

Sharpening Skills



Orissa Tribal Empowerment and Livelihoods Programme
(OTELP)





Improved Rice Production Technology under Rainfed Ecosystem and SRI Method

DATE OF TRAINING	: 3 rd to 5 th June 2011 & 16 th to 18 th June 2011
VENUE	: Central Rice Research Institute (CRRI), Cuttack
NO. OF PARTICIPANTS	: 36 (in each training)
NATURE OF PARTICIPANTS	: OTELP WDT (Agriculture), Village farmers, Agriculture officers.
OBJECTIVE	: TO POPULARIZE NEW TECHNOLOGIES OF RICE PRODUCTION AND POPULARISATION OF SRI METHOD IN OTELP OPERATIONAL AREAS.

The training was inaugurated by Dr. T.K. Adhya, Director of CRRI and he highlighted on rice production in India- problem and perspectives. In his speech, he opined that Rice is the produced in at least 95 countries of the world and it is the staple food for half of the world's population. It accounts for 23.03% of the gross cropped area and 43% of global food production. As population increases over this century, the demand for rice will grow to an estimated 2000 million metric tons by 2030. Meeting this about 35% increase in demand will require significant increase in rice production. Rice is also the most important cereal food crop of India which occupies about 24% of gross cropped area of the country. It contributes 43% of total food grain production and 46% of total cereal production of country.

In India rice is grown under various eco systems. Kharif rice accounts the major area and the yield per ha are much below the summer season rice. Out of total rice land in the country, 45% are completely rainfed. Though the green revolution technologies for rice developed during 1960s could increase rice production significantly in the irrigated areas, they by passed, to a large degree, unfavorable rice growing regions of India. The irrigation ratio is more in northern and southern India than

eastern India. Even some of the irrigated lands are prone to submergence/flood during monsoon season and more particularly in eastern India resulting in low yield.

Though constraints in rice production vary from state to state and also from area to area, eastern zone which generally experiences high rainfall and severe floods/drought almost every year, low and imbalanced use of fertilizers and low use efficiency of applied fertilizers result in heavy losses to the rice crop. Continuous use of traditional varieties due to the non-availability of suitable yielding varieties and quality seeds and farmers lack of awareness about high yielding varieties also contributory factor for lower productivity.

The area planted to rice is declining because of the pressure of urbanization and



Participants in the training programme



Participants visiting Rice Museum

industrialization. Availability of water for agriculture is declining and labour is moving to industry. To meet the challenge of producing more rice under these constraints, there is a need for new technologies and is expected to include rice variety with high yield potential, greater yield stability and adapted to changing global climate and overall more efficient management practices.

The resource person Dr.K.S.Rao explained about package of practices of paddy cultivation with special reference to SRI and low land ecosystem. He said that achievement of targeted production would be an uphill task in the coming decades with the shrinking natural resource base, deteriorating soil productivity, declining input use efficiency, plateauing of yields in irrigated ecologies and lack of a major yield breakthrough in rain fed ecologies. Based on the depth of water stagnation in the field , the rainfed lowland rice areas are classified into-Shallow lowlands, Mediumdeep and Deep water. The crop production under these rain fed areas can be improved by adopting the following technologies.

- Suitable varieties of paddy to be grown
- Nursery management
- Land preparation
- Stand establishment
- Fertilizer management
- Weed management
- Cropping/farming system
- Disease management

● Insect management

SRI improves environmental conditions besides increases rice yields significantly through effective integration of soil, water, and nutrient and plant management without dependence on high cost modern inputs. The practice of SRI is helpful in improving the soil quality and soil biodiversity. SRI appears to be a viable alternative that saves the inputs, improves soil health/quality and protects the environment sustainability. SRI uses less seed, water, chemical fertilizer, and pesticides but yields more with large volume, profuse and strong tillers with big panicles, more and well filled spike lets with high grain weight. The six basic principles of SRI are:

- Use of young seedlings for transplanting
- Careful transplanting
- Planting at wider spacing
- Weed control
- Water management
- Use of organic manures

Dr. G.J.N. Rao explained the participants on rice varieties suitable to be grown under SRI method and in low land ecosystem. Dr. D.P. Sinhababu and Dr. P.K. Sahoo told on the concept of Rice-Fish farming to the participants. Rice-Fish farming is shifting to farming system in rain fed low lands can only ensure higher and stable farm productivity, income and employment. Among the different farming avenues, rice-fish system is the most acceptable choice particularly in the eastern India. This system has many advantages including conservation of rice environment, as it creates micro watershed and facilitates farm diversification which leads to higher and sustainable productivity. In order to improve and stabilize farm productivity and income from waterlogged lowlands, CRRI developed an easily adoptable technology of rice-fish diversified farming system. This system integrates different compatible components like improved rice, fish, prawn, ducks, pearl culture, Azolla, and different crops after rice in the field

and vegetables, fruit crops, floriculture, apiculture, mushroom cultivation, agro forestry, poultry, goatery etc. on bunds. This technology mainly includes field design and construction and production methodologies of different components. Use of agriculture implements and nutrient management for paddy cultivation in low land eco system in SRI method are also explained to the trainees. The participants also learnt integrated pest management.

Different insect and pests and diseases damage the rice crop at different stages of crop growth and cause an annual loss of around 10% which costs about 5,000 crore rupees in India. The warm and humid climatic condition being conducive for many pests, they form a major constraint for increasing rice production in this ecosystem. Weed management is important for pest management. Though lowland rice weed is not a problem as compared to upland rice, different direct and indirect methods of weed control should be rationally combined to achieve economical and adaptable weed control. Direct methods include manual, mechanical, and chemical methods while indirect methods include land preparation, fertilizer and water management practices. Dr. K.M Das explained the integrated disease management during lecture. He described that there are 65 diseases of rice. Among them there are six major diseases viz. bacterial blight, sheath blight, false smut, brown spot and tungro which occur on low land rice. Their proper identification and management practices are discussed in detail. However, the integrated management of the disease involves the following practices.

- Use of resistant varieties
- Seed selection
- Seed treatment
- Field sanitation
- Eradication of weeds
- Application of pesticides at appropriate time
- Management of water in the field

- Frequent monitoring of disease incidence and taking appropriate measures.

Apart from chemical management, botanicals may be used to control the diseases of paddy that was described by Dr. Mayabini Jena. The major botanicals are neem, karanja, kochila, pani maricha etc.

The participants also visited SRI farmers' field and interacted with them and practical knowledge was also gained. At last, the trainees learnt the quality of grains and extension



A participant is receiving certificate

approaches for transfer of rice production technology. Dr. B.N. Sarangi and Dr. Arun Pandit in their extension approaches, described about rice production scenario in Odisha, challenges before the farmers, scope of technology and information to face the challenges and dissemination of information and technology to the participants.

Participants being the grassroots workers of OTELP, it is expected that they should work to strengthen the rice based livelihood patterns. It can be suggested that the workers should follow location specific, problem oriented and participatory extension.

The participants were also told to hold participatory evaluation of technologies by the farmers after implementation of the programme. Also in order to make the extension more effective in tribal area, the participation of women in agriculture development should be focused to have a better rice based livelihood as women in tribal community seem to be very active in agriculture.

Soil and Water Conservation, Agroforestry and Watershed Management for Improving Tribal Livelihood and Food Security.

DATE OF TRAINING	: 15 th to 17 th July 2010
VENUE	: Central Soil and Water Conservation Research and Training Institute(ICAR), Sunabeda, Koraput
NO. OF PARTICIPANTS	: 20
NATURE OF PARTICIPANTS	: SMS, WDT Members (Engineers), Facilitating NGO representatives
OBJECTIVE	: TO IMPART THE KNOWLEDGE ON DEVELOPMENT & MANAGEMENT OF WATERSHED IN HILLY AREAS



Training programme is in progress

Integrated Watershed Management is the process of managing human activities and natural resources on a watershed basis. This approach allows us to protect important water resources while at the same time, addressing multiple critical issues such as the current and future impacts of rapid growth and climate change. A watershed is not only a geographic area, but also a living space. It is basically the area of survival of the community living within it and drawing its sustenance from it. In resource fragile areas, these demands and claims on the environment are enormous. In order to conserve, enhance and regenerate

natural resources, while at the same time ensuring that claims made on it are within its carrying capacity, it is important that all those individuals and groups - who often are in competition and conflict with one another - come together, develop a common understanding of their problems, arrive at a shared consensus on measures to be taken and work out conflict resolution, arbitration and benefit sharing mechanisms that are fair to all.

The training Programme covered major activities like rain water conservations, agronomic measures and harvesting of rain water in watershed management. In each activity, the scientists discussed on various interventions and expected outcomes.

The different topics covered in the training programme are :

- Soil and Water Conservation ,Engineering measures in Watershed
- Agronomics measures in watersheds for sustainable productivity
- Agroforestry for livelihood improvement in watersheds

- Introduction of Agri-Horti. And plantation system in watershed for livelihood improvement
- Crop diversification for food security and post project manahement in watershed development
- Introduction of pisciculture in watershed
- Importance of sericulture in watershed forlivelihood improvement
- Role of livestock for livelihood improvement in watersheds
- Integrated watershed management-success story of KOKRIGUDA watershed

Field visits were done to Kokriguda, Dolimba and Lachhputraghati model watershed projects and on farm training was given to the participants.



Practical training is being imparted by the trainer

This training programme was an insight for the participants where they understood the concepts and approaches of watersheds. They were able to understand the technical aspects as well. The participants are now well versed with the same and they hope of better implementation in all OTELP operational areas.



IMPROVED AGRO TECHNIQUES ON FRUIT AND OFF SEASON VEGETABLE CULTIVATION

DATE OF TRAINING	: 12 th to 14 th June'2010 & 27 th to 29 th June'2010
VENUE	: Central Horticulture Experiment Station(ICAR), Dumduma, Bhubaneswar
NO. OF PARTICIPANTS	: 20
NATURE OF PARTICIPANTS	: Agriculture Officers of ITDAs, WDT (Agriculture), Progressive farmers, Agriculture volunteers
OBJECTIVE	: TO IMPART THE KNOWLEDGE ON FRUIT & VEGETABLE CULTIVATION

Agriculture is the major source of livelihood of the tribal of OTELP areas as they get more than half of their income from settled agriculture and shifting (podu) cultivation. The non scientific approach followed in farming by tribal communities is the main reason for low productivity in case of number of crops.



Class room training session is going on

Considering the above matter, a series of training programme organized for different stakeholders of OTELP to thrust knowledge on fruit as well as off season vegetable cultivation as most of the OTELP areas have a very conducive environment for off season vegetable cultivation. The participants were exposed to low cost techniques for increase in productivity with disease management.

The training Programme covered major activities like improved farming techniques on mango, banana and papaya and other off season vegetable cultivation practices.

The different topics covered in the training programme are

- Land identification, development, layout, planting & propagation techniques of mango, banana and papaya
- Concept of Integrated Pest Management (IPM) and practice of IPMA
- Farming techniques on off season vegetable cultivation
- Practical on pruning, Bordeaux pasting, canopy architecture, organic production technology.

This training programme was an insight for the participants where they understood the concepts and approaches of various horticultural practices with disease management and newer low cost techniques for higher yield productivity which will give a boon to their income. The participants are now well versed with the same and they hope of practice these techniques in their farm fields.



Practical demonstration shown to the participants

Improved Agro Tehcniques of Tuber Crops

DATE OF TRAINING	: 11 th to 13 th May 2010 & 24 th to 26 th June 2010
VENUE	: Central Tuber Crops Research Institute (CTCRI) - ICAR, Dumuduma, Bhubaneswar
NO. OF PARTICIPANTS	: 45 (in each training)
NATURE OF PARTICIPANTS	: OTELP WDT (Agriculture), Village farmers, Agriculture officers.
OBJECTIVE	: TO POPULARIZE TUBER CROP CULTIVATION IN A SCIENTIFIC WAY with EXISTING VEGETABLE CULTIVATION AMONG TRIBAL FAMILIES IN OTELP OPERATIONAL AREA.

Most of the tribes collect roots and tubers from the forest to meet their dietetic need at the time of scarcity. The tropical tubers crops can play an important role in food and nutritional security of the people of tribal areas. Tuber crops could serve as a source of employment and income in rural and often marginal areas. Some of these crops can withstand long period of drought and low fertility level and some are high biological yielder. These crops, although have high yielding potential, produce lower yields due to unscientific cultivation, low use of inputs and use of local varieties. Non availability of quality planting materials and poor financial condition of the tribal farmers are major factors for low yield of such crops. Accordingly a project for improvement of tuber crops in tribal areas of Koraput and Kandhamal districts are implemented under RKVY during Kharif, 2011.

Capacity building of farmers on tuber crops is one of the components under the above programme. Accordingly training programme was organized in RC, CTCRI, Bhubaneswar.

The training to the farmers was imparted by Dr. R.S. Mishra, Head, RC, CTCRI, and Dr. N. Nenduncherian, Senior scientist, RC, CTCRI

with practical demonstrations. At the outset of the training programme, the resource persons wanted to know about the process of yam cultivation that the farmers are doing in their own villages. The participants were oriented on three major tuber crops like yam, elephant foot yam, cassava and sweet potato which can be easily grown in almost all the areas. The resource persons pointed that the tuber crop cultivation not only enriches the diet of the people but also possesses medicinal properties to cure many ailments or check their incidences.

The resource person advised to choose good varieties of seed of yam and elephant foot yam before taking up such tuber crops. The high yielding varieties like Orissa-elite for Yam and



Practical demonstration is shown to the participants

Gajendara for elephant foot yam may be chosen for the field. These two varieties have been supplied under RKVY. But the scientists told that the following technologies should be followed before planting of tuber crops (Yam, Elephant foot yam, Cassava and Sweet potato).

Yam :

- Three feet (90 cm) space is to be maintained from pit to pit in Yam cultivation.
- Yam to be cut into pieces horizontally with the size of 50 g.m. to 200 g.m.(preferably 100 gm)
- It is better to plant the yam seed in between the maize field as inter cropping.
- When the plants grow, the support is to be given for higher growth.
- 100 gm cut is to be planted in one pit.
- Planting can be done near fencing area but with proper procedures

Elephant Foot Yam

- The elephant foot yam is to be cut into pieces with the size of 200 gm.
- One piece is to be put in one pit mixing with cow dung to it in 2 inches (5cm)deep after 15 minutes and to be covered with soil.
- If possible, mulching can be done for quick germination and maintenance of soil temperature.
- The distance from one pit to another should be three feet.
- This can also be done as inter cropping in maize field.
- The planting is done from April to June. Elephant foot Yam to can be harvested after 7 month of plantating preferably in the month of December and January. If necessary, the little irrigation can be done in the month of October and November.
- One small piece of 200 gm can give an yield of 1,5 kg



Classroom training is in progress

Cassava

- The stem to be cut into pieces with 20 c.m. Each piece should have three to four buds
- The pieces to be cut very sharply having round in size
- No pit is to be dug for cassava like other tuber crops
- It is to be planted on the heap of the soil preferably one and half feet size.(45 cm)
- While planting, the buds of the stem should be upward
- The planting season starts from April to June and the harvesting starts from December.

So far as the yield of Cassava is concerned, plantation of 20 cm. piece will give an yield of 4 K.G. and it can be sold @ Rs 2/- per k.g which is a highly demanding tuber in our neighboring state Andhara Pradesh. The farmers of AP cultivate widely to prepare starch out of it.

Sweet potato

The resource persons of CTCRI pointed out that apart from the above three tuber crops, sweet potato is one of the best food plants in warm climatic condition that the farmers have started adopting. One can use sweet potato as the substitute of normal potato and this has less disease problem. Moreover, sweet potatoes are very nutritious and grown with very little water

and fertilizer. Sweet potato has both white - flesh and orange -flesh variety. The orange - fleshed sweet potato is rich in beta-carotene, which the body converts in to Vitamin A. 125 gm of orange-fleshed sweet potato varieties which contains enough beta-carotene can provide the daily vitamin A needs of a preschooler. Besides sweet potato is valuable source of vitamins B, C and E.

However, the farmers need to adhere to the following steps while cultivating sweet potatoes as shared by the resource persons during the training programme.

- The best soil for growing sweet potato is sandy soil but the farmers can grow in all soils.
- The soil should have good supply of nutrients.
- Sweet potato can be cut into pieces weighing from 50 g.m. to 100 g.m.
- Beds can be raised to grow such tuber
- Four feet space (120 cm) is to be maintained from row to row
- Thick mulching is required between plant and even between beds to initially keep the weeds down.
- The planting season starts from April to June and the harvesting starts from December

- Mature compost may be applied and not to use fresh fertilizer having high nitrogen content

The farmers were told about the value addition process of each tuber crop. They learnt different preparations using these tuber crops which the farmers can prepare at home. So far as Yam is concerned, it can be boiled and then can be fried with spices. Various curries are prepared with Yam with good taste. Elephant foot yam is boiled and then mashed, there after spices added which tasty. The resource persons shared that, consecutive eating of elephant foot yam relieves the person suffering from piles. Cassava can be used for preparing chips and curry with other vegetables. Like wise, sweet potato can be used as normal potato. It can be boiled and steamed as well. The boiled sweet potato is very tasty after adding

The participants had field demonstrations as well on the above tuber crops. During this field exposure, the participants learnt the complete process of each variety of tuber crop cultivation and they practiced the plantation of tuber crops in field areas of CTCRI right from field preparation to plantation of the same.



Scientific Crop Management Technologies in Major Kharif Crops of OTELP Areas

DATE OF TRAINING	: 24 th to 26 th May 2010
VENUE	: Agriculture Technology Information Centre, OUAT, Bhubaneswar
NO. OF PARTICIPANTS	: 40
NATURE OF PARTICIPANTS	: OTELP STAFF, STAKE HOLDERS, WDTs (Agriculture), VILLAGE VOLUNTEERS (Agriculture)
OBJECTIVE	: TO ACQUINT WITH THE SCIENTIFIC CROP MANAGEMENT TECHNOLOGIES FOR MAJOR KHARIF CROPS IN OTELP AREAS

Three days training programme was organized at OUAT by OTELP for its staff and other stakeholders that include agriculture officers, village level workers, horticulture officers, farmers, and agriculture volunteers. The training focused on scientific method of cultivation of important Kharif crops like maize, ragi, minor millets, ginger, turmeric, off season tomato and cashew. The methodology of training includes both class room teaching and on-farm training. Scientists of OUAT imparted training as resource person.

The first day of the training programme focused on integrated disease management in turmeric and ginger. These two crops are widely grown in programme areas of Koraput and Kandhamal districts. Dr. N.K. Dhal, Dean, College of agriculture, Bhubaneswar in his inaugural session explained the major diseases and their management practices in turmeric and ginger. Rhizome rot is a major disease of turmeric and the symptom of the disease is brown spots with black concentric rings on the leaves of young and old plants. The disease is controlled by spraying Dithane M-45 (mancozeb) at 3 grams per litre water or Blitox (copper oxychloride) at 3 grams per litre mixed with sandovit at 2



Participants in classroom session

ml per litre, one month after planting and repeating at 2-3 week intervals. The seed material should be selected from disease free plots and should be treated with Dithane M-45 (mancozeb) at 3 grams per litre, for 30 minutes and shade dried before planting as elucidated by Dr. Dhal.

Similarly, in case of ginger, the soft rot is the most destructive disease of ginger which results in total loss of affected clumps. According to the resource person, the disease is soil borne and soil treatment is essential before taking up this cultivation. The infection starts at collar region of the pseudostems and progresses upwards as well as downwards. The collar region

of the affected pseudostem becomes water soaked and the rotting spreads to the rhizome resulting in soft rot and a later stage root infection is also noticed. This disease can be managed with mancozeb 0.3% for 30 minutes before storage and once again before planting reduces the incidence of the disease. Besides, cultural practices such as selection of well drained soils for planting is important for managing the disease.

Dr. P.K. Roul discussed on the profitable way of cultivation of turmeric and ginger with organic farming. He emphasized on organic fertilizers like cow dung, vermin compost, neem cake, bio-fertilizer etc to be used by the farmers which not only reduces cost of cultivation from chemical fertilizers but also manages diseases and increases the productivity of the crop. The disease management in maize, minor and lesser millets, off season tomato, and beans are also discussed in threadbare. Prof. S.S. Nanda also explained the scientific way of cultivating maize that would improve the economy of tribal areas. He stressed on WADI model of cashew plantation in private land. Further, he imparted training on selection of quality planting materials (cashew graft), maintenance of proper spacing, application of manures and fertilizers at different stages of the crop, plan and irrigation to the crop. The farmers and the participants told about the existing practices of cashew cultivation and Dr. A.K Pattnaik, horticulturist, expressed management practices, problems and prospects of cashew cultivation in tribal areas of Odisha and he suggested to sell processed cashew for better pricing instead of raw cashew. Dr.Kalpana Rayguru's discussed on the value addition process of cashew, tomato, turmeric, and ginger for profitable income of tribal farmers. Also the marketing strategies for major cereal crops, vegetables and spices are shared by the scientist Dr. S.N.Mishra. The resource



Trainees are explained with visual presentation

persons highlighted on different methodologies for increase of organic content and fertility status of the soil. Lime/ paper meal slag should be applied in the soil for correction of soil acidity. Spurious organic fertilizers are available in the market. Those should not be applied in the crops. Instead FYM, compost, vermin compost, neem cake bio-fertilisers should be applied in the soil for increase of organic content in the soil Green manures like dhanicha in medium land paddy can be incorporated in the soil and paddy can be planted. Leguminous crops like cow pea, black gram, green gram, arhar, groundnut can be cultivated to increase the soil fertility.

Apart from these, the resource persons stressed on off season tomato and beans that provide better profit meeting the demand of the consumers and earn more. The farmers should use certified seeds/quality seeds of off season tomato and beans. The farmers should be taught on seed treatment before sowing.. At last, Prof S.S.Nanda explained weed management process in both organic and inorganic way in kharif, maize and ragi.

Above all, the training programme provided the support and guidance to the tribal farmers and the stakeholders to follow up the principles as out lined during the training programme and would shift their indigenous cultivation pattern to modern technology to achieve better yield.

Land and Water Management in Micro-Watersheds

DATE OF TRAINING	: 6 th to 10 th June 2011
VENUE	: Water and Land Management Institute, Odisha, Pratapnagari, Cuttack
NO. OF PARTICIPANTS	: 21
NATURE OF PARTICIPANTS	: WDT Members (Engineers), Facilitating NGO representatives, Village Development Committee members and Village volunteers
OBJECTIVE	: To provide a consistent approach to a variety of land and water management options that may be suitable to watershed dwelling communities in hilly and tribal areas of OTELP. This will give guiding papers that are relevant to the management of land and water in micro-watersheds in accordance with best management practices.

Land, water and biological features are important resources in a watershed. Land could be arable or non-arable. Therefore land capability classification is very important from watershed planning point of view. There are different recommended conservation practices for different land capability classes. In all the watershed areas farmers are demanding for creating irrigation facilities for their lands as major percentage of their land is rainfed. Agriculture is the main source of livelihood of the tribal. Assured irrigation to the crops will increase the productivity of various crops. Hence rain water conservation and rain water harvesting are important activities in the watershed.

In the training, the importance of land and water management in the context of OTELP was clearly elucidated. The geographical area of India is 329 million ha out of which 100 million ha have already been degraded and soil erodes 4 tons per ha and it is estimated that 6000 million tons of soils are eroded every year in India and it takes 1500 years to recoup one inch soil. The first 3 to 4 inch soil of earth is very



Training is in progress

important. Similarly out of the total availability of water, 97% constitutes saline and only 3% constitutes fresh water and looking at the growth of population, it is expected that there will be a great war in future for water. In India, 87% of total population lives in rural area and 13% live in urban area. The major source of water is rain fall and the water is available in four forms viz. Surface water, Ground Water and Water within the soil. But water becomes scarce gradually from all these sources. It has become inevitable to recharge the level of water in all sources to mitigate the water war. So to meet the demand of water for cultivation and consumption and land reclamation, and

integrated approach is to be adhered viz. Watershed with following objectives:

- Develop five capitals(Human, Social, Natural, Physical, and Financial)
- Poverty reeducation and alienation,
- Judicious use of available resources like land, water and plant
- Eco-restoration/improve of natural resources
- Common property resource management
- Capacity building of primary and secondary stakeholders
- Improve the agricultural production
- Provide off farm activities for the landless through capacity building, formation of SHG
- Simple, no cost, low cost affordable and replicable technology for sustainable holistic development
- Greater access to income generating opportunities and focus on their human resources development
- Enhance the quality of life, health, food security, fodder, fuel, education, sanitation, gender etc.
- Employment generation and promotion of savings and credits.

The participants were lucidly explained about the concept of watersheds and land and water management through it. India is divided in to 6 regions and Orissa is divided into 4 basins. According to area, there are 8 types of watersheds viz. micro watershed, mini watershed, sub water shed, watershed, sub catchment, catchment, basin and region and these are explained in detail to the participants.

In OTELP areas, micro watersheds are implemented that cover 100 to 1000 hectares.

The participants were also explained about treatment of catchment, dry land farming technology, rainfall analysis and run off management, use of maps in watershed planning, alternate use systems in watershed with emphasis on agro forestry, sloping agricultural technology, mechanical measures of soil and water management in common land and private lands, use of minor instruments and



Field learning by the participant

check measurements, preparation of estimates for mechanical measures, post project maintenance of soil and water conservation measures and integrated farming systems in watersheds during training programme. Besides, location and shape of watershed are also explained to the participants. The participants also visited one model of watershed to have practical knowledge.

It was concluded that watershed management emphasizes on:

- Productivity
- Equity
- Sustainability
- Gender Neutrality
- Social harmony
- Accountability
- Role clarity

So efficient on-farm water management needs to be adopted for creating favorable environment by regulating water supply and soil management through:

- Rainwater management
- Water harvesting
- Plantation/Vegetation and in-situ and ex-situ moisture conservation measures

This training programme was an insight for the participants where they understood the concepts and approaches of watersheds. They were able to understand the technical aspects as well. The participants are now well versed with the same and they hope of better implementation in all OTELP operational areas.

Poultry Rearing

DATE OF TRAINING	: 18 th to 23 rd July 2011, 25 th to 30 th July 2011 & 1 st to 6 th Aug 2011
VENUE	: Central Poultry Development Organization (CPDO), Bhubaneswar
NO. OF PARTICIPANTS	: 20 (in each training)
NATURE OF PARTICIPANTS	: Self Help Group Members, Village Youths, farmer, community mobilisers of OTELP operational area
OBJECTIVE	: To impart the knowledge, sensitize and encourage on poultry rearing as one of the better livelihood option

Poultry industry with an annual output value of nearly Rs.20000 corers provides direct and indirect employment to about 30 lakhs people in India. Poultry farming is one of the fastest growing segment in India with a grow rate of 8 to 10 % per annum. But these efforts have resulted in unequal growth with development being mainly concentrated in few states. Tribal areas are mostly neglected in poultry development. The present high yielding poultry germplasm has tremendous growth potential that can be exploited by the small and marginal farmers and landless labour particularly tribal farmers of the state. Training and marketing are weakest links in poultry development which is now emphasized. The poultry development in most of the developing countries is based on scavenging system.



Livestock expert explaining to the participants

The participants were explained about backyard poultry. The emphasis was given on backyard poultry because of:

- Required minimum investment to start
- Rapid return of profit
- Poultry convert feed to feed protein efficiently
- Poultry provides a continuous source of income
- Farming requires small space
- Stabilize firm income
- Availability of high yielding/ superior stocks
- Employment opportunities
- Poultry manure is a good source of organic for crops and also used as fertilizer for good crops.
- Production of low cost and high value human food from animal origin.
- Low external inputs requirement.
- Good market dements.

The participants also knew about the various types of birds. Among them are ,Kalinga Brown (layer),Road Eiland Red (Broiler),Black Rock (Broiler),Vanaraja, Nirbheek, Guinea fowl, Japanese Quail (Gunduri), and white Pekin, Khaki Campbe. The participants visited hatchery

and learnt about hatchery machine, fumigation, refrigeration and shelter machine. Also they knew about the process of identification of quality chicks. Certain things like activeness chick, softness check, no stool, not to be attached with body cavity, clear eyes and clear

nose without running. The types of feed and the preparation of the same along day to day feeding process are also discussed in detail in training which are important for healthy rearing. The feeding status is as follows:

Day	Feeding status of chicks
1 day	100 w electric bulbs in 100 numbers of chicks, suji, water, electrolyte or glucose powder.
2 to 5 days	Feed, water with antibiotic like Histacycline and vitamin tonic (vit-A B C D E K)
6 day	Feed and water
7 day	Feed, water and Lasota strain vaccine 1 to 2 drop applied in nose or eye.
8 to 12 days	Feed, water and calcium tonic with vitamin D3.
13 day	Feed and water.
14 day	Feed, water and Gumbura strain vaccine 1 to 2 drop applied in nose or eye.
15 to 22 days	Feed, water, calcium tonic and liver tonic
23 day	Feed, water, calcium tonic and liver tonic
24 day	Feed, water and Lasota buster dose vaccine 1 to 2 drop applied in nose or eye.
25 to 32 days	Feed, water, calcium tonic, liver tonic and growth hormone.

In poultry rearing, one has to be vigil on common diseases and necessary precautions are required with treatment. Unhygienic surrounding, improper feeding, climatic stress, rearing, different age group of birds together, neither vaccination nor any health care practices are provided are the main causes of diseases in backyard poultry as discussed. The common diseases of poultry rearing are ranikhet disease, fowl pox, bacterial diseases and parasite diseases and the relative symptoms are analysed to the participants with practical visit inside the campus. The participants also knew the control mechanism. There are common vaccination schedules which need to be administered and the participants also vaccinated the chicks during their practical exercises and learnt vaccination schedule.

The trainees experienced better learning on poultry rearing and inclined to adopt this profitable business that can solve their financial constraint for all times to come.



Participants visiting poultry unit

Rearing Vanaraja Poultry Birds in Backyard

DATE OF TRAINING	: 20 TH to 25 TH MAY 2011
VENUE	: KVK, Semiliguda, Koraput
NO. OF PARTICIPANTS	: 40
NATURE OF PARTICIPANTS	: OTELP staff, WDT (livestock) and tribal men and women.
OBJECTIVE	: TO POPULARIZE VANARAJ VARIETY OF POULTRY REARING FOR INCOME ENHANCEMENT OF TRIBALS IN OTELP OPERATIONAL AREA

As an alternative livelihood option for poor tribals of OTELP operational area, the importance on livestock was laid down particularly on poultry rearing which is an age old practice by indigenous people. But rearing such type of desi birds do not compete with commercially developed birds now days as the features of desi birds differs in many aspects. Besides, these backward areas have received little attention in this sector to adopt such low intensive with high yielding varieties birds. So looking at the rapid growth of poultry sector, the intensive or commercial type poultry business by tribal people was conceived in the form of backyard farming. This backyard poultry farming would not only develop the economic strata of tribal families within a sort span of time but would help in providing nutritious food to the family for a healthy growth.

Having realized the back yard poultry farming, a six day training programme was organized by OTELP for 40 nos. of tribal men and women from different operational districts of OTELP on the Vanaraja poultry, a well thriving bird in rural conditions. Along with class room teaching, the trainees were also exposed to field gaining practical experiences.

After aspiration study of the participants, they were explained the benefits of Vanaraja poultry farming and its management with a comparison mode.

Vanaraja birds are available in different colours and can produce 160-180 eggs per annum in comparison to desi birds that can produce 30 to 40 eggs per annum as shared during the training programme. Vanaraja birds have high immunity power that make best choice for backyard farming which the participants learnt as well and the birds due to its low weight have no threat to the predators. Compared to indigenous fowl, a matured Vanaraja weighs about 500 to 700 gm more and produces nearly 100 more number of eggs. After four to six weeks of age, they can be let free for scavenging in the backyard surrounding the house. It is difficult to rear common poultry birds in the backyard in villages and hilly terrain as they become easy prey to predators but Vanaraja has the ability and agility to escape predators. Besides, the mortality rate is very low in this variety. The rate is as low as three per cent both at six weeks and seven weeks of age. The bird gives good quantity and quality of meat. There is wastage of just 30 per cent.



Vanaraja Birds in poultry unit

However, during initial acclimatization, care needs to be taken to train them to reach the nest in the evening for night shelter. Night shelter should provide good ventilation and protection from predator's attack. Vanaraja chicks can be let out in the backyard after 4-6 weeks of age as shared in the raining programme. Availability of clean and fresh water is essential to make the Vanaraja birds free from diseases. The participants also learnt the management of chicks aged between 0-4 weeks, 4-8 weeks and larger birds.

The trainees learnt the feeding of poultry birds during the training programme. Vanaraja poultry birds are able to search their own food in backyard once they learnt scavenging. They do not need any special diet supplement once let free. Vanaraja chicks can scavenge well on grasslands for insects, waste grains, grass seeds etc. Supplemental feed during brooding and subsequent rearing mostly depends on the purpose of its rearing as told by the resource persons. If the bird is kept for meat purpose the birds are to be fed with commercial broiler starter and finisher and if the bird is reared for egg purpose, the birds are to be fed jawar, ragi, bajra and broken rice, rice bran etc. depending on food grains available. The participants also

learnt common bacterial disease, viral disease, common farming disease of poultry and their control. The trainees received practical training on vaccination along with transportation and storage of vaccination of mass vaccination in a village which is very important for Vanaraja poultry rearing. The resource person pointed out that if the chicks are to be maintained for egg production they need to be vaccinated for Marek's disease and for Ranikhet Disease. The participants were mostly interested to know about the schemes available to have such poultry units and the resource persons elaborated lucidly on role of banking and other financial institutions for setting up the units and insurance of poultry birds. The trainees also witnessed the process of rearing of Vanaraja poultry through a video which built the confidence and also encouraged them to change the rearing practice to Vanaraja.

According to the participants, this training would help immensely to follow the whole this new process of rearing. The field visit and practical exercises were greater learning for them as shared by the participants.



A beneficiary with Vanaraja Bird



Vocational Training (House Wiring)

DATE OF TRAINING	: 20 th JULY to 18 th AUGUST 2011
VENUE	: Multi Disciplinary Training Centre, Khadi and Village Industries Commission, Bhubaneswar
NO. OF PARTICIPANTS	: 19
NATURE OF PARTICIPANTS	: Unemployed Youths
OBJECTIVE	: TO IMPART THE SKILL OF HOUSE WIRING TO THE UNEMPLOYED YOUTHS SO THAT THEY CAN BE GAINFULLY EMPLOYED

Most of the tribal unemployed youths are drop outs or non starters in OTELP operational areas. Some of them have also completed twelfth standard. They are either engaged in shifting cultivation or they do migrate outside to nearby state Andhrapadesh in search of employment due to limited work available according to their qualification. But these youths are the greatest strengths of community who need to be in work force either having some vocational skills or being gainfully engaged in agricultural sector.

So, OTELP through its village development committee selected 19 interested youths from different villages to impart vocational skill on house wiring in Multi Disciplinary Training Centre of Khadi Village Industries Commission, Bhubaneswar. House wiring trade is a burning demand now a days in both urban and rural areas. These youths after being trained in this trade would be able to work as professional electricians and may be self employed or may be absorbed in different organizations. The one month residential training programme focuses mostly on hands on practical training.

The participants learnt safety precaution, safety equipments that should be available with

a technician working on line electrical installation and on different trade symbols and units. The participants also learnt identification of wiring accessories, identification of various wire cables and its installation, demonstration of simple twist joints, married joints through practical exercises. The other components of course viz. demonstration of T joint in standard conductor, electric board cutting, identification



Vocational training is in progress

of different switches and sockets and fixing procedure over the cut board and preparation of T.W. board for fixing flux type accessories for a bed room of a house with several points were also taught to the trainees. Before doing practical exercises of these, they first under

stood all these doing diagrams of domestic wiring and lay out followed by preparation of boards and fixing switches over it with the support of the trainer.

In last week of the training programme the trainees learnt different types of wiring, earthing installations, demonstration of energy meter installations and testing. They also visited for concealed wiring which was important for concrete houses.

At the end of the training programme the participants were able to:

- Observe the safety precautions while working
- List of necessary hand tools and their uses
- Cater and maintenance of wiring tools
- Draw and describe simple electrical circuits
- Understand the necessity of good earthing in an electrical installation

- Do the domestic installation testing before energizing a domestic installation.

The training programme was very fruitful for the participants and they are now confident enough to take up this profession independently and they feel happy acquiring this skill. OTELP is also organizing training programmes for other unemployed youths in different trades in future days.



Practical session is going on





Experiences of Exposure to WASSAN areas, APARD and Forest Dept.of Andhra Pradesh

25th to 28th July 2010

OTELP team started journey from Hyderabad on 26th July in the early morning towards a village adopted by WASSAN name Doltabad. On arrival of the team a meeting was organised by the representatives of WASSAN with a SHG federation named Doltabad Mandala Mahila Sanchayika (DMMS). It started functioning in the year 1994 under support of UNDP and SERP. Currently this federation works for 37 nos. of village level organisations (VLO) comprising 661 women SHGs creating / raising Approx more than Rs.2.00 crores. The main objective of this federation is to address the issues of poverty and low income of women and to bring in a radical change in society as well as in the life of the rural women. Excluding all these this federation has other objectives as well:

- i. To provide support services of IGA chosen by SHGs.
- ii. To promote self-managed & sustainable women SHGs and to increase the income and economic security of poor women and their household.
- iii. To initiate & up keep networking with appropriate agencies

Functioning of the federation:

The main function of the federation is to streamline the business development activities among the SHGs under it. The procedure of business development is maintained through Village Organisations (VO) and SHGs. The federation disburses the loans to the interested VOs to purchase the commodities from SHGs under it as per approved government rate and sells those to traders directly with marginal profit. The sharing mechanism of profit is such



Interaction with members of SHG Federation

that 50% of the net incomes kept by the involved VO and rest shared by the non participating VOs.

Insurance:

Another very innovative idea of getting insurance to SHG members done by the Government of Andhra Pradesh named Abhaya Hastan under LIC, INDIA. In this scheme each member contributes Rs. 1.00 per day towards insurance premium. For getting the insurance the age limit fixed between 18 and 60. They have made insurance coverage for accidental treatments, accidental death and permanent disability.



Interaction with members of SHG Federation

Later visited one nearby village where a dal processing unit is established and successfully running through SHG members. Subsequently visit made to nearby areas where SRI cultivation practiced and participatory irrigation management has been made possible with the help of farmers club.

Suggestions for replication:

Initiative already started in creating institution like Apex organisation in the Phase-1 areas of OTELP. The federation can be made at this level in this institution and similar type of movements can be made.



SRI -Creating new Avenue of Success on Paddy Cultivation

The structures may be as:

SHGs ——— VLSC level Federation——— VDC level Federation——— Block level Federation

The block level federation may work in the premises of Apex Organisation.

Next day morning on 26th July visited a Cluster Level Livelihoods Resource Centre (CLRC). There visited an institution maintained for implementing all the capacity building activities in the Mandal under a single institution. The Capacity building is the core & basic strategy for the success of any livelihood based programme. This strategy recognizes the need for an easily accessible and dependable capacity building infrastructure and facilities for different levels of functionaries i.e. from grass root levels to the top level.

The functionaries may be members like Gram panchayats, User groups, Villager Organisation, SHGs, labour groups, Volunteers, Secretaries etc.

For strengthening the capacity building process & institutionalizing the two types of institutions named Cluster Level Livelihoods Resource Centres and District Level Livelihoods Resource Centres are established in Andhra Pradesh in all districts under support of Andhra Pradesh Rural Livelihoods Program (APRLP).

District Level Livelihoods Resource Centre (DLRC):

It is the institution established at each district for building the capacities of secondary stakeholders like WDT, PIA, MDT and other line department functionaries. It is located in Mahila Pranganams or KVK or any other training centres of (NGO/ GO) at district headquarter level.

Normally each DLRC have a team of three to four persons. The composition of this team is as follows

- i. One Course Director
- ii. One Assistant Director
- iii. One or Two Assistants

The team of these 3 to 4 persons represents to the Project Director, DWMA and get orientations or training etc from state level. The function of this team is as:

- i) The main function of DLRC is to act like a learning centre for the secondary stakeholders by providing capacity building inputs (conducting training programs and other knowledge inputs) to secondary stakeholder (WDTs; NGO Coordinators; PIA coordinators; MDTs).
- ii) It acts as Knowledge centre at district level.
- iii) It co-ordinates with PMU, State level resource organisations, Consortium of Resource Organizations in developing the capacities of members of PRP.

- iv) It has its resource base as Pool of Resource Persons (PRPs) as experts/ resource persons/ facilitators from different government and Non-government resource organisations.

Cluster Level Livelihoods Resource Centre (CLRC):

This type of institutions established at each block i.e. normally for around 50 to 60 micro-watershed development projects for imparting training mainly to the primary stake holders like SHGs, Village Volunteers, Secretaries etc. These type of institutions are equipped with adequate training facilities and relevant resource materials (modules, communication material, audio visual aids etc.). Normally the LRCs are equipped with two staffs to facilitate the capacity building inputs and manage the centre.



Participants visiting Dal Processing Unit

- Course Co-ordinator
- Assistant to Course Co-ordinator

The course co-ordinator in the CLRC access the services of a large number of experts/ resource persons/facilitators from government as well as Non-government and creates a group of resource persons called as "Pool of Resource Persons" (PRPs) for CB. For strengthening the list of PRPs different Individuals like trained farmers, successful farmers and representatives like PRIs, NGO Coordinators selected into the PRPs. Then the members of PRP formally empanelled based on certain objective and criteria set by a committee.

Funds to these CLRCs transferred directly from the district headquarter by government depending upon the requirement and action plans. The CLRCs imparts trainings with the help of PIAs and WDTs as per the plan. The action plans for the training prepared by the respective PIAs with the help of Course co-ordinator and transmitted to the district level for approval on the basis of which fund is released.

Suggestions for replication:

In the case of OTELP, ITDA looks at all those function that the DLRC doing there at AP. Similarly at block level as there is few MWS are under operation hence institutionalisation of separate institution may not be feasible. Instead Apex Institution may be strengthened that are to be formed for fulfilling all the needs at block level.

Next day the team visited Andhra Pradesh Academy of Rural Development (APARD) near NIRD, Hyderabad and WASSAN office at Hyderabad for getting overview on application of GPS in the field of Natural resource Management. There it was known about application of GIS data into different maps preparations like Geographical Maps, Watershed boundary Maps, Land use maps, Soil classification maps, Drainage line maps, Resource maps, Vegetation maps etc useful for planning, management as well as evaluation of a watershed project using equipments like DGPS.



Participants learning use of GPS at APARD, Hyderabad



Forest Dept. Official interacting with the participants

Also it was known that how people are using the handheld GPS equipments to get the positions in the stages of planning and implementation of structures. The co-ordinates which are captured by GPS equipments used through overlaying top sheets and Google earth maps.

On 28th July 2010 the team visited the Geomatics centre at headquarter of Forest Department. There it was observed that how broadly and successfully the department used application of GIS for getting field forest and vegetation coverage data along with topographic features. The department employed DGPS system to collect the fly levels in the area by walking in a zigzag fashion in such a way that the entire area is covered uniformly depending upon the terrain. The information was utilized for generating contours at 1 mt. interval for getting site suitability for different types of structures. In the same way the runoff is estimated using

other parameters governing the watershed development.

Suggestions for replication:

The Use of DGPS as well as Hand held GPS equipments may be utilised for proper planning and implementation of the projects. The use of these two types of equipments not only helps the planning & implementation of the projects but also helps in getting proper monitoring and evaluation.

Hence necessary steps may be taken get primary information using DGPS equipments by hiring some firms and later to train the technical professionals involved in the programme to use



Officials of WASSAN explaining use of GIS Software

the information collected for implement the programme using Handheld GPS equipments.

With a very fruitful exposure visit ,the team could learn many a new innovative things successfully grounded which holds a possibility to replicate in OTELP areas for ultimate benefit of the community.



Learning Experiences of a Team of SMSs (Subject Matter Specialists), OTELP, Orissa

The Exposure Visit to BAIF, Gujarat on WADI Model (29th June to 7th July 2010 & 1st - 11th January 2011)

A. Programme Objective:

1. Remunerative self employment
2. Developing sustainable livelihood opportunity
3. Improve quality of life

B. WADI Concept

Family based approach evolved over a period of 10 years...

Sense of ownership is the biggest driver.

C. Core livelihood Activities

1. Agri-horti-Forestry
2. Soil conservation
3. Water resource development
4. Value addition of wadi/ farm produce
5. Improved quality of life
6. Community empowerment

D. Horticulture and Forestry

1. Underutilised degraded land to productive asset.
2. Plantation of suitable perennial fruit species.
3. Forestry species along the borders / boundaries.
4. Selection of fruit species-
 - Agro-climatic conditions, soil, water requirements
 - Minimum two to three species introduced.
 - Market availability
 - Potential for processing
 - Farmers Choice

5. Types / Combinations of Fruit Species

- **Gujarat** : Mango and Cashew,
- **Maharashtra**: Mango, Cashew, Anola And Lemon
- **Karnataka**: Mango, Cashew, Anola, Coconut and Tamarind
- **Rajasthan**: Guava, Mango and Anola
- **Uttar Pradesh**: Mango, Anola, Lemon and Guava

6. Establishment and Maintenance

- Integrated Plant Nutrition
- Integrated Pest Management
- Regular Aftercare Activities

Wadi Components - one acre

1. Horticultural sp. Mango 20 (spacing 10 x 10 m), Cashew 30 and Amla 10 (spacing 7 x 7m)
2. 600 -1000 plants of forestry tree sp. around the Wadi
3. Dry fencing + Live hedge fencing



Dry fencing with live hedge fencing

WADI layout for 1 Ac of land

#	##	##	##	##	##	##	##	##	##	##	##	##	##	##	#
#	*	*	*	*	*	*	*	*	*	*	*	*	*	*	#
#	*	0	0	0	0	Λ	Λ	Λ	Λ	Λ	Λ	Λ	Λ	*	#
#	*	0	0	0	0	Λ	Λ	Λ	Λ	Λ	Λ	Λ	Λ	*	#
#	*	0	0	0	0	Λ	Λ	Λ	Λ	Λ	Λ	Λ	Λ	*	#
#	*	0	0	0	0	Λ	Λ	Λ	Λ	Λ	Λ	Λ	Λ	*	#
#	*	0	0	0	0	Λ	Λ	Λ	Λ	Λ	Λ	Λ	Λ	*	#
#	*	*	*	*	*	*	*	*	*	*	*	*	*	*	#
#	##	##	##	##	##	##	##	##	##	##	##	##	##	##	#
#	Fencing			*	Forestry			0	Mango			Λ	Cashew		

Mango : 20, Cashew : 40, Forestry : 600

E. Soil Conservation

- Sloping Land
- Heavy rains and Winds - erosion
- Treatment of Wadi land on priority

Site specific plans for Soil Conservation

- Slope 5 to 15% - Trench cum Bund
- 15% and above - Tree platform
- Gully plugging



Tree Platform



Trench cum bund



Tree Platform

Impact:

- Stabilization of plant
- Water conservation
- Eventual terracing - increase in cultivated area

F. Water Resource Development

Approach

- Ensure availability of drinking water
- Ensure critical irrigation to Wadi
- Enable cultivation of additional crops

Measures:

- Check Dams
- Community Lift Irrigation
- Springs Development
- Bore Wells
- Well Repairing / Deepening
- Hand Pump Repairs
- Jalkunds
- Pedal Pump
- Farm Ponds



Water Resource Development: Jalkund



Check Bunds

G. Value Addition to Wadi / Farm Produce

a. Approach:

- Processing
- Better price realization
- Village level decentralized processing
- Central packing and Marketing

b. Products:

- Mango- Pickle, Pulp, Jam, Dehydrated slices, etc.
- Cashew processing
- Cashew apple syrup
- Amla - Amla candy, syrup, etc.
- Karonda - pickle



Value Addition to Wadi / Farm Produce



H. Community Health

Focus on Preventive Health

- Safe drinking Water - Chlorination
- Hygienic practices
- Awareness campaigns

Primary treatment through village health guides

Mother and Child Health

- Antenatal clinics
- Nutritional foods - Kitchen Gardens
- Integration of traditional knowledge
- Government Linkages

Quality parameters of planting material:

Specification	Mango Graft	Cashew Graft	Forestry
Height	Minimum 3 ft	Minimum 2.5 ft	2-3 ft spp specific.
Minimum mature leaves	9-12	7-9	
Age	Minimum 1 year	minimum 7-9 month	6-8 months old
Joint	Firm(sturdy)	Firm(sturdy)	—
Plastic bag size.	7*9 sq inch, 300 gauge with 4 holes.	6*8 sq inch, 300 gauge with 4 holes.	Minimum 4*7 sq inch with 200 gauge with 4 holes.
	Free from pest and disease	Free from pest and disease	—
Hardening	Minimum 3 months, with removed plastic strip	Minimum 3 months, with removed plastic strip.	—

WADI AFTER CARE DURING MONSOON..	
1] Green mulching	Green cover around plants on the ring. Addition of green organic matter.
2] Earthling up,	Loosen the soil around the stem and heap it up in such a way to form a mound & small basin away from the plant. Benefit: - Improve aeration. : - Reduce waterlog Condition.
3] Fertilizer application	Ring Method of Application
4] Heap method of Composting	Make heap of manure at every plants. Addition of organic manure
WADI AFTER CARE DURING WINTER.	
5) Wadi & plant sanitation	Method : - Cut grasses & Clean the wadi plot, - Remove pest & disease effected plant part Benefit: - Reduce pest & disease attack. - Good growth of plants
6) Soil loosening & Basin preparation	Method: - Break the hard soil and make it loose and friable. Benefit: - Improve aeration. : - watering will more become effective. : - Increase water holding capacity of the soil

7) Watering (Repeat)	Method: - any suitable methods such as Head load, Pot drip, Flood irrigation etc. Seasonal interval should be maintained.
	Benefit: - Survival and growth.
8) Staking-II	Method: - "H" Type stake.
	Benefit : - <ul style="list-style-type: none"> • Protect against wind. • Reduce problem of termite
9) Organic manure production	Method : - <ul style="list-style-type: none"> • Pit compost , Heap Method, Vermi compost
	Benefit : - Improve soil fertility
10) Dry mulching	Method : - <ul style="list-style-type: none"> • Put dry grasses/ Straw in the pant basin. • Keep dry mulch slightly away from the stem to avoid the termite attack
	Benefit: - conserve soil moisture.
11) Shed preparation	Method : - Prepare shed above plant Sticks, Grasses, & leaves
	Benefit: - Prevent against direct sunlight. - protect against scorching effect.
WADI AFTER CARE DURING SUMMER.	
12) Forestry Pruning	Method: - Light pruning allow growing single stock. Train/Shape on the base of Objective e.g. Subabul for fodder
	Benefit: -Proper shape and early harvest.
13) Forestry Pit digging	Method: - At suitable spacing.
	Benefit: - Successful establishment of plant.
14) Bordex mixture application	Method : - Apply bordo pasting on the stem of the plant
	Benefit : - Avoid fungal attack

Financial Implication of WADI

Cost norm per Acre of WADI development

Sl No.	Wadi Activities	Cost per Ac in Rs.
1	Plantation & After plantation care for six years	24000
2	Soil Conservation	3500
3	Water Resource Development	6000
4	Quality Work Life	1500
	TOTAL	35000

20 tonnes production volume of Raw cashew necessary for one cashew processing unit.

Avg yield per Tree per annum (in Dharampur condition)

Mango : 65 kg /tree

Cashew: 7 kg /tree

Nut yield per Raw cashew = 1:4

Raw cashew cost = Rs. 45/- per Kg.

Cashew nut cost per kg (best quality) = Rs. 300 to Rs.400

Mango pulp price is Rs. 85/- per Kg.

Mango graft preparation and selling these to outside is the prime income generation activity for many individual farmer and also SHGs.

Selling price of mango Graft= Rs. 25/- per graft

Avg number of graft sold per family involved = 3000

Ie $3000 \times 25 = \text{Rs. } 75000/\text{ per year}$

Cost for these @ 5/- per graft = $3000 \times 5 = 15000/-$

Net profit per family involved in grafting business
= $75000 - 15000 = 60000/- \text{ per yr.}$

Key Learning from WADI Model Exposure

1. **Epicotyl Grafting**
2. **Individual Farmer Approach:**
Sense of Ownership is the biggest motivation
3. **Long term perspective: evolved over a period of 10 years...**

Epicotyl Grafting

Epicotyl Grafting : it is same as the grafting in terms of methodology, only that in this case the of 15 to 20 days old seedlings are used as root stock for grafting.

Salient features of mango epicotyl grafting:

1. Mango stones of any variety preferable bigger size are dibbled in the raised bed of 1.5 mt x 10 mt at a spacing of 3 inch x 3 inch.
2. Stones are dibbled vertically rather than traditional horizontally for convenience during uprooting and transplanting the mango grafts to the polythene.
3. When the mango seedlings are attained 15 to 20 days old, (still in reddish, greenish red colour and having stone kernel left with some food and nutrient supplement for getting quick joint in the grafts) these are uprooted carefully with stone and root undamaged.
4. These are cut at a ht of 6 inch and split to accommodate the mother scion(the twigs of desired verity)
5. Mother scions of about 9 inch as collected from the desired mother plant are then given two slanting cut opposite to each other at the base.
6. These cut scions are then inserted in the splitted root stock carefully and tied by the grafting polythene tape keeping about 6 inch of scion part above the joint.
7. To maintain the smoothness at the joints (mismatch due to the difference in the diameter of stock and scion) and greater success of grafts, one side of the joints is smoothened by matching the stock and scion surface before tying the tape.
8. These stock-scion grafts are then transplanted into the black polybags of size 7 x 9 sq inch and filled by the soil mixture (prepared earlier as in case of normal nursery) firmly.
9. These are then nurtured in controlled condition without exposing to direct sunlight and rain for about one month till the joints are successful. Then these are exposed to open area for vigour growth.
10. Most suitable time for grafting : **June 15- July 15** giving more than 90% success.
11. Plantation in main field is done on the onset of next rainy season when the grafts have attained 3 feet ht and of 10-12 months old.



Epicotyl Grafting of Mango

Low Pressure Drip Irrigation and Poly Nursery for Vegetable Cultivation in Raised Beds

6th to 8th May 2011



Raised Bed Cultivation with Drip Irrigation Model at Tangi, Cuttack

A team of FNGO representatives, WDTs, Agriculture Officer, Sr. Engineer and Horticulture Expert of different ITDAs left Bhubaneswar to Tangi at about 11.00a.m. along with State Consultant of Gram Vikash NGO and PO(CB) from PSU,OTELP. The aim of the Exposure visit was to expose the participants & interact with different stakeholders of low pressure Drip Irrigation system and integrated farming system with hi end technology used for floriculture. Mr. Behera proprietor of Bhomi Agro Enterprises at Chintamanipur, Tangi showed the farm and briefed the participants on the background of the project initiated and the entire process involved in it with cost benefit analysis.

After this visit, participants were taken to the Soil Conservation Demonstration Farm at Biswanahakani, Tangi. The participants visited the farm wherein various soil conservation as well as biological measures taken inside it including agriculture, horticulture, livestock, pisciculture intervention successfully. After field visit there was a meeting with JSCO Mr. Manoranjan Kar who briefed of the farm and various interventions taken so far time to time. He also made a presentation on watershed concept & intervention. The team returned



Soil Conservation Official at Biswanahakani, Tangi interacting with participants on various Watershed Development measures

from Tangi in the evening and at night left Bhubaneswar to proceed for Ranchi by train .

The next day the team proceeded to Angara Block where all participants were exposed to the MAATI model which claim to convert BPL to APL in 120 days through vegetable cultivation using gravity drip system on 25 decimal plot and poly nursery management.

Coming to the drip irrigation which is being proved to be most efficient & economic way of crop production particularly fruit & vegetables is also experimented in OTELP programme areas. Moving one step ahead OTELP has explored the possibility of low pressure drip irrigation system in farmers' field in order to reduce the fixed cost & working capital for the farmers. The low pressure drip system will cover an area of 0.25 ac (25 decimal) or 1000 sq. mtr area where the farmer can grow any seasonal & off seasonal vegetables. It is calculated at the lowest side a drip farmer of 1000 sq. mtr area will earn a profit of Rs. 30000/- in a year (3 cropping cycle). The system will convert a mono crop farmer to a multi crop farmer. The drip field is backed by a poly nursery which will feed the main drip field farmer with quality seedlings

because it is believed that the whole sustainability & economics of the project depends on timely availability of quality seedlings.

The project promoted by JSLPS in association with MAATI Agrotech has following objectives:

- The objective is to provide an efficient irrigation (water) management technology that empowers farmers to overcome drought situations and produce at least 3 CROPS A YEAR.
- CONVERGENCE - The Project aims to maximize the reach and impact of existing irrigation & water harvesting initiatives like Check Dams, Lift Irrigation systems, Ponds, Wells etc -
- Build a REGULAR INCOME MECHANISM - a round the year cash flow system for the beneficiary. Thus enabling rural poor to overcome poverty



Participants exposed to Drip Irrigation Vegetable Cultivation at Angara Block, Ranchi

Raised bed cultivation with low pressure irrigation was introduced in the process i.e. a technology that can create quantum leap in crop yields and household incomes.

Salients features on model of 1000 sq.m (25 decimal) Crop Area:

- Low financial risk - EMI Rs. 600/- p.m.
- Completely Managed by the beneficiary - no outside labour required
- Homestead Well - Adequate water resource to irrigate the plot 365 days.
- Can provide for (2600 tomato plants or 10 tons yield, 4800 Cabbage or 7.5 tons yield) sizeable (Rs. 50,000+) income

The above figure indicates a clear balancing Risk & Return model

Gravity fed Pressure Compensated Drip System:

- Low Energy requirements (Can operate even with Peddle Pumps where there's no electricity))
- In Jharkhand lands are seldom leveled.
- Pressure Compensated (PC) drip system unlike other drip lines, works on very low pressure ranges and ensures uniform discharge of water even in slopes or unlevelled land.
- The farmer benefits from uniform crop size and yield.

And of course operated 365 days a year uninterruptedly

Key benefits:

- ❖ Increases yield and quality (Off season cultivation possible)
- ❖ Affordable and cost efficient
- ❖ Saves labor and minimizes the need for electricity/energy - CAN BE MANAGED BY FAMILY
- ❖ Enhances use of existing water resources
- ❖ Prevents water run-off, deep percolation, leaching and soil erosion
- ❖ Maximizes water and fertilizer efficiency
- ❖ Enables multi-seasonal application
- ❖ Easy operation and maintenance

The result comes within 3-4 months of installation

Financials outlay:(per farmer)

DRIP IRRIGATION SYSTEM :	Rs. 24,000
CROP INPUTS :	Rs. 06,000
<i>(seeds, fertilisers etc.)</i>	
o Total Outlay :	Rs. 30,000
Training & Monitoring(SGSY):	Rs. 5,000
50% Subsidy under SGSY :	Rs.15,000
o ESTIMATED INCOME:	
Avg. INCOME PER CROP :	Rs. 20,000
Projected Annual Income :	Rs 50,000+

Project Financing:

■ PROJECT COST :	Rs. 30,000
■ Bank loan :	Rs. 15,000
■ Govt. Subsidy :	Rs. 15,000

- Budgeting per District (5000 farmers)
- Subsidy under SGSY : Rs. 7.50 Cr
- Demo & Awareness : Rs. 25 lakhs
- (Rs 500 per farmer)

Marketing Network

- # Forming Grower Associations
- # Post-Harvest Infrastructure
- # Professional Auction Centers with internet linkages
- # Linkages with Institutional buyers
- # Contract Production

Beneficiary Identification & Eligibility

- Farmers with homestead farm land (Bari) of at least 25 decimals.
- Proximity to Operational water source like - well/bore-well/pond/check-dam...
- Existing member or willing to join a SHG or Farmers' group
- To begin with the project targets at least 500 farmers in each block

Poly nursery:

A large number of seedlings can be raised in minimum space under optimized and controlled conditions. Scientific nursery techniques have the following advantages:

- Natural damages to tender seedlings at the nursery stage are greatly minimized
- Vigour of seedlings is increased.
- Reduces transplanting shocks and plant mortality at the field is extremely low.
- Success rate of the planting material is high.
- Overall operating costs are less, as labour cost is less.
- Inputs like water, fertilizers etc. are low.
- Germination and growth rates are enhanced.

The indicative cost of a poly nursery having size 12X8X4 m is Rs.1.32 lakhs.

Mr. James from JHLPS and Mr. Osborne from MAATI Agrotech explained all the poly nursery concept & reason of it's establishment . The Drip unit which was visited is meant & designed for 1000sq. mt area with 1000 ltr PVC tank & inline drip lateral. As the drippers are pressure

compensating so it can operate at low & high pressure. The discharge of the dripper is 1 ltr/hr. It is suitable for all vegetables & spices. During the field trip all visited 5 farmer's field who have earned good money from this farming. It is projected to earn at least Rs. 50000/- from one year & farmers who are currently on practice are surpassing the projected amount. One among the farmers could explain how he started the farming & the benefits. Fertilizers & soil application pesticides can be applied by this system inside the drum so that equal distribution of input is possible. The nursery is raised in poly pots inside poly house so that maximum care can be taken for producing healthy & disease free seedlings. The minimum requirement for this system is to have a water source to fill the tank & fencing. At Ranchi the system is supported from JHLPS with 50% subsidy from SGSY.



Mr. Jayant, MAATI Agrotech explaining the successful model of APL to BPL in 120 days

Next day the team attended a classroom session with Mr. Jayant Ghosh, the promoter of this technology & founder of MAATI AGRO TECH. He made a presentation on why & how this concept started & popularized. He hinted of this technology presently promoted in MP, Gujarat. He clarified all queries of the members on different aspects starting from agronomic aspects to irrigation aspects. He also explained the market linkage possibility for large scale farming. The team after a meaningful exposure returned back Odisha with a determination of replication of Jharkhand model on pilot basis at few selected areas of OTELP to get the MAATI model a successful one.

Exposure to Diversion Based Irrigation, Hydram and Stabilised Mud Block

28th to 30th January 2011

Diversion based irrigation is a method that uses the gravitational force to guide the water from streams to the crop fields at the lower level. Irrigation can be provided without using any external energy.

Considering the high potentiality of DBI in OTELP areas, selected field functionaries of the FNGOs and WDOs of ITDAs have been exposed to the successful sites in Rayagada and Ganjam District in association with the DBI secretariat. Resource persons from DBI Secretariat have already guided the Programme staffs and community for identification, survey, design and estimation in two diversion based irrigation programme of Gajapati district as per the MoU with OTELP.



Participants exposed to DBI source point

A team of WDOs and FNGO representatives along with Sri Sanjay Roy, Coordinator, DBI Secretariat, Bhubaneswar and PO(CB) from PSU, OTELP accompanied the team for an exposure visit of on Diversion Based Irrigation Structure(DBI) Figure 1, Hydram and Stabilized Mud Brick.

A short session on DBI at the spot was taken by the Sri Roy and staffs from PRADAN to the participants on various aspects of DBI before and after installation. Then a interaction session



Facilitator explaining on DBI

was held with the community members, in particular with SHG members and user groups of the village on situation before and after, community contribution for installation of the DBI, it's safe and controlled usage(water). The community members responded to various queries put by participants.

The participants then proceeded to Maa Rameswari Udyan Bikash Samiti, Lelibadi to have a visit to see WADI Model promoted through NABARD and executed through Harsha Trust. Three hundred mango and four hundred and twenty cashew trees have been planted in a series of patches. The village cultivable lands also get used of piped water supply. The project was completed by July'2009 and it has 20



WADI model developed by farmers

beneficiaries having 20 acres of land in total. The capacity of DBI so far as water supply area is concerned is 20 acres. The project had a total expenditure of Rs. 1,23,826.00 out of which Rs. 36,000.00 came as labour contribution from the benefited community members. On interaction with the beneficiaries, it was learnt that the farmers involved also get good benefit out of this WADI model promoted. The project was executed through Harsha Trust, Bisam Cuttack which is sponsored by Sri Ratan Tata Trust.

A hydraulic ram (or water ram) pump is a simple, motorless device for pumping water at low flow rates. The hydraulic ram pump, or hydram, is a type of cyclic pump that operates with the use of water as the means of supplying the source of power for the unit. It does not consume petrol, diesel, electricity. It uses the energy of flowing water to lift water from a stream, or spring to an elevated storage tank or to a discharge point. Water from a stream in a valley can be pumped to a village on the hill side. In general a hydraulic Ram pump can pump approximately one tenth of received water volume to a height ten times greater than intake. The pump is useful where water source flows constantly and the usable fall from the water source to the pump location is at least 3 feet. Hence the pump is used where falling water is available. It is suitable for use where small quantities of water are required and power supplies are limited, such as for household, irrigation, etc. A hydraulic ram pump is useful where the water source flows constantly and the usable fall from the water source to the pump location is at least 4-5 feet. It lifts 10% of the flowing water 10



Facilitator explaining on Hydram

times to the original head. Hydrams have been around for a long time as well proven technology, and before the advent of electrical wiring in public buildings in the latter 19th century. This is used in large areas in many mountainous countries and north east states of India for small scale irrigation. Hilly and sloppy terrain with abrupt change in slope and presence of perennial streams in OTELP villages provide a scope for installation of hydram for upland irrigation. Keeping in view of the matter, it was also planned for making a exposure visit to a area where hydram successfully installed and irrigates for upland cultivation.

The next day the team proceeded to Kakriguma and reached at Siddharth Village, Community School of Ecology-Eco Tribal Tourism, Woodsong World Resorts supported by Asian Institute for responding to Conflict and Management, Bangalore. Sri Benudhar Sutar from Desi Technology who has successfully installed Hydram inside the tourism village premises explained of the simple technique of hydram functioning and how it enables upland irrigation.



Participants exposed to Hydram in operation

Site selection for the installation of HYDRAM is the most crucial factor for its operation. The minimum technical requirements for the installations are as follows;

- Drive head range = 1.5 - 30 meter
- Drive flow range = 60 - 120 ltrs/min
- Delivery head range = 6 - 100 meter
- Typical delivery range = 2 - 20 ltrs/min



Facilitator explaining benefits of SMB

The team then proceeded to Pataleswar village development committee, Ledriguda for practical demonstration of stabilized mud block production from Mardini block press. There was a small powerpoint presentation by Mr. V. Joseph who also hails from Desi Technologies. He explained there are examples of the SMB buildings built in 1940s and hence the durability is in excess of 60 years.

Technical Features of SMB:

- Weight when wet : 9 KG
- Weight when Dry : 8.2 KG
- Density when wet : 2.05 Gms/CC
- Dry Density : 1.87 Gms/CC
- Compression Strength: 20 to 110 KG/CM² depending on the stabiliser percentage(a 7.5% cement stabilised block would have an average Wet Compressive strength of about 40- 45 KG/CM²)
- Water Absorption : 8-12%



SMB preparation in process

Tips to Control the Quality of Blocks

The following five tips are crucial for making high quality Stabilised Mud blocks:

- ❖ The soil granulometry should be ensured, i.e. the percentage of sand should be more than 65% and the clay percentage is below 15%;
- ❖ The stabiliser selection and dose should be properly selected and the soil and stabiliser should be properly mixed;
- ❖ The optimum moisture content should be ensured, i.e. usually it is around 10-12%;
- ❖ The wet density of the block should weigh 9 KGs and should have a wet density of 2.05 GM per CC;
- ❖ The blocks should be properly cured for at least a week in the stack and for another two weeks in the walls.



The Output-Stabilised Mud Block

Various steps explained of mud block production, the simplicity to produce with low cost and much durability with higher compressive strength. Then there was a practical demonstration of mud block preparation where all the participants including community members got involved and few pieces of mud block were produced too. It was felt there is ample scope of preparing such mud block in OTELP areas. This will not only cater to the need of huge demand of supplying low cost and durable raw materials for the construction works but also enable for the livelihood options of many to earn.

An Exposure Visit to Mother Chick unit at KVK, Mayurbhanj, Odisha.

7th to 8th March 2011

The OTELP, Paralakhemundi made Exposure Visit to Krishi Vigyana Kendra, Mayurbhanj on 7.3.11. The participants comprising of 11 SHG members of different SHGs of Six FNGOs, six WDT(mF), WDT(SS) and MFO Gajapati. In the exposure visit programme Live Stock Expert from PSU, Bhubaneswar Mr. Sachidnanda Swain, Sri Jagannath Patro, programme coordinator, KVK, Mayurbhanj, Additional district Veterinary officer Sri Pattnak and Sri Ragnath Pati facilitated the programme, the following important things were observed.

Which variety of chick to be reared.

Banaraja: For meat and egg purposes such type of chicks to be reared in rural areas, in 20 weeks the chick will be 2kg to 2.5kg along with 150 nos of egg.

Gram priya: In rural areas such variety of chicks can also be reared, in 20 weeks the bird will give 180 eggs it became 3kg to 3.5kg of weight.

Kalinga Brown: This is a hybrid variety of chick and it will give 260-270 no of eggs per year.

Black rock broiler: This variety of chick is black in colour and fleshy and the egg giving capacity per year is 120 to 140 and in 20 weeks it will be 2.5 kg to 3.5kg

Out of all the variety of chicks the Banaraja variety of chick is most suitable as prescribed by the KVK scientist because of the following merits

- High growth.
- Improved variety.
- Low cost for rearing
- The growth is like Broiler.



- Special care is required.
- Perfectly good for meat.
- Low mortality.
- Easily marketable.
- Lucrative Business.

The house for the chicks:

For poultry rearing two types of house can be prepared that is deep litter house and another is cage type of house, for Banaraja variety of chicks the house should be 1000 Sq. Ft for 1000 chicks. The east and west direction of the house should be 20 to 22 ft and the north and south direction should be 50 sq. ft, it will be 1000 sq ft and the roof should be thatched or asbestos, so that the air can be passed from the south side apart from this around the chick unit there should be planted the creeper type trees and papaya, drumstick and banana for shadow and cool to the chick unit.

Brooding to the chicks:

Brooding means artificial heat to the chicks, generally in summer season the brooding should

be given for one day to fifth week and in winter season it should be zero to eighth week, that should be maintained a limited heat in the following schedule;

In the first week -95' equal to 35'c

In the second week -90' equal to 32'c

In the third week -85' equal to 29'c

In the fourth week -80' equal to 26'c



As per the above schedule the temperature should be reduced at least 5 ' per week to maintain the heat to the chicks and the brooder should be in the height of 3 to 5 feet from the litter, in one brooder there should be 200 to 250 chicks can be safely remained. the ready made brooder can be applied in the unit what it is available in the market but for the sake of cost effectiveness the artificial brooder can be prepared with the help of bamboo and flour gum and waste papers simultaneously we can be applied the cow dung to the brooder but for the durability point of view it is little bit low. In the brooder we can fix 60w, 100w, 200w normal bulb if possible we can adopt two nos of infrared bulb available in the market it will cost only Rs100-200/-, incandescent bulb, milk violet bulbs can also be applied to the mother chick unit, one chick guard to be remain in the litter, the height of the guard should be 18" (1 & 1/2 feet), rectangular type of chick guard is not advisable it should be in circular type before 24hr we have to maintain the heat to the chicks

Feeding schedule:

From the day one chicks we can give maize powder, suji dana, along with Glucose "D" with fresh water for 100birds 25gm of glucose is required, ORS Powder can also to be given, the quantum of water can be given like a manner;

For 100birds the glucose water is required 2liter a day in the first week.

In the second week it required 4 lit/day.

In the third week it required 8 lit/day.

For 1000chicks 20liter of fresh water is required.

Baby waterier and baby feeder is required to keep in the unit those are available in the market. For safe side we should keep the chicks on the paper above the litter if not there is attack of very chances of diarrhoea to the chicks, in the litter we can apply the husk, rice bran, saw mill powder in the thickness of 2 or 2.5 inch height. For safety and prevention point of view we can destroy the handicapped chicks and we should maintain clean and hygiene the unit to avoid all sort of disease. For sterilization of the unit and avoid all sort of infections we have to apply the KOHROLEIN-3% (Glaxo pharmaceutical make) medicine 3ml in one liter of water around the unit by sprayer. similarly in the unit we can also use foot path, phenyl, potassium paramagnet, trespasser is strictly prohibited for the poultry farm to control several crippling diseases attack to the chicks. In the mother chick unit there is 2% of mortality is admissible and above 5% is so to say is loss that should be maintained properly it will be better to apply KOHROLEIN-3 % in every lot / batch. The Feed conversion Ratio (FCR) in the age of 28th day the chicks can consume 600Gm of food and the weight of the chick will be 1kg per chick. The water should be changed four times a day the tube well water is preferably good, the waterier should be washed on daily basis.

Vaccine schedule:

SI No	Age of the chicks	Name of the vaccines	Method of vaccination	Dosage.
1	1 st day	Mareks disease (soil pore disease)	Under the neck.	0.2ml injection
2	5 th to 7 th days	F-1(Ranikhet disease)	Eye or nasal, intra ocular.	1-2 drops
3	14 th to 18 th days	IBD(GUMBER Disease)	Eye or nasal, intra ocular.	1-2 drops
4	21 st Days	F-1 Booster dose	Eye or nasal, intra ocular.	1-2 drops
5	28 th days	IBD booster	Eye or nasal, intra ocular.	1-2 drops
6	40days	IBD Gumber	Eye or nasal, intra ocular.	1-2 drops
7	50days	Foul pox	Under the arm or by touching the bird.	0.2ml
8	60days	Newcastlerani kheta R2B	Under the arm or leg.	0.5ml
9	112days	Newcastlerani kheta R2B	Under the arm or leg.	0.5ml

To avoid the Chronic Respiratory Disease (CRD), pneumonia. Tetracycline powder can be applied and for deworming piperzine liquid 5ml for 100bird can be applied. The maximum life span of the chicks is 3to 4 year for meat purposes the chicks can be kept for 6 month and for egg purposes that can be kept for 1year after 3 months the male chicks should be disposed and male female ratio should be 1:10 and 5:10 is not advisable in 3 months the chick will be 2kg and in 3to 4 month that will be 2 to 2.5kg

2 nd day to 6days	Tetracycline powder	Up to 3days 5gm for 1000birds with water
7days to 15days	K LIVER TONIC+Calcium tonic +Famitone syrup	Each 10ml for 100birds
CEPHALEX	FEVER	Dosage mentioned in the medicine file.
KANDOX FORTE	Dysentery	Dosage mentioned in the medicine file.

Low cost food for chicks

Low cost foods for chicks can be made in the respective villages as per the quantum of available materials mentioned below;

Maize -35 to 45 %

Rice powder-10%

Wheat powder-10%

Sunflower Cake-10 %(Except Mustard Cake)

Dry fish powder-8 to10%

Mineral Mixture-3to 5%

Bajara powder-10%



Budget estimation for Mother Chick unit for 1500Birds

SI No	Particulars	Details	Amount(Rs)
1	Chicks	Rs14/chicks as per CPDO, Bhubaneswar	21000.00
2	Packing charges	Card board	465.00
3	Transportation(KVKown vehicle)	Diesel	2400.00
4	Medicines and vaccine		4000.00
5	Food	70kg BagX1430/-	18000.00
6	Labour charges		2300.00
7	Electricity charges	estimated	4000.00
8	Incidental charges	---	835.00
	TOTAL COST(Rs)	---	53000.00

If the life bird can be sold at Rs40/- the total sale will be **Rs60000/-**

The net profit will be **Rs7000/-**-per batch

Apart from this in Krishi vigyana Kendra (KVK) visited the Kitchen garden, integrated Pisciculture, dhingri mushroom cultivation, poly house mushroom cultivation, paddy foundation seed preparation machine and packing. Then met with two successful farmers of Pithabata near lulanga village and made interaction with sri Manas singh successful farmer who has done low cost motherchick unit, vegetable cultivation, bee keeping, and floriculture and

poultry similarly sri Bhaskar jena one of the successful farmer who has done vegetable cultivation (SRI cultivation awarded farmer),mango, papaya, cocoanut plantation and soft water prawn culture and pisciculture in samakhunta village. Participants really made out all things and got an opportunity to see some thing and have a faith on these interventions and they have been inspired to do the things by learning from others.



Krushi Vignan Kendra, Mayurbhanj



Chicks with in ring guard



Chicks with brooder



Exposure to Badhagada KASAM, Baliguda

19th to 20th May 2011

A team of 19 APEX body members, WDT (Agriculture) of CYSD, Dasmantpur and 3 SHG member of TSRD, Nandapur along with MFO, Koraput made an exposure visit to Badhagada, Kasam on 20.05.2011.



Mr. Satyaban Mallick of Kasam described detailed on turmeric wash, boiling, polishing and grinding step by step. The participants tried to know from the facilitator about the details on establishment of such unit along with financial implication. According to the facilitator, Kasam the cost of wash machine is Rs.2,000/- per unit and the polish machine cost is Rs.80,000/- The rate quoted is before 5 years but now the present rate is Rs.1.50 lakhs approximately. The polish machine polishes 3 qtls. per hour which gives 90Kg. polished turmeric out of 1 Qtl. The participants asked about the boiling system of the turmeric as a result the boiling system is fully manually. The packing system is done in two types i.e. machine and manual. The participants agreed to do the system manually. Then saw the turmeric powder

machine which cost is Rs.5.00 lakhs before 3 years but the present rate is Rs.6.00 lakhs approximately which requires to run in 3 phase electricity. In this matter the participant asked about small powder machine which is required for APEX body the cost of small powder machine is Rs.2.50 lakhs approximately. The participants agreed to establish the small machine with washing, polishing machine and packing manually at Talakutinga village of Laxmipur Block. At the time of discussion the facilitator said that the quality of turmeric is high at Laxmipur then the Kandhamal. At Kasam the final product per Kg. of turmeric Rs.140/- at present. The participants said that the raw boiling turmeric at present was Rs.150/- per kg. at Laxmipur. Discussed about this matter and finalized that the APEX body sale at market with organic keskari brand which is demand in market above Rs.200/-



Turmeric powder unit

Cost of establishing turmeric powder unit (Approximately)

1. Cost of small turmeric powder machine	: Rs.	2,50,000/-
2. Cost of Polishing Machine	: Rs.	1,50,000/-
3. Cost of Wash machine (2 x Rs.2000)	: Rs.	4,000/-
4. Cost of Electricity Charge (3 Phase)	: Rs.	5,000/-
5. Packing machine (5 x Rs.500/-)	: Rs.	2,500/-
6. Two Boiling Pot	: Rs.	1,000/-
7. Branded Packing polythene	: Rs.	2,000/-
Total		: Rs. 4,14,500/-

Product System

1. Raw Turmeric : 1 Qtl. after boiling : 25Kgs.
2. Cost of raw turmeric : Rs.1,500/- Cost of boiling turmeric : Rs.3,750/-
(@ Rs.150/- per Kg.)
3. From 1 Qtl. Boiling turmeric 90Kg polished turmeric produced.
4. From 90 Kg. polished turmeric 80 Kg powder turmeric produced (maximum 10% depreciation)
5. At final after 4 Qtl. raw turmeric at the cost Rs.6,000/-, 80Kg. turmeric powder produced which cost Rs.16,000/- @ Rs.200/- per Kg (including electricity, human resource, transport, marketing etc.)

At the time of annual work plan and budget of the APEX body the total product and benefit to be finalized.

The team had a good exposure and could learn the business model of turmeric processing along with value addition to tap the local market and outside as well.



Exposure report on the visit of SALT models in Claveria, Misamis Oriental, Philippines

Claveria is situated in the province of Misamis Oriental of Northern Philippines its landscape consists of steep mountains and rolling hills, comprising of 68 per cent of its total land area with slope from 25-95 %. Its elevation ranges from 450 to 1200 meters above mean sea level with high and steep slopes. The average annual rainfall is around 2500 mm. The annual average top soil loss per hectare in sloping upland is from 40- 300 t. The soils are moderate to deep and acidic in nature with pH from 4.5 to 5.2. The farm size ranges from 0.25 to 5.0 ha, averaging to 2.0 ha. Major crops at lower elevation (i.e. <600m.) are maize, cassava and upland rice. Vegetable and maize in rotation are practiced in upper elevation (i.e. >600m.). 59 % of the cropping (maize and vegetables) occur in lands more than 15 % slope.

World Agroforestry Centre (known as the International Centre for Research in Agroforestry, ICRAF before 2002) is giving all technical support to the communities.

Contour Hedge Row System - Earlier Approach for Salt:

Contour hedge rows are vegetative barriers established along a contour line on sloping upland and considered as an important Agroforestry technology. These are effective to reduce soil erosion. Hedge row plants are leguminous crops like *Gliricidia sepium*, *Paspalum conjugatum*, *Penisetum purpureum* etc. But adoption of this system is low due to high labor intensive for establishment and maintenance of the hedge rows.

Natural Vegetative Filter Stripes (NVS) - Present Approach to Salt

Contour lines are laid out with an A-frame or through the 'cow's back method' (a cow is used to walk across the slope: it tends to follow the contour and this is confirmed when its back is seen to be level). The contours are then pegged to serve as an initial guide to ploughing. Two persons are required per day for making contour lines in one ha area. Thereafter natural **vegetation** is allowed to grow without planting trees and fodder grasses. Besides many other farmers place crop residues in lines on contour to form **trash bonds** which rapidly vegetates with native grass and weeds and soon form stable hedge rows with natural front facing terraces. NVS are natural vegetation strips usually unplowed along the contour to act as soil filter. The width of each NVS is from 30 - 50 cm. NVS are spaced 6 -10 meters apart on the sloping field. Runoff flowing down the slope during intense rain is slowed, and infiltrates when it reaches the vegetative strips. Eroded soil collects on and above the strips and natural terraces form over time. This leveling is assisted by ploughing along the contour between the NVS - through 'tillage erosion' - which also moves soil down slope. The vegetation on the established NVS needs to be cut back to a height of 5-10 cm: once before planting a crop, and once or twice during the cropping period. The cut material can be incorporated during land preparation, applied to the cropping area as mulch, or used as fodder. Now NVS is widely adopted due to low labor requirement unlike contour hedge rows system.



Natural vegetative filter strip



Establishing NVS demarcation of contour

Benefits of NVS

- i. It can reduce soil loss by more than 90 % as per research results.
- ii. It involves low labour requirement and farmer-friendly technology for resource poor farmers.
- iii. It enhances infiltration of water conserving the soil *in situ*.

Recommended Alley widths at 1/2 m intervals

Slope (%)	Alley width (m)
10	10-20
20	5-10
30	3-7
40	3-5
50	2-4
60	2-4

Limitations of NVS:

- **Scouring.** As the soil moves downward to form terraces, the upper part of the alleys become less fertile and crop yield in this area may decline. On the other hand, the lower part of the alley will become more fertile.
- **Lesser biomass from NVS.** Unlike trees and legumes, grass hedgerows cannot provide large amount of biomass as nutrient inputs for the alley crop.

Overcoming the limitations:

- **Application of more organic fertilizers and crop residues** on the upper portion of the alley. In time, the contoured fields with NVS will give consistently higher yield compared to those without hedgerows.
- **Selection and application of appropriate methods to further improve soil fertility** on the alleys like contour farming, minimum tillage, improved fallows, cover cropping, among others.

Ridge tillage systems

This is practiced to enhance the effectiveness of NVS. It is a conservation tillage system and does not require primary tillage. Soil is scraped off the ridge just before planting. The soil is cultivated as needed for weed control and ridge is rebuilt either at the last cultivation (Maize/ Bean) or after the crop is harvested. Typically only top 5-8 cm of soil is disturbed. This system maintains alternate strips of untilled and tilled land in a row-cropped field. The untilled strip (the ridge) is where the crop is planted in the same exact row position in each successive season; the inter-row area is where cultivation is practiced for weed control. The ridges act as a partial barrier to the surface flow of water, but their major distinction is that they act as a zone of greater infiltration. The no-tillage area tends to accumulate organic matter and macro-

pores, due to soil biological activity and root channels. Since primary and secondary tillage operations are not practiced for land preparation between crops, the land is less subject to erosion in the off-season. Labor and expense in land preparation is mostly eliminated. Research on combined use of Ridge tillage system and NVS shows that, the annual soil loss of 85.5 tons/hectare on bare, uncropped soil is reduced to 0.3 to 1.1 t/ha.



Ridge Tillage System

Minimum or no tillage system

No-till farming (sometimes called zero tillage) is a way of growing crops from year to year without disturbing the soil through tillage. No-till is an emergent agricultural technique which can increase the amount of water in the soil and decrease erosion. In this case crop residues or other organic amenities are retained on the soil surface and sowing is done with minimal soil disturbance.

Agroforestry :

Different tree species are integrated with the NVS to obtain additional income from the same piece of land. The choice and selection of the species depends on types of crops grown and should be complementary to the field crops, need of the farmer and should suit the agro-climatic condition. Fruit trees, timber trees, fodder grass, legumes, cash crops such as pine apple, banana, root crops are planted at the same time or in sequence on the 2nd/3rd year after establishment of NVS.



NVS enriched with fodder & timber



Agro forestry

In Claveria, there is a growing interest among farmers to establish fruit and timber trees on their NVS. In a sloping cultivated field, farmers establish soil conservation using the natural vegetative filter strips on their farms. After they have established contours, they raise seedlings

of timber or fruit trees. Introduction of trees come during the 2nd or 3rd year after the establishment of NVS. Tree canopies start to close 3-4 years after planting of trees. By this time it is no longer feasible to plant annual crops at the alley because it is already too shady for them, but farmers introduced ruminants under the trees. Farmers having wider alley (8-12 meters wide) can still plant annual food crops between the rows of the trees, and grow fodder grass between trees along the row. A wider spacing of NVS is very useful for farms where it is desired to continue growing food crops as the fruit and timber trees mature. However, farmers with larger farm sizes tend to opt for somewhat closer hedgerow spacing, and move food crop cultivation to other parcels once the tree canopies shade the annual crops. These fast growing timber tree systems have a 6-8 year cycle.



Beans in alley with cassava



Double rows of pine apple with rice



Tomato in alley

Species grown:

- Fruit : Mango, pine apple, banana
- Timber : *Gmelina arborea* , *Eucalyptus* , *Sunitienia spp.* ,
Ptericarpers indicus , *Mysopsis emimi* (from East Africa - very quick growing)
- Fodder grass : *Setaria spp.* , *Pennisetum purpureum* , *Panicum maximum* , Napier , *Stylosanthes guianensis*
- Forage legume : *Fleminga congesta* , *Dismodium rhinizonii*
- Vegetables -

Different agroforestry systems:

- Maize +Gmelina (timber) + Setaria (grass)
- Eucalyptus + Maize
- Muzizi (timber) + Banana + Cassava
- Timber tree sps.+ Banana + Maize
- Banana + Timber tree sps./ Fruit tree

Additional strategies adopted:

1. Livestock integration

Livestocks such as cattle, goats, pigs, chicken and ducks are means for additional income, food security, draft power, manure and agri-diversity of the farming system as well as risk management strategy during adverse climatic condition. Manures can be used for bio-gas for the household energy requirement and substitute for vermin composting.

2. Rain water harvesting

Rain water harvesting addresses rainfall variability's during climate change making water available during dry spells for livestock's, crops and even for domestic use. It also provides additional income to farmers by promoting aquaculture. Promotion of aquaculture improves nutritional load to the pond water and when used for irrigation, it improves the crop growth.

3. Organic fertilizer production

Organic fertilizer through vermi-composting is important for agriculture as it mitigates climate change through avoidance of CO₂ emission by fertilizer substitution from inorganic sources..

4. Mulching & cover crops

Mulching and cover cropping maintain soil cover throughout the year which reduce soil erosion, increase the water infiltration, reduce weed pressure and improves soil fertility, also improves soil carbon.

The land care approach: In claveria

Land care is a method to rapidly and inexpensively diffuse agrforestry practices among upland farmers. It is a set of practices for appropriate land management systems. It addresses judicious use of natural resources. Local institutions like land care groups

collectively learn to improve their knowledge and skill for sustainable NRM. Landcare groups are supported by the government

Elements of successful sloping land management program in the Philippines:

- a. **Appropriate upland technology**-Simple and affordable technologies suited to biophysical conditions of the land and socioeconomic conditions of the communities. NVS technology and tree integration are very much successful in uplands having slope up to 95%.
- b. **Strong community institutions** - Land care groups are formed
- c. **Government Support**: Cash incentives upto 50,000 INR are given to each land care group by the Govt to spread the technology rapidly.

Monitoring and evaluation

ICRAF has been keeping records of all those who have attended a training or had been assisted with establishing NVS on their farms, as well as of farm boundaries.

Adaptibility of NAV in programme area under otelp:

The topographic condition, rainfall etc. in programme area under OTELP is more or less same as Claveria, Philippines. Slash & burn (*podu*) cultivation are most common features in OTELP villages. The cultivation method as existing in the OTELP area has been replaced with NVS and supported with different agro-forestry models for higher income on sustained basis minimizing the most hazardous soil erosion in Claveria, Philippines.

The limiting factors in programme villages of OTELP in spite of these similarities are-

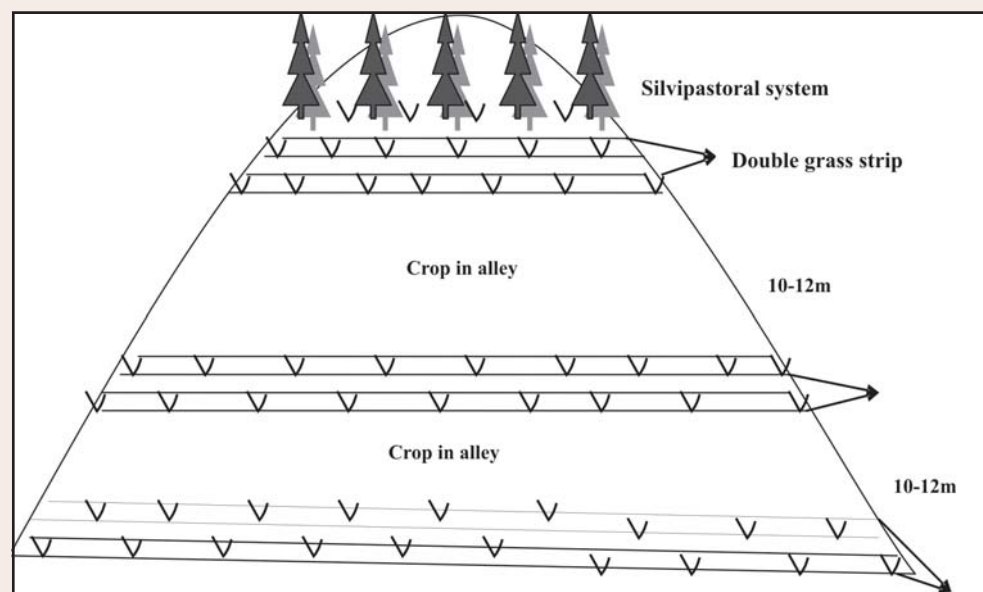
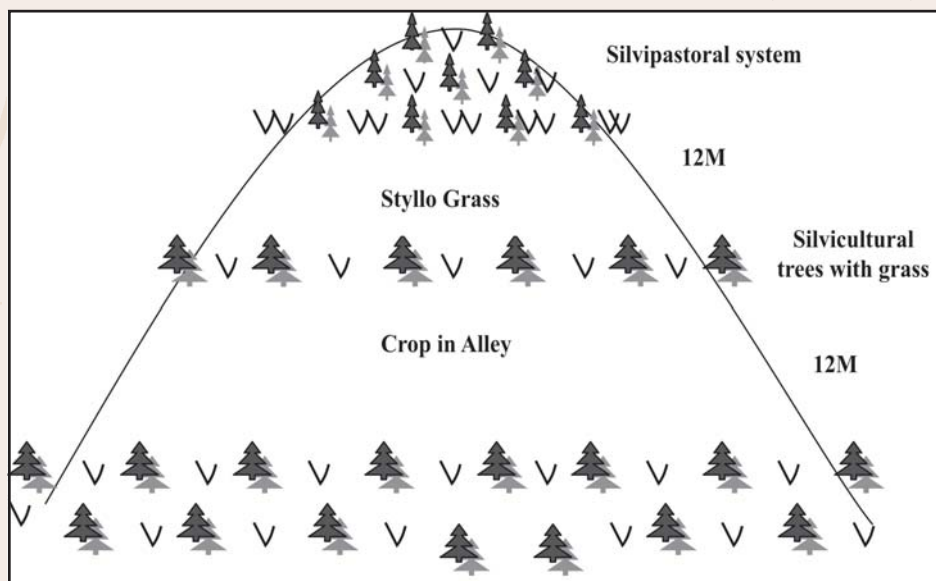
1. Soils are shallow whereas in Claveria, the soil is deep in most of the cases.
2. Soils are heavy, hard with exposed pebbles and rocks on soil surface by which soils on

hill slopes are never ploughed using draft animals whereas in Claveria, soils are light to medium textured, where one draft animal is sufficient to plough. Cost of ploughing will be much more in OTELP villages than that of Claveria.

3. Good quality natural grass is uncommon excepting few cases and abundance of weeds and root stumps are common in shifting cultivation patches whereas in Claveria, natural grasses are common with low nutrient content.

4. By NVS, establishing natural terraces may take much longer time in OTELP villages due to lesser soil depth and hard soil whereas in Claveria, natural terraces are established within 3-5 years.
5. Much higher slopes are exist in OTELP area which will increase no. of strips with less width for cultivation. It will decrease the area under cultivation and increase the cost of cultivation.

However, few shifting cultivation patches may be piloted with the conservation farming practices like NVS as indicated in the following models (SALT-I & II).







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