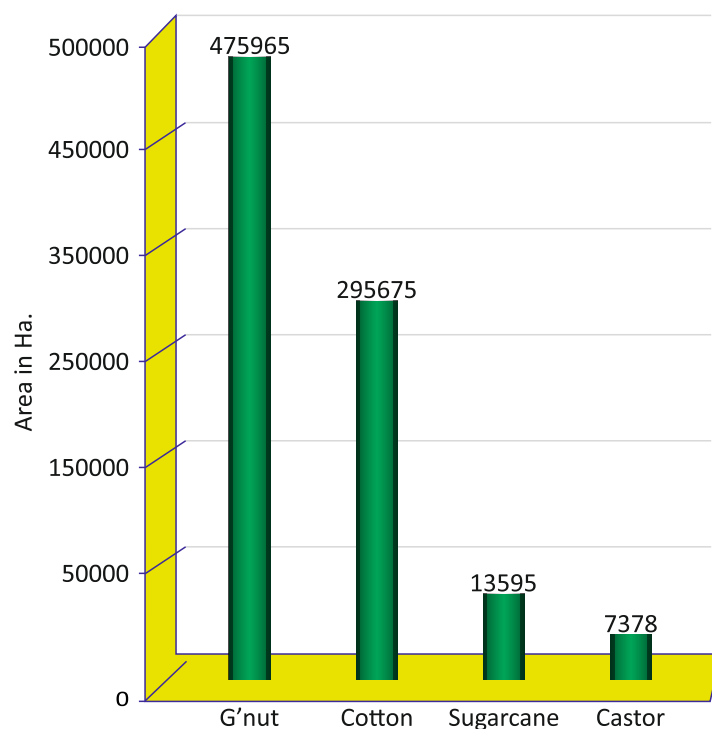
Fig. 5-MIS Adoption Pattern in the State as per size of land holding

Crop wise MIS Adoption

Out of total area under cultivation, Gujarat has 85% area under Agricultural Crops and 15% under Horticultural Crops. The matching trend in adoption of the MIS in the State follows the similar way covering 87% area under Agricultural Crops and 13% under Horticultural Crops being groundnut and potato as leading Crops in Agriculture and Horticulture crops respectively (Fig. 6)



Horticulture Crops



Agricultural Crops

Fig. 6-Crop wise area covered under MIS

Impact of MI Scheme on Gujarat Agriculture

The AFC India Ltd. (GoI) has been assigned the job to conduct a Concurrent Evaluation of the Scheme from 2005-06 to 2011-12 on an annual basis.

No.	Details	Result
1	Saving in Water	20-48%
2	Saving in Electricity Cost	10-17%
3	Saving in Labour Cost	30-40%
4	Saving in Fertilizers	11-19%
5	Increase in Crop Yield	20-38%
6	Increase in Net Annual Income Rs./ ha. due to MIS based on annualized cost	Rs. 17000/-

- Based on the above findings, the pay back period for the beneficiary farmers and for the Government has been estimated at 2 cropping seasons.

Source: AFC report submitted in the year 2014.

Contribution of MI Scheme towards Gujarat Agriculture GDP

As per the GGRC's rough conservative estimate from the year 2013-14 onwards there will be a contribution of Rs. 4741 crore towards the Gross Domestic Product of Agriculture sector (Fig. 7)

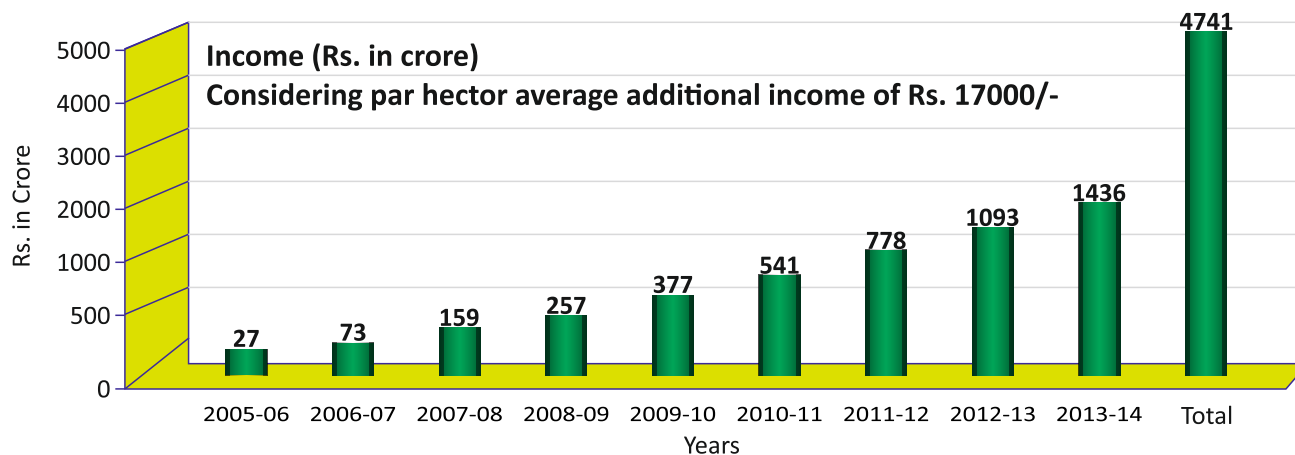


Fig. 7-Additional Income to Farmer

- 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.

Micro Irrigation – Efficient tool to reduce the input of fertilizers

- Micro Irrigation is an efficient tool to reduce the input of fertilizer with the help of Water Soluble Fertilizer (WSF). WSF 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. Water Soluble Fertilizer (WSF) have higher fertilizer use efficiency 45-95% compared to traditional fertilizers 20-50%.

Nutrient	Fertilizer Use Efficiency (%)		% increase compared to Soil Appli. (%)
	Soil Application (Flood Irrigation)	Drip Fertigation	
Nitrogen	40-50	95	90-216
Phosphorous	20	45	125
Potassium	50	80	60

Source : Tamilnadu Agri University , Koimbtore Agro Tech Portal

History of WSF in India

- During the early 90s, the WSF technology was first time introduced in India in Maharashtra. However, field trials were conducted in subsequent years and based on the result Government of India notified WSF under Fertilizer Control Order (FCO). The brief history is mentioned below:

Year	History of WSF in India
1992	Technology first time promoted in India-Maharashtra
1993	Field trials were conducted on high value crops
1995	Distribution / Sales started on commercial basis in India
1997	Govt. of Maharashtra first notified WSF
2003	Govt. of India notified WSF under FCO
2006	GSFC has started production in the year 2006-07

Methods of WSF Application



1

WSF Fertigation through Fertilizer Tank in Drip System

WSF Fertigation through Ventury Injector in Drip System



2



3

WSF Fertigation through Drip

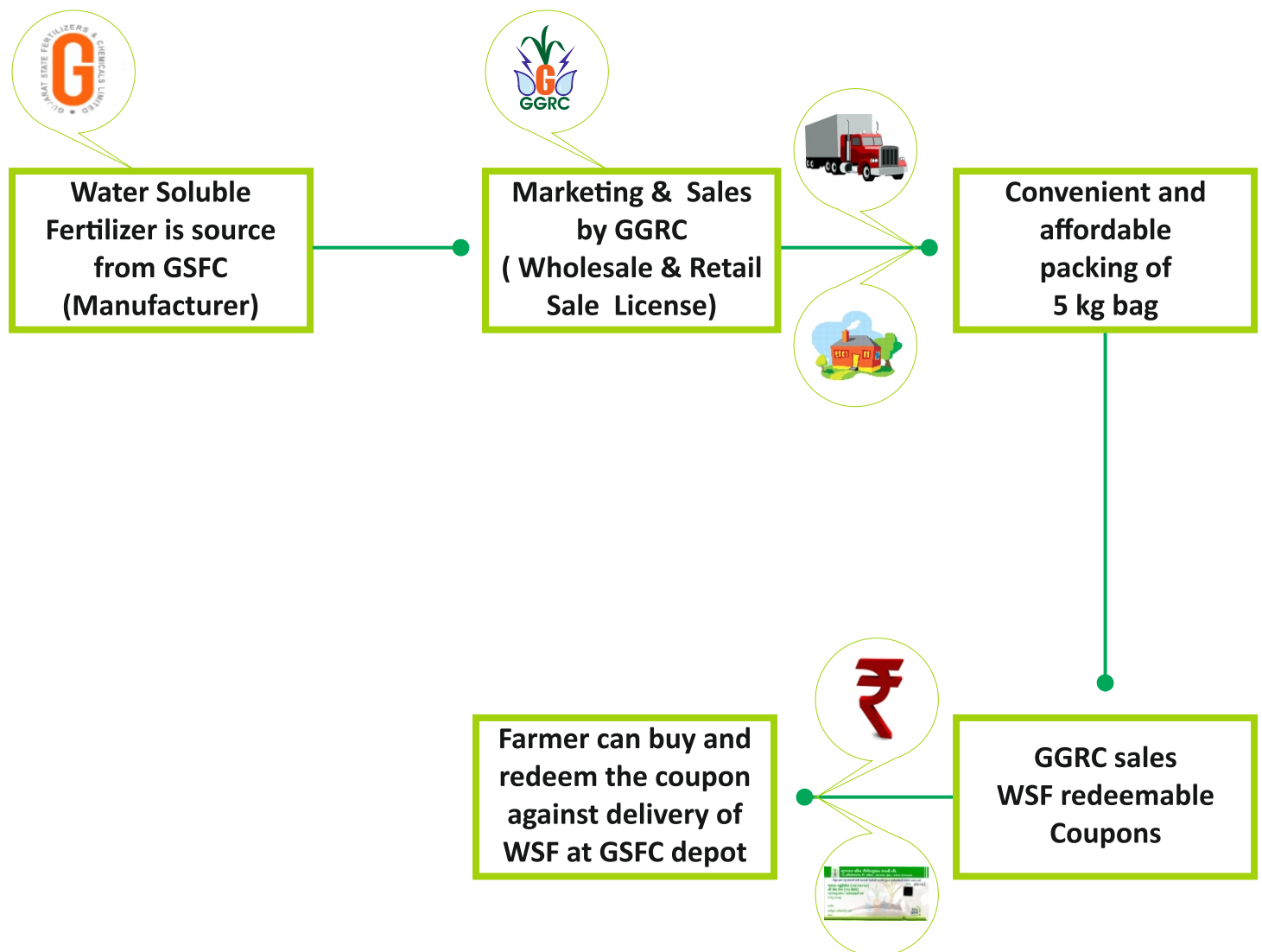
Strategy adopted by GGRC to distribute and promote WSF

GGRC has tied up with GSFC to make available WSF to MIS beneficiary farmers. At present 6-different FCO approved grades containing major nutrients are being offered.

- 19-19-19 NPK-Nutrisol
- 00-52-34 Mono Potassium Phosphate (MKP)
- 13-00-45 Potassium Nitrate (KNO₃)
- 12-61-00 Mono Ammonium Phosphate (MAP)
- 00-00-50 Sulfate of Potash (SOP)
- 17-44-00 Urea Phosphate

- To make available WSF to drip beneficiary farmers, GGRC is distributing Water Soluble Fertilizers through marketing network of 63 Micro Irrigation Suppliers (MIS) who are registered under Micro Irrigation Scheme having dealer base of more than 1100 in Gujarat.
- GGRC along with MIS Suppliers continuously conducting large number of farmer's awareness meeting and training in the field wherein, main emphasis is on scientific and judicious use of Water Soluble Fertilizers.
- Available in convenient, affordable small size packing of 5 kg so as small and marginal farmers can buy.
- Promotion of crop specific usage of WSF through SMS services to beneficiary farmers.
- Field demonstration of usage of Water soluble fertilizer through fertigation.
- Providing Fertigation Equipment to beneficiary farmers of Drip Irrigation.
- Special discount on sales price to Farmers for bulk purchase of WSF.
- MIS Suppliers are also mandated to organize field demonstrations for Water Soluble Fertilizers.
- Protected Cultivation farmers are also targeted for promoting use WSF.

Procedure adopted by GGRC for distribution of WSF in Gujarat



Promoting of WSF



सरदार
सरदार न्यूट्रीसोल

- सरदार न्यूट्रीसोल पानी में १०० प्रतिशत घुलनशील खाद है।
- उसमें सूक्ष्म पोषक तत्व के अलावा खाद पूर्णतः पानी में घुलनशील होने से फोलीयर स्प्रे और ड्रिप फर्टिगेशन में भी उपयोग किया जा सकता है।
- सरदार न्यूट्रीसोल प्रत्येक प्रकार की फसलों जैसे फल, फूल, सब्जी, अनाज, दाल, कपास, गन्ना, केला, मसाला, चाय, काफी के लिए उपयोगी है।

गुजरात स्टेट फर्टिलाइजर्स एन्ड केमिकल्स लिमिटेड
फर्टिलाइजरनगर - ३९१७५०, बड़ोदरा, गुजरात. www.gsflimited.com

Leaflet and Pamphlet, Wall paintings, tractor and trolley painting etc.

Field Demonstration, Farmers' meeting, participation in fairs and exhibitions



TV, and print media, and Radio broadcast

Protected Cultivation Scheme : Pilot Project

By looking into the success of GGRC in implementation of MI scheme module, the Gov. of Gujarat has entrusted the implementation of protected Cultivation Scheme on pilot basis where GGRC took a new initiative by establishing Poly/shade net house along with developing Market linkages for the produce. The Government of Gujarat has issued a GR dated 08/08/2014 for the implementation of this Protected cultivation Scheme on Pilot basis.

- Protected cultivation means cultivation of crops under partially controlled weather parameters.
- The integration of Protected cultivation with the Micro Irrigation Scheme would add value to the MIS and yield synergistic results for the benefit to the farmer.

Benefit of Protected cultivation

- An efficient utilization of water, fertilizers and electricity.
- Reduction in plant protection cost.
- Crop(s) can be grown under adverse weather conditions.
- Higher crop yield (30-40%) compared to open field cultivation.
- Improvement in the quality of produce.
- Increase in farmer's income

Type of Approved Structures:



Naturally Ventilated Poly House



Dome type Poly Shade Net House



Dome type Shade Net House



Flat type Shade Net House

Area of Structure : Ranges from 250 sq. meter to 2000 sq. meter.

Subsidy : Up to 50% of the unit cost is provided as a subsidy.

Services :

- Insurance of life of beneficiary & Structures
- Agronomical Advisory Services for 1 year;
- Maintenance for 3 years.

Unique Features

- Adoption of GGRC successful business approach model of MIS.
- Implementation on a Cluster Mode.
- Promotional and Demand generation by Supplier companies and GGRC.
- Hand holding of farmers for a period of one year for crop cultivation and maintenance of the PC Structure.
- Partnering with NGOs/GH Suppliers for creating marketing linkages for farm produce.

Market Problems faced by the farmers

- Limited quantity of production is acting as major hurdle in getting the market access.
- Absence of niche market for high value crops
- Dependability on the APMCs / Local mandis for day to day selling.
- Limited bargaining power because of individual market approach.
- Absence of farm produce storage and preservation facility at farm end.
- Low presence of organized sector in agro and food processing.

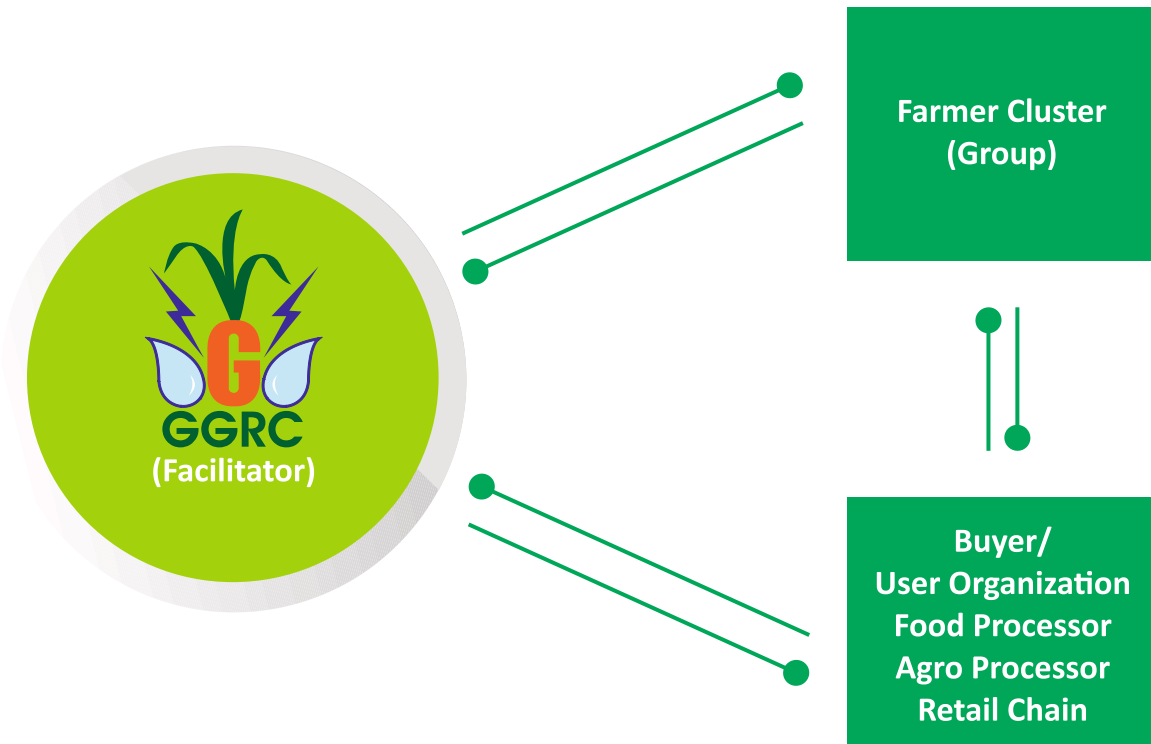
GGRC Initiative

- Initiated to tie-up the farms on cluster basis with the potential buyer.
- Execution of tri party agreement to ensure the smooth implementation of the agreed terms.
- Transparent and flexible sale price mechanism to purchase :

$$\text{Sale price with 15\% premium} = \frac{\text{Weekly avg. of model prices of APMC-1 + APMC-2 + APMC-3}}{\text{Total No. of APMCs (3)}} \times 1.15$$

- Desired quality & assured availability of quantity of agri. produce to the buyer.
- Ex-farm delivery.
- Generation of daily income for the farmers like ATM.

GGRC Model for Mkt. Linkages



Current tie-ups

- MOU among leading food outlets in Vadodara.
- Covered 8 beneficiary farmers in Bhalej village of Anand District under Protected Cultivation Scheme of Protected Cultivation Scheme.
- The food outlet will take delivery ex-farm. The food outlet will pay farmers on agreed premium rates.

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 Customized 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.

- Govt. of India, Ministry of Agriculture, contacted GGRC to develop a monitoring system for its ongoing On Farm Water Management Scheme under NMSA.
- Sardar Sarovar Narmada Nigam Limited, Gandhinagar appointed GGRC as a consultant to advise them on adopting GGRC module in their Under Ground Pipeline Sub-minor Scheme on a large scale.
- Govt. of Karnataka, Dept. of Horticulture has appointed GGRC as consultant to develop Scheme implementation module.

Conclusion

- Micro Irrigation for economising irrigation water and improving water use efficiency.
- Gujarat model; to bring in transparency, pace in implementation with a complete autonomy to the farmers and implementing agency, is to be introduced among all States.
- Micro Irrigation Industry should focus on better economical designing without compromising the technical feasibility and operation and maintenance aspects.
- An imminent need to educate the farmers on better scientific use of the system especially in the areas of water and fertilizer use.
- Fertigation through the use of locally available WSF like urea phosphatic fertilizers in conjunction with liquid bio fertilizers like Azetobactor, Rizobium etc. need to be popularized.

GGRC has set a milestone through

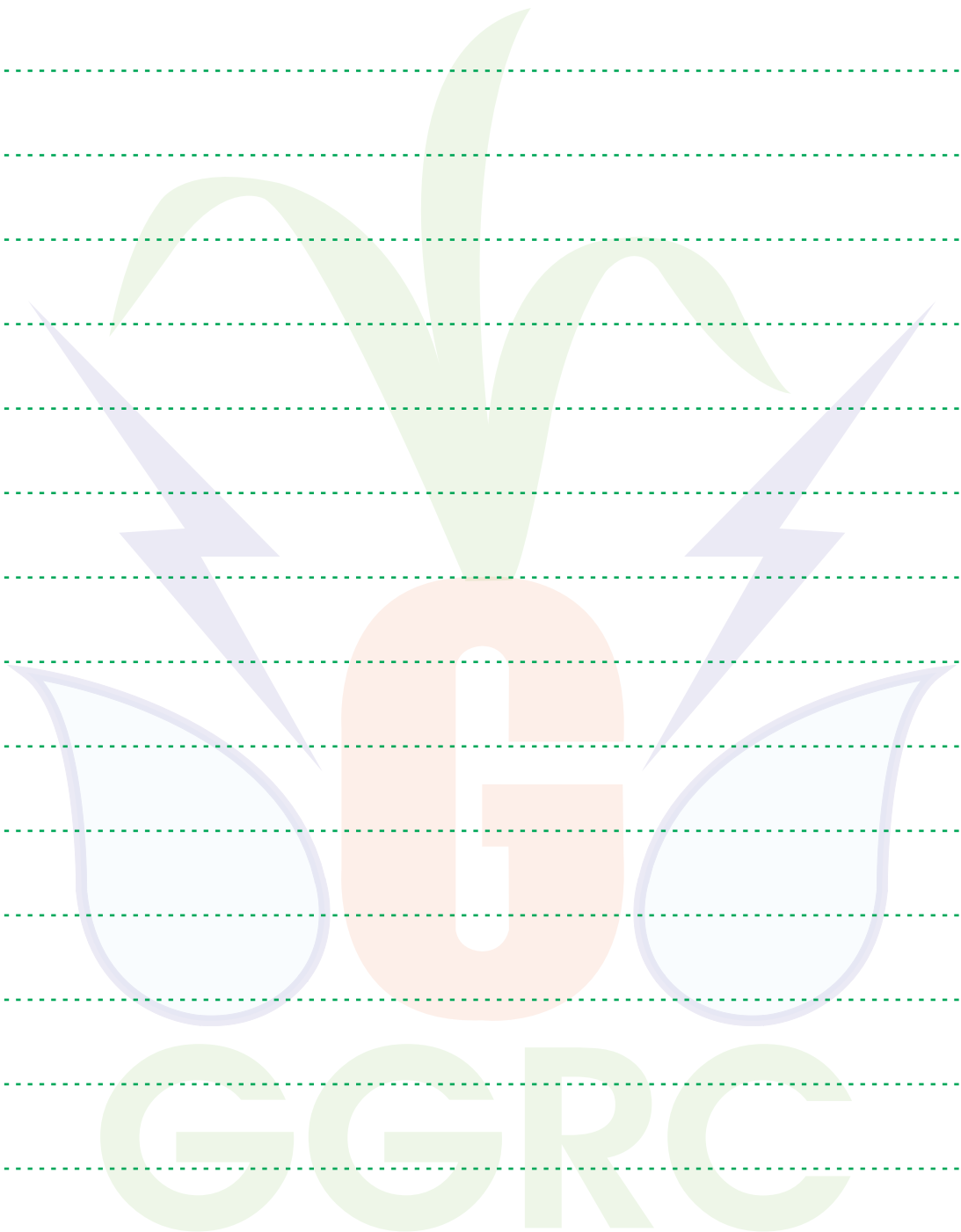
Drip Irrigation;

An irrevocable Benchmark which has added word
“Extra” for just and “Ordinary” farmer.

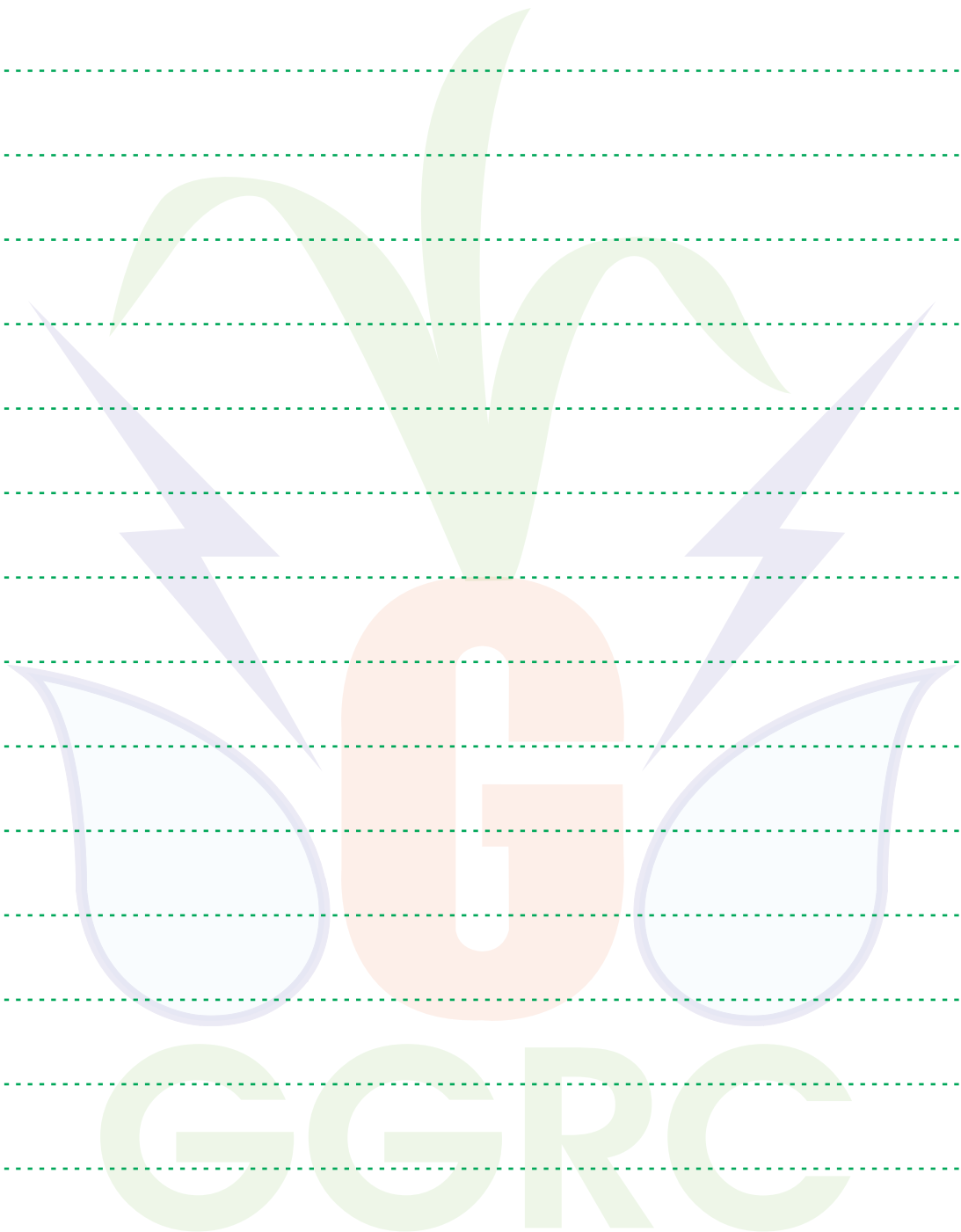
That's Extraordinary



Key Notes



Key Notes





Still, a lot to be done to realise

 ताकात अेक ँडनी 

To achieve More Crop per Drop as per our
Hon'able PM's vision