Newsletter
Biological Integration of Farming Activities & Resource Management

BIOFARM
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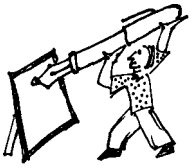

Editorial Note

A very significant and thought provoking document titled **'Agriculture Policy: Vision 2020'** that was drafted and brought out by the Indian Agriculture Research Institute, New Delhi throws open a number of significant issues. This document, *al beit* championing the successes of the dramatic increase in country's agricultural production also recognizes the serious bottlenecks of the present agricultural scenario. A number of observations made in this vision document can be debated upon and even some of the visions might also leave some room for further empirical verification. Nevertheless there are quite a few convergence areas between BIOFARM's own vision of India's small farm scenario and this vision document. There are a number of significant statements that this document makes. I find the following rather significant- *Concentration* (of Green Revolution- Ed) *was on enhanced production of a few commodities like rice and wheat, which could quickly contribute to increased total food and agricultural production. This resulted in considerable depletion of natural resources and the rainfed dry areas having maximum concentration of resource poor farmers remained ignored, aggravating problems of inequity and regional imbalances. This also led to a high concentration of malnourished people in these rainfed, low productive areas. This era also witnessed rapid loss of soil nutrients, agro-biodiversity including indigenous land races and breeds.* There is nothing new in this observation, but the cognizance of the above coming from one of the fountainheads of Green Revolution agriculture of this country is noteworthy. It only vindicates the guiding philosophy of the BIOFARM program. While charting out the visions, this document spells out that *'Sustainability and natural resource management: Prescription must lie in the domain of political economy. Otherwise, allocating funds for watershed development, agroforestry, soil conservation, and so on will not produce desired results'.* I cannot but agree more with this statement with a small amendment that the phrase 'Political Economy' be replaced with 'Political Ecology'. Why I make this distinction is because of my belief that the solution to the perils of small farms lies in correcting the aberrations of natural resource access and distribution. The prescription, so I believe, should lie in providing our small and marginal farmers with real freedom to produce what they require to produce for their food and nutritional security and not blurring their decision making horizons with imposed perspectives. Let us try to help them designing their own natural resource management strategies that would capture their social and cultural imaginations as well.

Monsoon is lashing across the country. Fortunately for the BIOFARM program, from what I gather from our partners, all the project areas have been receiving adequate rainfall. This would have made our initial interventions a lot easier.

The National coordination would be completing its first year of activities by the time this newsletter reaches you. The family should be meeting soon to take stock and I look forward to this family reunion.

So long.

- Parthiba Basu

Note from AICPNational Coordination

- The Second residential training program for project staff was organized at Wardha in collaboration with DHARAMITRA during June, 2005.
- We have started to receive baseline data from different partners. Data entry has been started in the specified access format.
- It is also required to mention that even though all the organisations have started their trials with different farmers we are yet to receive baseline data from all the partners.
- The first set of booklets namely Integrated Farming-A Concept Note; Soil- A Manual and A Handbook on Multipurpose trees in Integrated Farming were published as part of the BIOFARM Publication series in June this year.
- The second set of the publication series on various aspects of IFS is about to release.
- The discussion forum of the website is yet to be utilized to its proper potential. This could have been utilized as the platform for sharing status of work, as well as to inform others about any technical difficulties faced & successes achieved by us.
- The newsletter also gives a platform to share various experiences in the form of news clippings.
- Even though monsoon is late, all the organisations have been able to intervene in their respective farmer's fields.
- During this project, one of our objectives would also be to generate new information database on local technology, local plant species, seeds, weeds, herbs and other local resources. We are yet to devote ourselves into this. We request our partners to take necessary steps in this regard.

Food for Thought

Can Agriculture Afford to Ignore Ecology ?

It is now generally agreed upon that the green revolution while bolstering agricultural production has also led to widespread loss of soil fertility due to increased application of inorganic fertilizers, salinization and waterlogging of soils and other attendant problems. Furthermore, unchecked spraying of pesticides has not only led to contamination of soil, water, foodstuff and biota, but also to the development of pesticide resistance in pests. Emphasis on enhanced production of a few crops like rice and wheat has aggravated problems of regional inequity and imbalance. Both ICAR and IARI are cognizant and concerned about these issues, as revealed through various documents released by them in recent years. While productivity has continued its upward trend, yield per hectare has reached a plateau. Why is Indian agriculture getting bogged down and how can it be pulled out of this morass? A large number of scientists are confident that biotechnology alone could solve these problems. They believe that tinkering with some genes here, and chipping in some genes there could create 'superplants' that will be at the same time productive as well as resistant to diseases, herbicides and various environmental limiting factors. The skeptics of course wonder whether the answer to such a vexed and complex problem could be so simplistic, or it is yet another of the grand yet short-lived utopias that the people are being fed with. One reason why the green revolution could not achieve long-term, sustainable solutions is that on the one hand it ignored the health of the environment in which the plants grow and on the other hand failed to predict the adaptability and resilience of the pest species that also share the same environment with the crop plants. Unfortunately, biotechnology also appears to be trying to restrict their focus on the plants or the pests, while ignoring the issues of soil health and productivity. An interesting and instructive study was made by Brian Halweil of the Worldwatch Institute. *Striga hermonthica* ("witchweed") is a dangerous plant parasite belonging to the Scrophulariaceae family whose root-like organs called *haustoria* infest the roots of nearby crops and extract water and nutrients. *Striga* is a big problem in East Africa, where it is devastating the maize crop that is grown there by a large number of farmers . The biotechnological answer to this problem is to genetically engineer maize or other crops to make them herbicide resistant so that herbicides could be freely sprayed to kill the weeds while the crop itself remains unaffected. Needless to say, the questions of development of herbicide resistance, contamination of the surrounding environment and the crop itself, remain unaddressed in this 'hi-tech' package. Also, no thought is given to the limited capacity of poor African farmers for buying GMO seeds, herbicides, etc. However, Halweil also noticed that while many maize plots were heavily infested by *Striga* and consequently had withered and undernourished maize, several neighbouring plots were entirely free of this parasite. It was learnt that *Striga* could not pose a problem in those plots where the soil was not overused and depleted of nutrients. Many African farmers have found an innovative, indigenous and ecological answer to *Striga*: they plant leguminous tree crops in fallow periods and even a very short fallow period of three months has been found to cut down parasitic infestations by as much as 90 per cent. And this has ancillary benefits like nitrogen fixation in soil besides meeting the fodder and fuel requirements of the farmers. The tree crop also shades out weeds and by increasing diversity of the agroecosystem suppresses the insect pests. Halweil rightly argues that such ecological packages are more sustainable because they are available at the farmers' level and are sustainable yet cost-effective. Most importantly, they are also integrated into the social and cultural milieu of a given area. The lesson that we could perhaps learn from Halweil's and other similar studies is that before using an 'imported' hi-tech solution to our agricultural problems, it would be more rewarding to look at the indigenous improvisations and try to reinforce them with available scientific knowledge to make them more effective. While not ignoring biotechnology and its potential for human welfare, we better not abandon a holistic approach, thereby 'missing the forest in our endeavour of counting the trees'. It would be most unfortunate if our 'technophilia' once again overshadows our ecological wisdom that is the fruit of centuries of devoted observation, experimentation and analysis, not only by the 'whitecoat' scientists, but by the 'barefoot' folk practitioners of agricultural knowledge as well.

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Bytes we can use

Designing a Kitchen Garden

Kitchen Gardens usually are small spaces and yet many types of plants and animals share this limited space along with the people who live there. In home garden we can observe plants closely and can improve the quality & quantity of production by careful selection of seeds. Each cultivated variety represents generation of careful work. Discarding local varieties is easy, but restoring them is quite tough. Home gardens can play very important role in conserving lesser known plants, especially those with a lower market price but which often yield better quality vegetables & tastier fruits.

Why Kitchen Garden?

- To get fresh, poison free nutritious vegetables, leafy vegetables, fruits and tubers, combating daily ailments, flower etc. If a kitchen garden is planned properly, one can get at least some food, fodder, fuel and medicine through out the year even in the periods of scarcity.
- To recycle and reuse used kitchen water and other kitchen wastes, waste from cowshade etc. for production. Birds & animals can be fed plant wastes, their excreta can be used to make biogas, and the slurry produced can be used as fish feed or earthworm feed and remaining part can be used as organic manure. In a kitchen garden; kitchen wastes, wood ashes, animal and bird manures and urine, rotten roofing material, wastewater etc. are always possible to recycle. These kind of multi-use elements/products & multi-step-processes help to increase the energy efficiency of a production system.
- To reduce household expenses for fruit, vegetables and others. Even one need not invest large amount for seeds and fertiliser if managed properly.
- To have vegetables of own choice.
- To make the environment around the house clean and healthy.

• **The components**

The four important components one needs to think about are sunlight, air, soil and water.

Sunlight : Most of the plants need sunlight; few of them need strong sunlight, some like shade. So the gardener needs to map sunlight zone properly to plan the garden keeping in mind the seasonal changes.

Water : Plant needs water, but they don't like excess of water. Some places in India are draught prone. So this issue needs special attention. The gardener should try to map -

- How much waste water is produced in the kitchen
- The rainy season and the possible amount of rainwater stored
- Slope of the garden
- Flowing path of water during rainy season

The type, species, techniques and land shaping should be planned accordingly.

Especially in draught prone area, to maintain certain moisture level in the soil and to prevent evaporation loss, one must think about using dry leaves, straw and creepers with big leaves for mulching. Mulching helps soil to regain its water holding capacity. Pitcher and drip irrigation could be a very useful technique.

Air : We never consider air as an important component for farming activities, but it has a very important role to play in ecology, in soil erosion, in controlling evaporation. If we anticipate properly, introduction of bushy plants can check the air and can also provide a constant supply fuel wood round the year.

Soil : The most important but neglected component of farming activities is soil. The properties of soil depend on the physical structure (loam/sandy/clayey) and chemical composition. But fertility and water retention capacity depend mainly upon presence of organic matter in the soil. Usually soil is referred to as a living substance, as several species of microorganisms are working together to keep the soil healthy and fertile. In order to get help from those micro-workers we need to keep balance of water, air and temperature within the soil.

Few important techniques to keep garden soil healthy

Mulching : The garden soil should be covered to protect it from sunlight, rainwater, air, damages done by man & animal and to keep the moisture and maintain the temperature, especially in dry, draught prone areas. One can do mulching by straw, grass, dry leaves, rice husk, wood dust or even stones. Using creeper crops, like Horse Gram, Grass Pea, Mung Bean etc or leguminous fodder crops like stylo, centro butterfly pea, is also a good practice.

It is possible to create shade or half shade with few copishable bush and trees like Drumstick, Curry Leaf, Mulberry, Indian Coal Tree, Subabul etc. During periods of scarcity, those trees will supply fuel wood, fodder and fruits. These plants are rich in food values and can be effectively used as fodder and composting material.

Supply of Oxygen : Intermolecular space of a healthy and fertile soil is filled with water and air. These spaces help roots to respire, and water to move up and down. So the soil should be kept granular and loose as much as possible. Though continuous digging and turning up of soil will ensure it yet this is not very energy efficient and long lusting. Rather activity of earthworms, ants and other microorganisms and roots of leguminous plants can do the same for free and forever. If few selected deep rooted weeds which are cut before they reach their flowering stage, then the root of these can get decomposed within the soil adding organic matter to it.

We need to plan planting in such a way that deep-rooted and short rooted plants are mixed together. This will help the soil to maintain its nutrient level, and prevent creating pressure on a single layer.

Crop rotation : Rotating deep rooted and short rooted plant is a healthy practice for soil rather than monocropping. It gives soil enough time to prepare itself for the next season, as pressure is less on a particular layer. Cereals and grasses are usually of short rooted. Leguminous crops like Cowpea, Pea, Cluster Bean, Pigeon Pea etc are deep rooted.

Adding organic matters : Organic matter is a source of food for the innumerable number of microorganisms and creatures like earthworm etc. who breaks down these to micronutrients, which are easily absorbed by the plants. Few popular techniques, which add organic matter to the soil, are Compost, Green Manure, Vermicompost, liquid manure etc. We will not be going into technical details of these. Here is a list of few sources of nutrient to be used for soil improvement.

- Source of Nitrogen for composting and green manuring: urine and excreta of animals and birds, feather, skin of oil seeds, young leaves especially of Gliricidia, Subabul, Seaban, Indian Coal Tree etc
- Source of Carbon for composting: Straw, Coconut Fiber, dry leaves, cotton & jute waste, rice husk etc
- Helps in loosening up soil, especially for clayey soil: Stone dust, rice husk, charcoal etc

Planning of a garden

One can learn about diversity from natural ecosystem like forest and river. Forests and aquatic suystems have established itself as a self-supportive system and through ages a symbiotic relationship has been established between the forest and aquatic ecosystem and the dependent communities. The reason is diversification and tight recycling of waste. To create a productive garden we need to imitate the nature.

In commercial farming only few types of vegetable are grown and large areas are planted with a few varieties. This uniformity makes it easy to manage, but also makes the production system unstable and vulnerable to attacks of pests & diseases. Diversity in plant species as well as in the crops cultivated, keep pests away, and can play an important role in preserving our food habits and cultural traditions.

We can introduce or integrate animals like Pigs, Rabbit, Goat, Cow and birds like Hen and Duck in a kitchen to get waste product as source of nutrients and other functional inputs. It is very important to select carefully the different components so that they interact positively; e.g. chickens can be destructive in a vegetable garden, but in a fruit orchard they can keep the pests / weeds under control.

In a garden some plants/birds/ animals etc. are deliberately introduced by us; other living things grow by themselves or come to our garden if we create a suitable environment or

provide food / water /shelter for them.

To get maximum utilisation of a kitchen garden, there should be at least six types of crops -

- Leafy Vegetables
- Fruits
- Leguminous
- Root and Tuber
- Spices
- Medicinal

While planning and selecting species we need to think that

- Few plants are seasonal, few are perennials
- Few like shades, few sun light
- Few needs water, few can tolerate the scarcity of it
- Few are short rooted, few are deep rooted

One way to tackle this characteristic diversity is to mix crop intelligently to get help for repelling pest, getting nutrient etc. Leguminous plants can be mixed with other crops to get nitrogenous input from nodules of the root. Plants having strong smell like Garlic, Onion, Ginger, Basil, Mint, Marigold can be mixed with other crops, as pests don't like these plants.

Home made pest repellents can be made if we mix *Neem* Oil and soap solution (1:20 ratio) and may be made use of. Using light trap and feeding those trapped insects to frogs and fishes could be an innovative practice.

Fence can be a very important component as it protects from animal and airflow, which in turn prevents soil erosion and can also be a useful source of food, fodder during the periods of scarcity. Tall plants like Gliricidia, Indian Coal Tree (which herbivorous don't like) etc can be planted as support for creepers like greater yam, sword bean etc. Few bushy/thorny plant species can be planted in between those.

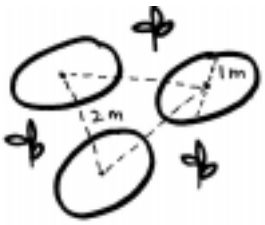
1. Trees which are pollardable (cut in upper portion): Indian Coal Tree, Drumstick, Neem, Sesban
2. Trees which are coppicable (cut in lower portion): Gliricida, Subabul,Kanchan, minjiri
3. Plants having thorny leaves: Pinapple, Alloevera, Ageav
4. Bushy short hieght plants: Karaunda, vasak, Vitex negundo, hibiscus
5. Creepers: sword bean/Jack bean, greater yam

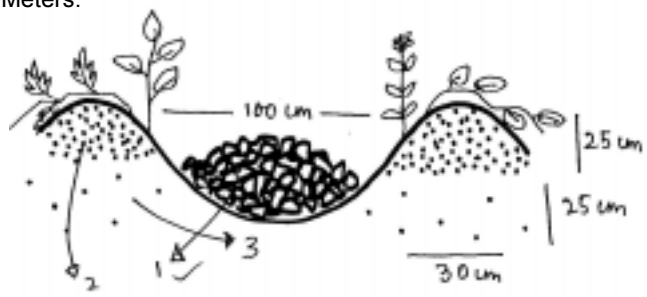
As space in the kitchen garden is very limited we need to use it effectively. So like the ground, we need to think about the vertical space also.

Different types of vegetable beds

Circle Bed : This type of bed is useful for getting different types of vegetables in a small space using little amount of water. During rainy season water gets logged in different areas in a garden. This technique helps in accumulating this water within the circular beds. This efficiently uses the rain water specially in dryland areas. Thus it facilitates drainage/storage of water from/within the garden and also recharge of ground water.

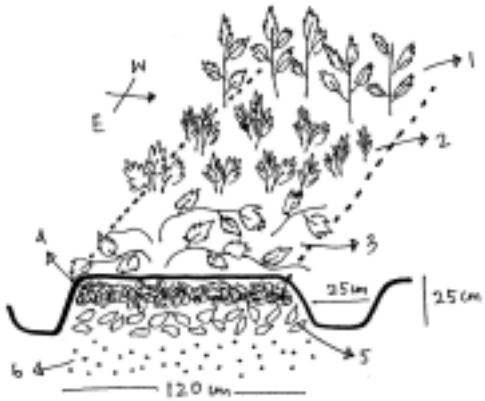
For growing vegetable, the circles should be of 1 Meter diameter. The distance of centres of the circles should be 2 Meters. For fruit trees like Banana, Papaya or Pineapple, the diameter and centre-to-centre distance will be 3.5 Meters.





1. Dry and young leaves, kitchen waste, small amount of excreta of hen/duck
2. Mixture compost and dugged up soil
3. Loose soil

Raised bed : This bed is useful for clayey soil and waterlogged area. Here ridges and drains should come in sequence so that drains can be used for irrigation, drainage and as means to reach and maitainan the beds. Beds should be laid in east-west direction to get maximum sunlight.



1. Tall vegetables
2. Short hight vegetable/leafy vegetables
3. Creepers
4. Mixture compost and dugged up soil
5. Layers of dry leaf and straw (4~5 cm)
6. Loose soil

List of crops commonly cultivated in Lower Gangetic Plains of West Bengal according to their requirement of soil texture, climatic condition, moisture and availability of sunlight.
Every region should have such a list, which will help them to select different crops for different seasons.

Plant Species	Soil	Climate	Moisture	Sunlight	Companion crops
Gourd Family (Cucurbitaceae Family) Snake Gourd (Trichosanthes anguina L.); Smooth Gourd (Luffa cylindrical); Ridge Gourd (Luffa acutangula); Pumpkin (Cucurbita moschata); Bottle Gourd (Lagenaria siceraria); Cucumber (Cucumis sativus); Water Melon (Citrullus vulgaris); Bitter Gourd (Momordica charantia); Ivy gourd (*Coccinia grandis)*	Loam, Sandy Loam	Warm to Hot	Moderate to high	Sunlight required (cucumber though prefers shade)	Grows well with cowpea, radish but don't like coriander, basil and so on.
Fabaceae Family Lablab Bean (Dolichos lablab); Cow pea (Vigna unguiculata); Cluster Bean (Cyamopsis tetragonoloba); Mung Bean (Vigna radiata); Lentil (Lens culinaris); Pea, chickpea (Cicer arietinum); Soybean (Glycine max.); Yam Bean (Pachyrhizus erosus) and so on.	Can grow in almost all kind of soil but prefers dry lands with good drainage.	Cold, warm, hot (depends on the specific specie.	Low.	Sunlight required	Can be mixed with almost all crops except crops like onion, garlic etc.
Solanaceae Family Tomato (Lycopersicon lycopersicum); Toamatilo; Brinjal (Solanum melongena); Chili (Capsicum frutescens); Sweet Pepper (Capsicum annuum).	Fertile Clayey and loamy soil.	Cold to warm (chili can grow in heat)	Moderate to high.	High (chili prefers shade)	Doesn't grow well if mixed with crops of Brassicaceae Family. Grows well if mixed with basil, onion, carrot, coriander, Indian marigold and other leguminous crops.
Malvaceae Family Lady's Finger (Abelmoschus esculentus)	Clayey or loamy	Warm to hot	Moderate	Moderate to high	Sunflower
Araceae/ Dioscoreaceae Family Taro/Cocoyam (Colocasia esculenta); Greater Yam/Asiatic Yam (Dioscorea alata); Giant taro (Alocasia indica); Elephant Foot Yam (Amorphophallus campanulatus); Potato Yam/Air Potato (Dioscorea bulbifera)	Clayey and loamy (wet soil)	Usually warm to Hot, although can grow in cold areas also	Moderate to high	Low to moderate	Grow well with onion, Indian marigold and leguminous crops but don't like crops like pumpkin, cucumber etc.
Brassicaceae Family Cabbage (Brassica oleracea); cauliflower (Brassica oleracea L. var. botrytis); Knolkhol (Brassica oleracea L. var. gongylodes); Turnip (Brassica rapa); Raddish (Raphanus sativus)	Loamy or clayey soil	Cold to very cold areas	Low to moderate	Moderate to high	Grows very well if mixed with leguminous crops, onion (Allium sepa), raddish and turnip.
Amaranthaceae Family Chinese spinach/vegetable amaranthus (Amaranthus tricolor); Prickly Amaranth (Amaranthus spinosus); Pendant Amaranth/ Tessal Flower (Amaranthus caudatus)	Can grow in all types of soil	Warm to hot	Very low	Very high	Can be mixed with crops which takes some time before they start to give yield and attains certain height. In this regard we will also have to keep in mind that while mixed, the duration of these leafy vegetables should not be prolonged.

Compiled from different publications of DRCSC by Anshuman Das and Anindita Mukherjee.

News from partners

GEAG (Uttar Pradesh)

Kataiya, Ram Chaura and Janakpur are the villages identified by Gorakhpur Environmental Action Group in Campierganj block of Gorakhpur district to initiate their BIOFARM project. The sustainable agricultural activities of the project have been initiated in these villages that are running successfully.

The major interventions of GEAG so far are discussed below:

• Initiation of Farmer Field School (FFS)

The Farmer Field School approach is an effective approach for technical education and capacity building of farmers. Farmers generate functional knowledge necessary to improve their production and livelihood potential. It also helps to empower farmers because apart from generating knowledge, they are both the users as well as the owners of the knowledge base.

Keeping this in view, a FFS has been initiated in village Ram Chaura. The school sessions are run once in a month where about 40-50 farmers participate to discuss their crop/animal related problems. The basic approach of the FFS is problem solving where the problems faced by the farmers are discussed and solutions are negotiated with the help of experts and experienced farmers. The solutions provided are based on indigenous practices, which are gender friendly and also environment friendly.

• Initiation of Agro Service Centers (ASC)

Having gained information and solutions, which are low cost, easy to prepare, and eco-friendly, the problem arises about the availability of such inputs. To address this problem, Agro Service Center has been established in village Ram Chaura where these inputs are readily available at any time. All these bio-inputs are made from locally available resources and are cost effective, as well. The ASC ensures timely availability of quality inputs such as vermicompost, bio-fertilizers, neem-oil cake, etc.

• Sustainable Agriculture Literacy

A Sustainable Agriculture Literacy Programme was organized for the farmers in the month of July 2005. This entailed 3-days training program for the farmers. The training was given on the basic concepts of sustainable agriculture and related issues such as soil fertility, flow cycle, food security, cropping cycle, integrated pest and disease management, diversity and complexity, etc.

• Introduction of Leguminous Crops

During the past 4-5 years, the farmers of Campierganj did not cultivate pulse or leguminous crops. Probably, they were not aware of the various advantages of cultivating such crops. Also, the infestation of such crops by pests and insects were a major problem for them. After GEAG's interventions through the BIOFARM project, the farmers were made aware of the benefits of such crops and have also started cultivating the same.

• Integration

Uma Shankar is one of our selected farmers from village Ram Chaura. He has a good collection of trees in front of his house, which includes trees like mango, guava, wood apple, Jamun, etc. Underneath these trees the land used to be covered by wild grasses and weeds. After the intervention of BIOFARM project, he was suggested to make a kitchen garden in that unutilized area. Today, he has developed the 0.3 acre unused land into a good kitchen garden with integration of other plants such as Jatorpha, Turmeric, Ginger, etc. His efforts have become a good example of possible integrations of plants and also a source of inspiration for his fellow farmers.

• Green Manuring

For the purposes of green manuring, the 3 acres of land that was lying vacant after the cultivation of rice in the Kharif season, Dhaincha has been planted. The sowing of Dhaincha ensures soil fertility and it is a good source of green manuring.

• Plantation

The farmers felt the need and importance of planting trees on the bunds. With the cooperation and support of the BIOFARM project staff, farmers have planted around 40 saplings of Sheesham, 400 saplings of Teak, 31 saplings of mango, etc. The trees will provide them with healthy fruits and will also serve the purpose of fuel wood.

Mitraniketan (Kerala)

ADOPTION OF SYSTEM RICE INTENSIFICATION TECHNOLOGY IN THE FIELD OF BIOFARM FARMER

Mr. Somasekharan of Vellanad Panchayat, Thiruvananthapuram district of Kerala, a participant of the BIOFARM project takes up a new system of rice cultivation in his field. The technique is known as System of Rice Intensification (SRI) which was tested and proved fruitful during the last season by the Krishi Vigyan Kendra (KVK) of Mitraniketan, Vellanad.

Even at the age of seventy two, this innovative farmer was bold enough to accept this new technology and adopted the same in his eight cents of paddy field during the first crop season mainly with a view to reduce the cost of cultivation and increase the productivity of rice from his small holding. The major bottlenecks of rice cultivation in Kerala are increased cost of production and lower productivity. Because of these reasons, the area under rice cultivation in the sate is decreasing at an alarming rate. The new technology, SRI (otherwise known as Medagasker system) envisages the adoption of different simple and easy technologies which are entirely different from the conventional system of rice farming. The features of SRI are :

- Reduced seed rate- only 6 to 8kg. Per ha.
- Transplanting the seedlings at an early stage: 8 to 12 days old seedlings are transplanted.
- Careful handling of the young and delicate seedlings.
- Transplanting the seedlings in square system.
- Only 11 to16 hills are planted per square meter. Wider spacing of 25 cm. X 25 cm. is given enabling the use of rotating hoe and to encourage heavy tillering.
- Only one seedling is planted per hill.
- Application of organic and bio-manures are stressed alongwith reduced dose of fertilizers.
- Only moist condition is required in the field. This gives ample opportunity to popularise rice cultivation in areas of water stress

Mr. Somasekharan adopted all the recommended practices of the SRI for the popular variety 'Thavalakannan' with a view to boost up the production, reduce the cost of cultivation and make the rise cultivation more economical.

The farmer informed that he had used only 250 gm of seed for nursery instead 2.5 kg in the traditional methods. Also he had raised nursery in the garden land where moisture was available. Nursery period was only 12 days instead 25 days in the previous case. Main field was levelled well to regulate water level and maintained only 2 cm of water instead of flooded condition.

He used the same quantity of organic manure as in the conventional method but used now only ½ the quantity of fertilizer. Within 20 days, he has done weeding two times with hand hoe received from KVK. He also informed that there are 50-60 tillers from each plant instead of 20-30 tillers in the case of traditional methods. Comparing the tillers there is chances of obtaining double the yield of the Traditional methods. There is no difference noticed in the incidences of pest attack. The yield is still waiting but the growth is promising.

AME Foundation (Trichy)

The AICP on Biofarms took off in a cluster of four villages of Veppur Block, Kunnam taluk, Perambalur district through a launch workshop organized at the panchayat head quarters. Various stakeholders such as farmers, NGOs, local panchayat heads, representatives from Tamil Nadu Agricultural University, Banks, Krishi Vigyan Kendra, Agriculture and Veterinary departments participated in the workshop where an action plan for Kharif 2005 was drawn.

At the field level, the following activities have been completed

- Farmer groups have been formed with five participating project farmers in each village as Lead farmers.
- PRA on natural resources and its management at the village level and a report prepared
- Individual farmer baseline data collection and consolidation for the 20 participant farmers of the Project
- Trainings on Insitu soil water conservation; soil fertility management, azolla production, kitchen garden and usage of bioinputs facilitated for the project farmers
- A farm planning exercise at individual farm level
- All the participant farmers have taken up bunding, compost pits on farm, kitchen garden and azolla production.
- Installation of rain gauge, electronic minimum and maximum relative humidity and temperature unit in one of the villages of the cluster

A Soil Testing lab has been established at AME office premises, which was inaugurated by a participating farmer amidst officials from State Soil Testing Lab, Agriculture department, Central IPM Centre and farmer group members. The Project staff has been exposed to both centralized and local trainings on various aspects of the project activities.

Resources to tap

1.

The information content of indicators in intercropping research

J. Connolly, H.C. Goma, K. Rahim

Abstract

This paper examines indicators and methods currently used in intercropping research. A review of papers in *Experimental Agriculture* and *Journal of Agricultural Science* (*Cambridge*) in the years 1990–1999 gave 50 papers on intercropping from which 72 experiments were examined. The objectives of experiments, apart from virtually all being concerned with crop yield under intercropping, were dominated by interest in management methods affecting intercropping benefit, with concerns about the economic analysis of intercropping benefits and of the sustainability of tested systems and in the mechanisms underlying intercropping effects. Concerns about stability and sustainability were not as central as might have been expected.

Few experiments were mainly concerned with exploring the way in which species interact in mixture as an explanation of intercropping effects (e.g. through manipulation of the timing of planting or examination of root and shoot competition).

Close to half the studies used the additive series design with pairwise, replacement series and response model designs each accounting for about 17% of cases. Only two studies measured at the level of the individual plant and only two studies included initial indicators of plant size or other biological starting point. Analysis of the combination of experimental design used, the measurements taken and the statistical analysis performed showed that while most experiments could provide some valid indicators and thus inferences on crop yields few of them could be used to address questions on the inter and intraspecific interactions leading to the intercropping outcomes. The duration of experiments was 1 year for about half of experiments involving annual species only and about one-third of experiments involving at least one perennial species. The overall conclusion is that considerable care needs to taken to ensure that the indicators and experimental methods used are appropriate to the development and testing of sustainable systems based on intercropping.

Keywords: Intercropping; Plant competition; Indicator; Experiment design

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2.

Indicator quality for assessment of impact of multidisciplinary systems

Janet Riley.

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Abstract

Since environmental conservation has provoked much interest globally indicators have been proposed for a wide range of different projects. The distinction between indicators is unclear. A project to clarify indicator issues was established by the European Union to link partners working with real data at a local level to highlight problems and discuss possibilities for rationalisation across systems. The major issues relate to indicator structure. They can have single or multiple components and be measured at different scales: local, community, regional, national and international. Many different frameworks exist and which may not be compatible. The quality of indicators across different systems, sectors and themes is reflected in the degree of difference in their definitions and calculation. Finally, the papers in this Special Issue are described. Appendix A gives a definition of an indicator.

Keywords: Indicator; Component; Multidisciplinary; Scale

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3.
Microirrigation
ITDG Practical Answers to Poverty
www.itdg.org/docs/technical_information_service/micro_irrigation.pdf

ABSTRACT
Conventional irrigation systems often result in over flow of water without being taken up by plants. Microirrigation is an approach to irrigation that keeps the water demand to a minimum. Many parts of the world are now using micro irrigation technology. Small-scale framers in developing countries have been reluctant to take *up micro irrigation methods due to the initial investment required for the equipment.*

A number of organisations have looked at ways to simplify and reduce the cost of micro irrigation resulting in the approaches of drip irrigation and pipe irrigation.

4.
Conjunctive Use of Water Resources in Deccan Trap
www.unesco.org/most/bpik13-2.htm

Domestic wastewater is used to irrigate the small **kitchen gardens** adjacent to dwellings. **...** water management in other **dryland** regions of **India** and worldwide……

[This is a very good paper on water managemnt in dryland kitchen gardens and fields as well with the use of Indigenous knowledge base in the locality. This paper can be downloaded from the website given above- Ed.]

5.
Performance evaluation of rice-fish integration system in rainfed medium land ecosystem

Abstract
This study was carried out for three successive years during 1999-2001 to evaluate growth and yield performance of fish, prawn and paddy under rice-fish integration system in rainfed medium land ecosystem. Irrespective of stocking density, faster growth rate was recorded for Catla catla followed by Cyprinus carpio, Cirrhinus mrigala, Labeo rohita and Macrobrachium increase in stocking density, biomass yield increased up to an optimum and then decreased. An average minimum and maximum yield of 906.6 -1282.3 kg ha^{-1} of fish and prawn has been achieved, which was much higher than the earlier recorded productivity in a season under rice-fish integration system. Highest grain yield was recorded at 15-cm weir height plot (3629 kg ha^{-1}), probably contributed by higher number of panicles per square meter (235.5) and number of filled grains per panicle (121.7). Percentage increase in rice yield under rice-fish integration system was 7.9-8.6% against control, where paddy was cultivated without integration of fish and prawn probably due to better aeration of water, greater tillering effect and additional supply of fertilizer in form of leftover feed and fish excreta. Irrespective of stocking density, the overall rice equivalent yield (REY) of the system was high (4.22 - 4.55 tons ha^{-1}) at 12.5 - cm weir height plots-cum-refuge, without using any pesticide, herbicide, etc. rosenbergii. C. carpio and C. mrigala performed better growth rate against that of L. rohita probably due to the fact that being bottom dwellers, C. carpio and C. mrigala are more tolerant to fluctuation of oxygen concentration. Productivity of fish and prawn was, however, higher ($p < 0.05$) in refuges with 10-cm weir height plots, irrespective of stocking density, while overall yield performance was good at stocking density of 25,000 ha^{-1}.

Aquaculture 230 (2004) 125 – 135
[This material is available with the coordination]

Integrated farming approach for runoff recycling systems in humid plateau areas of eastern India
R.C. Srivastava., R.B. Singhandhupe, R.K. Mohanty

Abstract
Regions having undulating terrain are predominantly rainfed and have a poor productivity level. As the traditional irrigation systems, viz. canal irrigation and tubewell irrigation are not feasible due to topographical, geological and hydrological constraints, rainwater harvesting has been found to have potential of being an irrigation water resource which can provide full irrigation in conjunction with rainfall to a transplanted rice based two crop rotation. Utilization of stored water in both monsoon and post-monsoon season crops increases the efficiency of the system which is evident from higher water yield-storage capacity ratio of 1.75. The evaluation of a rain water harvesting system has shown that integrated farming approach of utilizing the system enhances the economics of the system. While the B–C ratio with only crop was 1.89, it increased to 2.27 if horticultural crops are taken on the embankment of the tank. It further increased to 2.80 when fish culture is taken up in the stored water. There is possibility of its increasing to more than 3.0 if duckery is also taken up. Extrapolating these results, benefit cost analysis has been done for other two site conditions where the seepage loss is between 6 and 10 mm/day and seepage loss is more than 10 mm/day and therefore lining is required.

Keywords: Runoff recycling; Integrated farming; Water yield-storage capacity ratio; Benefit cost ratio

Agricultural Water Management 64 (2004) 197–212

Relevant Audio-Visual Materials Available with AICPNational Coordination

Kitchen Garden
Development of a kitchen garden for the purpose of supplying year round nutrition for a small rural family.
An EMRC Production
Duration: 21 min.

Growing Together
A documentary on how the Green Village of Auroville helps women to procure food and nutritional requirement of the family from the kitchen garden in a sustainable way.
A Forest Vision Production
Duration: 27 min.

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