

A REPORT ON INTERNATIONAL TRAINING & EXPOSURE VISIT ON "NATURAL RESOURCE MANAGEMENT AND SUSTAINABLE AGRICULTURE PRACTICES" IN SEMI ARID BRAZIL

On behalf of Gramin Vikas Trust, I participated in this International Training cum Exposure visit organized which has been sponsored by NABARD and conducted through World Resource Institute (WRI) during 18th to 24th of August, 2014. During this visit I got orientation and exposure to various NRM and agricultural practices being adopted in semi arid Brazil to adapt for Climate Change Resilience. I travelled to three states of Brazil and could see the works done by the farmers' co operatives through networks of NGOs, Agricultural Research centre of the country and others. My day to day exposure cum training and learning are illustrated below;

18th August 2014 to 20th August 2014

Visit to Adapta Sertao, Pintadas, Salvador.

Adapta Sertao – “Adapta” means Adaptation and “Sertao” means semi arid region.



Roof top rain water harvesting system for Agricultural use.

This is a network of farmers' cooperatives working which started working since 2005 focusing on water which is main challenge as the region witness severe drought after certain interval. This initiative believes that efforts could be fruitful through local institutions. Hence farmers cooperatives were facilitated and development interventions were promoted with farmers family keeping Climate Change resilience as core of its development

Interventions. First of all water harvesting and storage were adopted to have sufficient water for drinking, domestic use, animal use and agricultural use. Agriculture was focused and marketing of agricultural produce were promoted through co operatives. Thus farmers' cooperatives were formed in the year 2009. Other technological options like milk and processing of fruits were introduced as dependence upon one technology was not adequate.

KEY Learnings:

1. Roof top Rain Water Harvesting Systems for Drinking water, domestic use, agriculture and animal husbandry.
2. Bio physical storage of rain water in Palma Forrageira – a species of cactus for animal feed in semi arid conditions. This variety of cactus is spine less and its use as animal feed is helpful in 30 % reduced requirement of water for animals.
3. Promotion and strengthening of Local farmers institution as Cooperatives have played an important role in establishing market linkages for farmers to sell their agricultural produce at local level as well as for processing and value addition. Farmers co operatives are instrumental in absorbing the production and commercializing it.

A field visit was also conducted to see these technologies implemented in field. One farmer also shared his experience. The Farmer had adopted various interventions of water harvesting, goat rearing, pig rearing and cactus cultivation. A demonstration of chopping of cactus and mixing nutrient to it and feeding to the cattle was shown. Technologies were very simple and replicable in the semi arid region.

The group also visited one of the cooperative – Serdo Sartao, working in Pintadas, which owns and operate one vegetable selling stall at Municipal Market Place. The stall was allocated by the government.

The co operative had a Fruit Processing plant having capacity of processing 2 Tonne per day to prepare Pulp. The co operatives identified that a local fruit called “Umbu” is available with each farmer and very rich in vitamin are not being fully consumed locally and found the opportunity to make pulp and package it. Along with Umbu other fruits like Guava and Papaya were also processed for pulp. The packaged pulp of fruits is purchased by government



Vegetable stall operated by Cooperative



One of the members of cooperative demonstrating the pulp of Umbu fruit processed in the plant.

Presentation by SICOOB Credit Cooperative:

The conception of such cooperative came into being thirty years ago when there was a need for communities to organize and set up various institutions for different common necessities. Different entities were formed for fulfilling these requirements one among those is SICOOB Credit Cooperative which was established in 1997 as people do not have access to banking services in that area and have to travel other municipalities to avail financial services. Started by 50 people with a capital of 10,000 R\$ this cooperative has been recognized by Central Bank of Brazil in 1998. The functional areas of the bank is divided mainly in three areas –

1. Relation Management
2. Credit Operations
3. Organizational support

Currently this cooperative is operational in 10 municipalities of Bahia state and has grown to almost 600 % from 2007 to 2014.



Officials of SICOOB Credit Cooperative discussing credit structure and operations in Bahia state, Brazil.

One of the important feature of the credit system was **MAIS – Sustainable Smart Agro-climatic Module**) which serves as single window access to availing different agricultural credit needs in a comprehensive mode. The cooperative also has a legal buy back agreement with farmer to sell his produce to the cooperative from which he availed credit. Based on the requirement of the farmer the cooperative prepares a DRS Plan (Sustainable Rural Development Plan) for 5 Year with a financial outlay of 20,000 R\$ per 5-6 Hect of land per farmer at the rate of three percent per year.

21st August 2014, Petrolina

Visit to Embrapa Semiárido

Embrapa Semiárido that I visited is one among the forty Embrapa units that are established for research on Brazilian Semiárido ecosystems. The unit that I visited was a regional unit established with Public Private Partnership with research focus specially in areas of interface of R&D along with many government institutions like Ministry of Agriculture as well as private corporations like Syngenta. The unit hosts Center for



Mr. Pedro Paganini, Official of Embrapa Semoarido interacting with team during his presentation.

Management on Natural Resources. The operational areas are divided mainly into Eco regional units for dealing with regional research and development and Product centers that deals with crop or commodity specific research. The Director General shared some of the experiments that mainly focusing on Semi arid tropics. Campus experiments were mainly divided into three categories

1. Irrigated area research campus
2. Dryland Farming Research campus
3. Green houses.

The center also carries research on Tropical wines. The group visited to some of the campus experiments

1. Comparative experiment in Robusta and Arabica Coffee where Robusta coffee experiment was very successful
2. Research plot on adaptation trials of cultivating tropical fruits in Semi Arid climate.- Cultivation of PEARS by water management
3. All season mango fruits cultivation by water and nutrient management
4. High density mango plantation @ 6 m x 3 m spacing and pruning
5. Drip irrigation and fertigation in Grapes and other orchard
6. Orchard irrigated with rain water harvesting systems viz. rooftop, plastered surface, pit with poly sheet etc.
7. Comparative experimental plot of onion with direct sowing and transplanting.



Field visit to experimental and research plots by the team

Visit to Coana cooperative Grape Farm

A visit to one of the farmer who had undertaken grape cultivation was conducted. The farmer was member of Coana cooperative that exports fruits to Netherlands, Germany, England and many other countries. The farmer had canal water as source of irrigation and had undertaken cultivation of grapes in thirty seven hectares and mango in 35 hectares of area.

KEY Learning:

1. By management of water stress and nutrient management harvest of mango is possible all seasons.
2. High density plantation and pruning of plants was useful tips



Grape Farm of Coana Cooperative

23rd August 2014, Rio de Janerio

Visit to MATA ATLANTICA

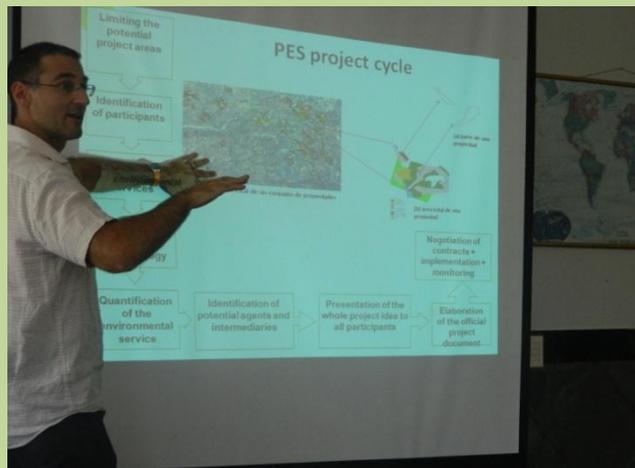
Presentation 1

Mata Atlantica is one of the largest biom with rich bio diversity that exists in Brazil. Rio having population about 10 – 12 million people have created heavy biological stress on the Natural Resources in the region. It was shared that the forest area has now reduced to only 8.5 % of the original forest. Thus there is an immediate need to protect and conserve the bioma. Adapta Mata Atlantica is one of the projects that have been promoting conservation of forest and bio diversity in the region through “Payment for Environmental Services” approach. Basic philosophy behind this concept is that Forest provides many environmental services to the people and industry in that region. Thus the services provided by the forest can be quantified and the proportionate value can be paid in turn to the farmers or



the community dwelling in the forest that undertakes conservation activities. This has been on going on pilot basis.

Another initiative SINAL has been promoted as one of the initiative to conserve, practice and research in improving the quality of life and environment. Volunteers at SINAL are welcome to offer their contribution in the following areas: organic gardening, agroforestry, animal husbandry and various farming systems.



Presentation 2

Second presentation was made by one of the official from Department of Civil Defense, Rio de Janeiro on "The Relation between Disasters and Development in Affected Communities." In Brazil there is a National Policy on Civil Defense for preventing, helping, assistance and rebuilding actions needed to avoid or minimize disasters, preserve people's morale and re-establish social normalcy. It was shared that Climate Change and degrading environment has serious repercussions on Water, Public health and food systems. There was severe land slide occurred Nova Friburgo valley region due to rainfall in excess of 300 mm in 36 hours. That event accounted for around 900 deaths in the mountain region, and over 430 deaths only in Nova Friburgo. Thus the government started capacity building programmes for communities for Disaster risk mitigation and Disaster management.

- Project 1 - UPC & Community Civil Defense Agents
- Project 2 - Alert and Alarm System with sirens
- Project 3 - School Community Agent

One interesting fact that is shared by the official that the event also has serious impact over energy requirements and later government has provided financial incentive to replace old inefficient home appliances with the new efficient ones.

Presentation 3

Adapta Mata Atlantica Law (AMA) and Water Management

In 1988 Federal Government of Brazil by constitution declared Water as public good. There is another law in Brazil that gives right to communities to take decision over public goods. Thus the concept of River Basin Committees came into being to Manage Water resources. One of the officials has shared the operation of Paraebade Su Basin Committee which is a 60 member committee that consists of the following

- Users – 40%
- Representatives from Government – 35%
- Representatives from Civil Societies – 25 %

This committees are further divided into subcommittee consists of

- 12 Users
- 9 from civil society
- 9 from government
- 7 from Municipality
- 1 Federal government representative
- 1 State government

Prior to 1997 there are no charges for use of water. A law has been passed which gave right to committees to decide water use charges. Now committees prepare plan and take decisions on development from the funds collected as water charges.



Presentation 4

A brief presentation on Micro watershed development model being implemented in India with NABARD support was made by Gujarat Team Leader Shri Rajesh Dave, DGM, NABARD.

Through this presentation key technical intervention of water harvesting, in situ soil moisture conservation, agricultural development and institutional development were shared. It was highlighted that all the



technological options used in our country are fit for climate change resilience though it is not pronounced so but focus is on livelihood.

Besides above training and exposure last one day of the visit was used for some site seeing at Rio where the team visited Christ the Redeemer, Botanical Garden and Copacabana Sea Beach.

Overall the visit has provided a very good learning opportunity to the team members where each one could see simple technologies being used in semi arid Brazil for climate change mitigation. Some of the interventions are certainly worth replicating here also. Besides watershed development works being done in our country may rightly be termed as **Climate Change Resilient Livelihood Programme** which could attract world's attention towards our approach.



The visit was so concluded with thanks and lots of cheers.

Some key suggestions worth implementing in our watershed in Gujarat

1. There is a need to introduce Rain Water Harvesting Systems in watershed area specifically for raising small Wadi of 36 - 50 horticulture plants with low cost dry matter mulching.
2. We may moot livestock development with water saving feeding mechanism for which suitable plant species may be identified followed by necessary R & D.
3. In order to tap the post harvest processing cum value addition, promotion of pulp making unit with deep freezers and pouch packing machines may be suitable for local fruits.
4. We may undertake crop diversification for Semi Arid Tropic region as well as watersheds to provide better income generation and regular cash flow to farmers.

5. Need of cooperative farming and marketing for fruits may be well placed for watersheds after associating all the producers as FPOs.
6. We may request Agriculture Universities to establish package of practices for Mango Crop Induced flowering through Moisture stress and some hormonal treatment to expand the season of mango fruit availability for better return.
7. Coffee plantation in shade of big orchards including Banana plantation as mixed crop may also be taken up on experimental basis by horticulture research stations.

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