PADDY

A CAMPAIGN AWARENESS MATERIAL
FROM SAVE OUR RICE CAMPAIGN

NO. 13 OCTOBER 2011

From the Campaign desk

TRADITIONAL PADDY WAS NOT A MONOCROP!

The image of wet green paddy fields with hedges planted with various crops like tur dal, cowpea, bhindi, marigold etc is fresh in the minds of people who spent their childhood in traditional paddy growing areas. This was not the only practice prevailing then; paddy farmers rotated various other crops along with paddy, depending on the climate and soil of the area.

Today there is a general perception, while looking at large green expanses of paddy, that paddy is a mono-cropping system and a water-guzzling one at that! However that is the story of green revolution paddy, which ruthlessly pushed out the traditional inter-crops, rotational practices and mixed cropping followed previously in all paddy systems. It also introduced chemical fertilizers and toxic pesticides into the paddy eco-systems while marginalizing indigenous locally adapted paddy varieties. The traditional, time tested paddy ecosystems are a far cry from green revolution paddy.

For example, in Kerala paddy is grown in different agro climatic zones, from the hilly Wayanad region to Kuttanad, the coastal paddy granary of Kerala with its geographic peculiarities (paddy farming here is carried out below sea level). In the coastal regions paddy used to be rotated with fish/ prawn farming. Along with these, farmers used to rear ducks as well. This mixed cropping system provided sustainability (currently the most important issue under discussion) to the agrarian economy as well as the agro-ecosystem. In addition, this also ensured the food and nutritional security of farming families.

In the inlands, especially where the soil is sandy or loamy, farmers used to traditionally grow a crop of sesame after paddy. The sesame of Onattukara region in Kerala was so famous that traders from Tamil Nadu came to buy it. There was no marketing problem because the quality decided the market and income for farmers.

In some parts paddy was rotated with black gram and green gram, which provided food security and nutritional security to the farming families along with enriching the soil. During the summer months farmers (in some areas) cultivated vegetables and stored them for use during the rainy season. Tubers were also rotated with paddy. Productivity from the paddy lands used to be very high when compared to the non-paddy uplands. In the drier regions farmers mixed paddy with hardy cereals like sorghum, ragi, pulses etc and this helped them to conserve the resources and tide over the natural limitations of such areas.

Traditional farmers were very innovative and intelligent. They never depended on one single crop for their livelihood or food security. Instead they depended on biodiversity and found ways to use it sustainably to improve the quality of their lives. The knowledge gathered and used by them over the years lost its value in the green revolution era since the entire focus was on paddy alone.

The thrust of the green revolution was to introduce two crops of paddy in areas where previously a single crop was grown, introduce three crops where two crops were previously grown. All other crops were eliminated

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Photo: Krishnaprasad

Sustainable paddy ecosystems in Karnataka

Anitha. M and G. Krishna Prasad

Rice deserves recognition as an invaluable gift to mankind, feeding half the population, representing life, culture, tradition and for being a means of livelihood for millions. India has the largest area under rice and, as is the case with many Indian states, it is the principal food crop of Karnataka. Karnataka, a land rich in diversity is known as "the priceless gift of indulgent nature". It is a unique blend of a glorious past and a rich present. Rice is grown in a wide range of climatic and vegetation zones from arid lands to hilly ranges to wetlands to coastal plains in Karnataka. The diversity ranges from rice grown under deep water or tank irrigated conditions and in rainfed or dry land conditions. The altitudinal and climatic variations in the state has enabled the cultivation of a range of rice varieties –medicinal, deep water, dryland, wetland, aromatic and saline tolerant.

Traditional practices in paddy farming in Karnataka

A common traditional practice followed in the Mysore, Srirangapatna and Mandya regions of Karnataka was to separate paddy fields not only with bunds, as practised today, but also to leave about eight to ten feet of uncultivated land between two fields where trees were planted. Also the region followed rice-rice combination using the dry seed cultivation method[3] wherein about 18 to 20 varieties of paddy were intercropped. Along with the rice-rice combination, rice-ragi combination was also cultivated in alternate plots. Legumes and minor millets were also intercropped with rice. Paddy, ragi, black gram, red gram, foxtail millet, little millet were the main crops of which rice and ragi dominated.

In other parts of the state also traditionally rice was grown in a mixed farming[4] system. Paddy was often mixed with other cereals or pulses or oil seeds and even vegetables. Crops commonly planted with upland rice are sorghum, ragi, cassava, sweet potato, pigeon pea, groundnut, cowpea, black gram and a few vegetables like brinjal, okra and beans.

Farmers were used to crop rotation. They grew pulses after rice[5] and the land remained productive naturally without using any artificial fertilizers. Moreover, they used cattle-dung or compost that provided essential nutrients to the land without causing any damage to the environment. These traditional farming systems also controlled pests and diseases biologically. Farming was totally organic and soil health was a high priority. Crop diversification and mixed cropping was practiced by small farmers mainly to avoid total crop failure, maximize productivity, and supply the needs of the farm family.

Paddy is the main crop grown in Malnad[1], and the coastal and irrigated and dryland tracts of South Karnataka. Francis Buchanan, the famous 18th century British botanist and a medical practitioner, who visited the state, provides an excellent narrative about the culture and agriculture of the region under the regime of Tipu Sultan, known as the Tiger of Mysore. His travelogue has recorded many unique rice varieties of the then Mysore state. It is very clear from his narrative that paddy was largely cultivated with organic manures and the productivity was also better in Mysore province. He talks about a strong animal husbandry culture along with agriculture and about inter-cultivation practices within the paddy farming system. He also mentions a large number of green manuring plants used in paddy cultivation like *cogay soppu, hongay soppu, tumbay soppu,, ugany soppu, atty soppu, umutty soppu, and yeccada soppu (aloe vera).*[2]

Irrigation changes cultivation practices!

The mixed cropping pattern followed in the rice systems in the Mysore region underwent a change with the construction of the 'Kannambadi' (Krishna Raja Sagar-KRS) reservoir and canals. Earlier the crops were mainly rainfed and irrigation was available sporadically.

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from the paddy system –making paddy a monocrop- resulting in degradation of soil, decimation of agro-biodiversity, depletion of water, high levels of pest infestation, loss of nutritional security of farming families, negative health impact on farmers and impoverishment of the newly cash dependant farming economies.

Now after seeing the damages caused by mindless adoption of green revolution, some farmers have begun re thinking about the how, why, what of traditional ecologically biodiverse paddy farming. Many farmers have started realizing the significance of some of these age old practices and have started to revive them in different parts of the country. In this lies the hope of reviving the ecologically bio-diverse paddy systems.

-Paddy Team

With the availability of regular supply of water from the reservoir the farmers changed over to cultivation of monocrops that thrive in irrigated areas and on chemicals.

Farmers today recall how they grew black gram, niger, sesame, groundnut and horse gram on their lands prior to the introduction of the canal water in the late 1960s. Boregowda a farmer of Shivahalli, Mandya district recalls how his grandfather used to cultivate black gram as a single crop during the second crop season. Black gram was preferred as it was a good fertiliser for the fields. This tradition of dry crop cultivation[6] was followed by all farmers in the region.

Current paddy practices

The various rice-based cropping patterns currently prevalent in the state are detailed below. Regrettably, despite their proven advantages, many of these cropping systems are slowly disappearing in many parts of the state.

Rice-Rice

This is most suitable for areas with high rainfall and assured irrigation facilities in summer months, particularly, in soils which have high water holding capacity and low rate of infiltration. In some canal irrigated areas of Karnataka, like Mandya, Gangavathi, Davangere (with assured irrigation) a cropping pattern of rice followed with rice is practised and two crops of rice are grown in a year.

Rice-Other Cereals

A unique cropping pattern which is followed in the areas where the water is not adequate for a rice crop in summer. The alternate cereal crops grown are ragi, maize and jowar. This is practised in most regions of Karnataka particularly in Kolar, Mandya and Bangalore Rural districts. In Haveri, Dharwad and Bidar districts, which fall in the rainfed low lands area, where rainwater stagnates during monsoon, farmers mix dryland paddy seeds with jowar seeds and broadcast them together. Jowar plants can be seen randomly spread across the rice fields. Farmers opine that with a good rainfall there will be high yield of rice along with jowar for fodder. In case of failure of rain, the drought tolerant jowar acts as an insurance crop, which secures household food and fodder security.

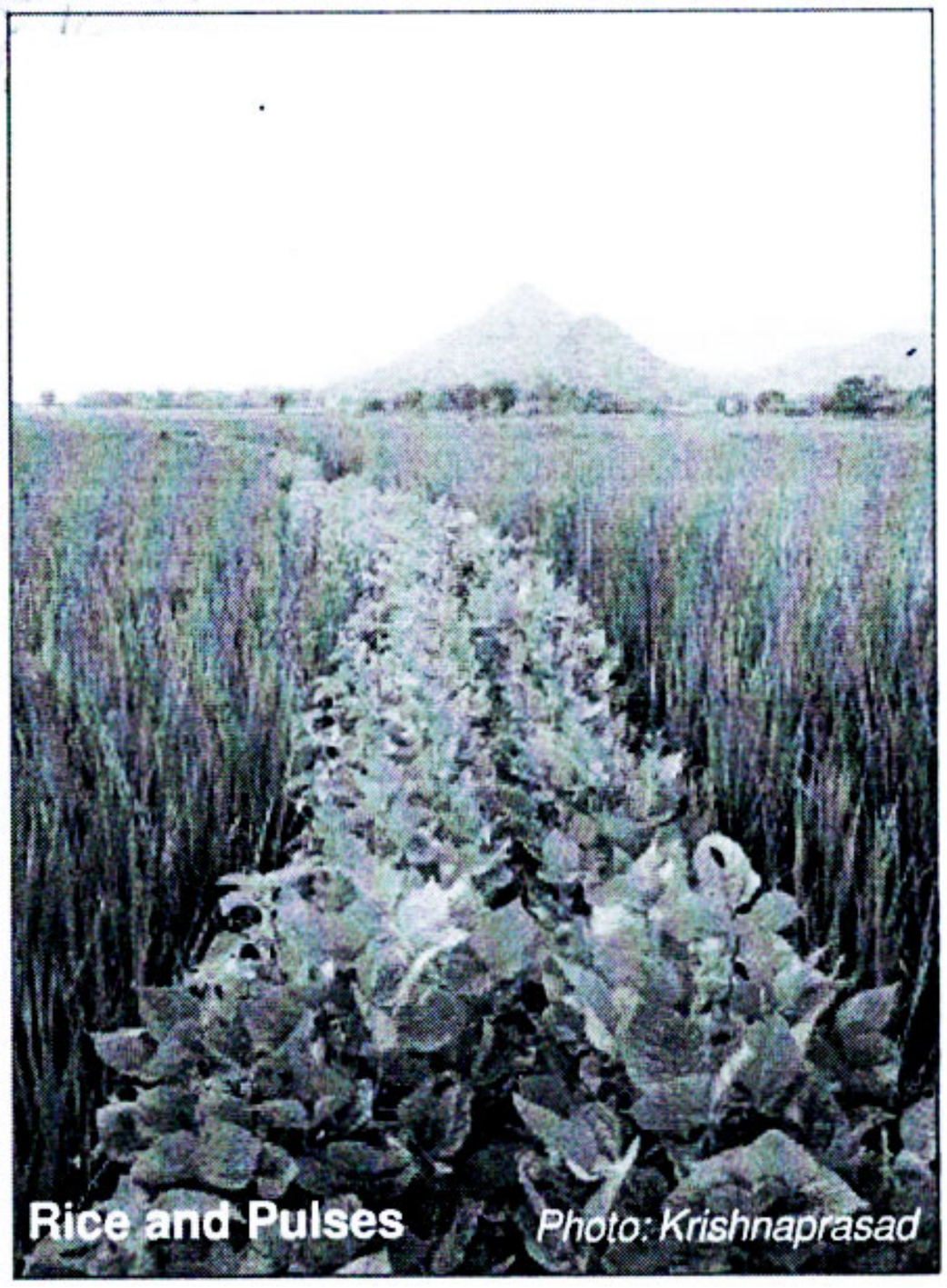
In Soraba and Shikaripura Talukas of Shimoga district, growing ragi on the bunds of rice fields is a very popular practice. Even though rice is the staple food the nutritious ragi is also extensively used. Another unique practice followed in Mysore, Mandya and Ramnagar is that after every six rows of paddy one row each of foxtail millet, red gram, green gram, black gram and mustard are planted.

Rice- Pulses

Cereals like sorghum are intercropped with dryland paddy varieties and pigeon pea (*dalicous lab lab*) is grown as a border crop. Growing pigeon pea on the bunds of the rice fields is a common practice in Gangavathi, Sindanur areas of Tungabhadra irrigated region. Growing black gram and green gram on the bunds of the rice field is also another popular practice. In the central Karnataka districts of Davangere, Chitradurga where rice is the main crop black gram, red gram and soybean are grown on bunds. In old Mysore region similar practice of pulses on bunds is followed but if the bunds are broader then field bean is grown.

Rice-Oilseeds

In some of the dryland areas rice based cropping systems involving mustard, linseed, niger is being practiced under low input management conditions. This combination of rice-mustard-niger-castor-ragi-and vegetable sequence appears to be the most remunerative cropping system. Both in Ramanagar district, which is rainfed, and Mandya district, which is irrigated, castor is grown on the bunds of rice fields.



Rice and Pulses Photo: Krishnaprasad

Rice-Fish farming

Paddy fields with sufficient water retaining capacity for a long period and free from heavy flooding are suitable for rice-fish farming system. This system is being followed by the small and marginal poor farmers in rainfed lowland rice areas. Paddy fields are utilized for culture of shrimps and fish. When the water level increases due to accumulation of rainwater the bunds surrounding the paddy fields are cut at some places to allow fish to enter the fields. The fishes and shrimps are grown naturally in the paddy fields.

Rice intercropping systems (mixed and rotation crops) reduce the incidence of pest and diseases, are highly adaptable to local environmental variability, provide a continuous and varied supply of fresh food, and provide good soil cover. Mixed crops act as hosts for beneficial insects, use land more effectively and also increase yield stability.

The cultural practices, systems and values, which naturally evolved over thousands of years, have been replaced over the span of 60 years. The hybrids introduced with Green Revolution poisoned our rice fields with pesticides and synthetic fertilizers; degraded rice lands; destroyed rice ecosystems, ecological rice practices and rice culture; and has severely undermined its safety as food.

(Footnotes)

[1] Malnad or Malenadu in Kannada meaning'land of rain or hills,male "hill" or male "rain" together with nādu "land". It is a region that covers the western and eastern slopes of the Western Ghats and is known for its green forests, plentiful rainfall, and beautiful waterfalls and is the source of many rivers that flow in the state. Malnad covers districts of Shimoga, Chikmagalur, Uttara Kannada, Kodagu and Hassan where rice cultivation predominates.

[2] These are green manure plants which were traditionally grown in the old Mysore region mainly to fertilise the soil. During land preparation, land is first harrowed and the green manuring seeds are broadcast and the plants are allowed to grow for about 45 days after which they are chopped and spread on the field and later waterlogged for about 4 to 5 days. The strewn plants are left to decompose and are then ploughed into the soil. This is done as it releases vital plant nutrients back into the soil which are then used by the next crop. In recent times sunhemp and dhaincha are also used along with neem.

[3] It is a traditional method for cultivating rice, the fields were ploughed four times beginning from March till June and after the fifth ploughing the field was watered. According to the Hindu calendar in the month of Shravana (July –August) manuring is done and then land was watered for about 24 days and three days after that seeds were sown. Weeding was carried out three times; first on 45 day; 20 days afterwards; and finally 15 days after the second weeding.

[4] Mixed cropping involves a system of combining crops at the same time in the same field. A practice used in virtually every form of traditional agriculture - persists in the semi-arid areas of Karnataka. In most dry and rainfed regions of Karnataka farmers practise mixed farming even to this day in a few pockets. Through a shrewd combination of different crops or by using variety within one crop, mixed cropping is practiced. It ensures security in the event of monsoon failure, increases the returns from the land. It enhances nutrient availability and water holding capacity.

[5] Leguminous pulses fix atmospheric nitrogen into soil and thus reduce the demand of nitrogen-based urea fertilisers.

[6] Dry crop cultivation is cultivation without use of water. Soon after harvest of paddy black gram and horse gram are sown in January as a rotation crop. This is a common practice in most districts of Karnataka. The legume crop is sown as it grows using the moisture in the land and the dew available in the atmosphere.

Rice and Ragi — Photo: Krishnaprasad

Legume Logic & Green Manuring!

Nandish B.N.

I began paddy farming in 1998 with one goal -to show results through high yields to my family. But the brown plant hopper (bph)[1] pests that attacked paddy fields in Karnataka in 2000 affected my paddy crop as well and my yields were reduced to 50% of the expected yields. I felt very dejected and felt like a total failure in front of my family. I was also fed up with the unnecessary work and expensive inputs required for conventional paddy farming. All this prompted me to look for alternative methods in farming.

That is when I met Krishna Prasad of Sahaja Samrudha and heard about the LEISA practice. The phrase "***low external input for sustainable agriculture***" attracted me a lot. I began my transition by spending a whole night making a list of expenses that I had incurred for my paddy crop during that season. I realized that 45% of the expenses were for fertilizers, pesticides and herbicides, so I decided to cut out these white elephants. Then I went in search of organic and inorganic sources for fertilizers, tried to understand about pests, root causes for diseases, and sought permanent solutions for the problems, in my search I came across the

logic of legumes!

Further exploration and experiments taught me about green manuring and mulching! I have been fine-tuning my understanding for 10 years now and farmers from around the state visit me to understand the techniques I practice. Some of the practices are detailed here.

Uses of green manure plants

- Cheapest, easiest, fastest way to enrich our soil.
- Free biological nitrogen fixation
- Each & every plant carries nutrients of their own & has medicinal properties.
- Large amounts of biomass can be produced
- Saves fertilizers, pesticides & fungicides
- Weeds reduced to minimum due to lack of sunlight
- Puddling[2] become easy and no machines are required
- Added humus saves water
- Niger on the border keeps the cattle away
- Dhaincha (Sesbanias bispinosa) helps in improving the alkalinity of soils
- Gliricedia at farm borders checks the activity of field mice

What is legume logic?

In simple words it is the culture of using legumes for sustainable agriculture. The world of legumes offers us a free biological nitrogen fixing factory -welcome to the world of legumes!

There are 550 genera, 12,000 species of legumes known to us. They are annuals, bi-annuals and perennials. They are plants for all seasons and climate zones and come in the form of herbs, shrubs, creepers, bushes and trees. Apart from biological nitrogen fixation(BNF) they provide food, fodder, fuel wood, fibres, gums , natural dyes, medicines, and act as trap plants. They can be used as wind breakers, live fences and pest repellents. They are also used for biomass, erosion control and alkaline land reclamation. Some of them are fire resistant, some are highly toxic, while some others are slightly toxic with nematicidal properties.

One hectare of atmosphere contains 75,000 to 80,000 tons of nitrogen and almost 80% of air consists of nitrogen. Nitrogen is one of the primary nutrients required by plants in large quantities. The rhizobium bacteria found in the root nodules of the legumes biologically fixes nitrogen free of cost.

Green Manure

After discovering legume logic I continued my explorations and found that in addition to legumes many other plants also contribute to soil enrichment. Like legumes fix nitrogen other plants have different minerals which when added to the soil act as hosts for various soil micro organisms thereby enriching it.

I began changing my paddy cultivation practices using this knowledge. I used the simple logic of legumes and green manuring to sustain my paddy cultivation inexpensively and without external inputs and have been getting high yields comparable to or higher than that of chemical high external input based cultivation. Currently I get yields of 20-25 quintals of paddy per acre depending on the variety used. I do not use any prepared manures and don't use bio pesticides or fungicides. I depend completely on green manures. I sow only 5-7 kgs of paddy seeds per acre in the nursery

for seedlings. In the last 10 years my income has increased ten-fold.

Pre –rice green manuring

The practice of growing green manure plants before paddy for 45 -60 days and incorporating them during flowering is called pre–rice green manuring. 15-20 kgs of sun hemp seeds per acre (as it is a drought tolerant variety) is ideal for rain fed areas. 12-15 kgs of dhaincha is good for areas prone to water logging. These two are the most popular legumes used. Any fast growing leguminous & non leguminous plants used together in the 1:2 ratio is good for pre-rice green manuring.

In addition, 10-12 kgs of any one of the green manures or a mix along with green gram, black gram, fodder cowpea, horse gram can also be used. Apart from legumes 4-5 kgs of niger & cockscomb can be used as they are potash rich manures. 4kgs of horse gram creeper or any other climbers used along with any of the above green manures acts as a first floor by climbing them, doubling the green production and biological nitrogen fixation.

Post-rice green manuring

Growing green manure plants after harvesting Kharif paddy for 6-7 months until puddling the soil for the next Kharif paddy is called post-rice green manuring.[3] Monocots , dicots, oil seeds, millets, spices are all mixed together for green manuring. Road side weeds like indigo, crotalaria, and cassia are found to be the best for this. Dhaincha and sun hemp can also be used , however since the former grows up to 14 feet and the latter up to 10 feet tractors with double cage wheels would be required to incorporate them into the soil. During the monsoons broadcast 4 kgs of horse gram creeper, they will occupy the remaining space by climbing the green manure plants standing in the field.

The perennial hardy grasses in the field will start withering due to lack of sunlight. One such post-paddy green manuring is equivalent to doing three times pre-paddy green manuring and can create 3-4 inches of organic matter in the soil. This is three times more effective than pre-rice green manuring. With this method any degraded soil can be conditioned and enriched in two to three years.

Green Manuring along with summer crops

Farmers growing two crops of paddy can follow the method detailed below to build soil fertility. Broadcast 5 to 7 kgs of fox gram (Pillipesalu) in the standing paddy crop at the time of final watering. It is a fast growing, semi aquatic plant and thrives well in these conditions. This is particularly useful during summer crop as it gets enough time to grow as green manure as well as fodder.

Fast growing plants like dhaincha and sun hemp should be avoided. In places where farmers grow semi irrigated summer crops like green gram, black gram, cowpea, horse gram, jowar etc. these crops can be harvested in 3 months. After that broadcast the field with 4 kgs per acre of horse gram; this creeper will climb on the plants and build a first floor and all the plant matter can be incorporated into the soil before the next paddy crop.

Gliricedia and adulsa[4]

Gliricedia and adulsa can be grown on the bunds of paddy fields as a live fence and as green manure. Both are not eaten by animals. In Greek Gliri means rats, cedia means kills, so the activity of field mice is very less in and around the root zone of gliricedia. Adulsa forms scum after incorporation(into the soil) and helps in checking germination of aquatic weeds in the paddy fields.

Green manure incorporation

15-20 kgs of sun hemp as a pre-paddy green manure is the best option, especially for bullock users. Never incorporate green manure without water. During the 1st and 2nd time use only cage wheels for tillers and tractors for green manure incorporation, during later stages use rotovators. Move the vehicles along the direction of the flow of water. Never over-flood the field heavily and unnecessarily during green manure incorporation.

Seeds for change

Green manure seeds can be produced along with vegetables in raised beds, alleys, along with dry land crops, and also as a separate crop. Seed quality and quantity is better during the rainy season than in summer. Those who can't produce seeds can collect the seeds from ponds, wastelands, forests and alongside roads. During the period from Nov – Feb a lot of cassia, crotalaria and indigo seeds will be freely available. The green manure seeds should be ideally used one month after their harvest for good germination.

Zero tillage for green manuring

First, flood the field then broadcast the seeds chosen for the land, leave standing water for 24-36 hours, depending on the soil, to germinate the seeds and then drain the water so that the roots can enter the smooth, puffy, moist layer of soil easily. The green manure seeds get established in dry & harsh climates of Nov – Feb as well. Broadcast a little more than the usual requirement of the seeds. The seeds cost less than tillage.

Sheep folding

Farmers who are unable to produce or collect seeds can go for sheep folding[5] on their paddy fields after harvest. Folding of sheep during November to February will result in a lot of seeds, as they leave behind a lot of green manure seeds along with their dung. Those seeds are properly treated as well as coated safely by the sheep's dung. They have a very good germination rate and show vigour in growth. They germinate and grow when they receive enough moisture either through rains or when we flood the field with water. This is a simple process, easy and cheap as well.

B. N. Nandish of Churchigundi village-577 214, Shikaripur taluk, Shimoga district, Karnataka farms on his 20 acres of land and can be reached at legumelogic@gmail.com

Footnotes

[1] Bph is one of the most devastating pests afflicting paddy and bph affliction is an outcome of excessive chemical pesticide use (refer article from PADDY July 2011)

[2] Puddling (of paddy fields): Softening (by various operations) of the top soil layer before transplanting, at the same time levelling the soil surface and destroying weeds, while maintaining a low permeability of the sub-soil (to reduce percolation losses)

[3] This practice is possible for one season paddy growers & followed by a very few people.

[4] http://en.wikipedia.org/wiki/Justicia_adhatoda

[5] The practice of confining sheep to a restricted area for feeding and other purposes is called sheep folding and it can be done in paddy fields as well

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Crop holiday declared by paddy farmers

FROM AROUND THE WORLD

Paddy farmers in the East and West Godavari districts of Andhra Pradesh have declared a crop holiday during this Khariff season, which means that they are not going to grow paddy and leave their lands fallow. This painful and extreme protest stems from acute distress among paddy farmers who are demanding better minimum support prices (MSP) and input subsidies.

The protest began in the fertile Konaseema region of East Godavari district covering about 100,000 acres and they were joined by farmers from West Godavari increasing the area to 1,50,000 acres. Ironically the protest has not stemmed from a bad harvest, but a plentiful one during the Rabi season. However the farmers were unable to sell this rice. The villages have also run short of storage space and paddy is stacked up in open fields and schools and other places. Rice procurement was far below the output as Food Corporation of India (FCI) godowns were already full.

Fingers are being pointed at the rice procurement system in AP which operates through the rice millers, who do not pay farmers even the low MSP, rather than directly from the farmers. Farmer groups complained that the un-remunerative MSP does not take into account the spiralling input costs and in addition the AP government has checked the price of rice in the open market and restricted grain trade with other states as well.

The farmers pointed out that they have requested time and again that agriculture be included under the Mahatma Gandhi National Rural Employment Guarantee Scheme (MNREGS) as currently most farmers can't afford expensive farm labour. They said the inclusion would be beneficial for both farmers and farm labourers; however the government has not paid heed to their request.

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War of Greens

War of greens is fought unseen
Where two leaves are in game,
One of them is jack fruit leaf
Can you guess the other name?

In their wise eyes
Framers observe things very coolly
Why no weed is growing there
Under any jack fruit tree!

Thick, green and glossy leaves of jack fruit
Which message do they carry?
The leaves have a hidden force
That tells the battle story.
Dry leaves of jack fruit trees
If laid in a land,
It can prevent any weed there
The soil may be loam, clay or sand.

Before monsoon comes in June
Jack fruit leaves you may lay,
Leaves release their toxic force to soil
That keeps weeds away.

If you think
A little bit in the way
"Make a juice of green leaves,
And use in paddy field as a green spray !"

In the summer months of April, May and June, farmers prepare their land for the next sowing of paddy. During the days of summer, manure preparation is a general sight one can see in villages. Farmers take home made organic manures in bullock carts, very early in the morning and spread these artistically in the crop lands. One can see the village roads and paddy fields bustling with the work of transporting and applying manure in the fields. In the village of Jakeikala in the subdivision of Bonaigarh in Sundargarh district, the Chasa community does the work of manuring with utmost care, sincerity and punctuality. They finish the work of manuring before Raja Sankranti, because the monsoon reaches by that time.

I saw an old farmer named Ananda Chandra Pradhan in Jakeikala who after primary tilling and manuring, adds dried leaves of Jackfruit plants in his paddy fields. These jackfruit plants are abundantly available in his village .The fallen dried leaves are gathered and heaped together by the farmer. These are added as an extra to his land. Why does he do so? When asked, Ananda Chandra Pradhan laughed and asked me a question. Have you seen any weeds growing under the jackfruit trees? Why so? I said, "I have no specific answer". Then he described his experiments.

Mr Ananda Chandra Pradhan is a keen observer of nature. He noticed that no plants, grass or weeds grow under Jackfruit trees. He verified his observation in different places. He found the fallen leaves of jackfruit plants did not allow weeds and grass to grow. So he began collecting these fallen leaves and spread them on the crop land before sowing seeds. Then he tills the land so that the leaves degrade well into the soil. This according to him inhibits all weeds and grass from growing. This experiment of his, which he has been doing since the last 20 years, has worked successfully in many places. So he advises other farmers to use dried leaves of jackfruit plants in crop lands so that it works not only as a manure but also as a weedicide. Some farmers are also of the opinion that the juice obtained from the green leaves of jackfruit plants can be used as a spray to kill and control weeds. Jackfruit trees (*Artocarpus heterophyllus*) generally grow in the tropics.

Dr.Balram Sahu

PADDY-FESTIVAL-2011

Lakshminarasimhan.M

I shifted my base to a place called Adhirangam, near Thiruthuraipoondi, to pitch in to co-ordinate and help organize the paddy festival scheduled on 28th and 29th of May 2011,although I hardly knew what my role was going to be for a festival which had been successfully hosted every year since 2005. I reached the CREATE farm, met Mr Jayaram,the seed conservator cum all-in-all and we discussed about the run-up to the festival day.The days passed quickly as we juggled work between the farm house and the office in Thiruthuraipoondi.

The first day was a seminar which began with Mr Ponnambalam ,Trustee , CREATE making the introductory speech on pesticides,the paddy festival and the state of water bodies. The local environmentalists enlightened the audience with statistics about the encroaching of the lakes and ponds for expanding roads,realty etc.Dr.Lal Mohan gave a few examples of the extent of destruction of water bodies in Nagercoil, and also talked about some success stories. Organic scientist Nammazhwar enlightened the audience with many inspiring stories on organic farming and said that this movement of organic farming and conserving the traditional variety of seeds should be done in all districts and has to spread fast. He also talked about the threat of genetically modified (GM) crops and the need for an agricultural policy for organic farming in Tamil Nadu. Sridhar from Thanal spoke on the "Land acquisition bill" and the urgency to act,else it would threaten the nation's food security. Usha, the national coordinator of the Save Our Rice campaign, stressed on the need to create a "pesticide free Tamilnadu" to ensure safe food.The event was attended by numerous people from the state level farmers unions, farmers from far and near and the local public.

The day wound down with a cultural-cum-musical event by a performing group from Madurai.The dance steps and the beats from the "country drums" was very tempting for anyone who likes dancing.Thus day one ended with the echo of music and rhythm.

Day two, the paddy festival day began with brisk registrations. The varieties we distributed were , Seeraga Sambha,Kattu Yanam,Kattu Ponni,Mapilai Sambha,Poongar, Sambha Mosanam and so on. Totally around 20 varieties, 1500 bags of two kilograms each were distributed to farmers for cultivation. Farmers shared their experiences and many informed us that their yields from these traditional varieties are equal to hybrid varieties.

The festival ended with farmers promising to come back again next year! This is a small drop of indigenous paddy promotion in the ocean of hybrid paddy seeds, however as years go by the drops will increase and we believe that traditional paddy will be adopted by a large number of farmers.

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Campaign Deks's comments: Today it is Andhra Pradesh. Tomorrow it can be Tamilnadu, Kerala, Karnataka....because the situation of paddy farmers and food producers is getting worse everywhere. Paddy is one crop which needs skilled labour at appropriate times. Mechanisation can solve only part of the problem . Skilled human labour is still very much needed to improve productivity as well as quality. Both the scarcity of labour and the prohibitive cost of labour are forcing paddy farmers to take such stands. Also their produce is not valued adequately either by the government or by the society making paddy farming a loss making proposition for farmers. That is why there is reluctance to include MNREGS in paddy cultivation. But all of us need cheap rice (1 or 2 rupee maximum)!

Adapted from "farmers on holiday", Down to Earth, July 15, 2011. http://bit.ly/rLSarJ, Outlook, August 29, 2011. http://bit.ly/vieNrD, Hindu Business Line, September 19, 2011. http://bit.ly/p94h6W

FROM AROUND THE WORLD

Paddy diversity is the solution for Varinellu !

Leneesh.K

Farmers and agriculture scientists in Kerala are in big trouble. Varinellu is the cause! Varinellu (scientific name - Oryza spondania. Nivara in Sanskrit and Bengali, wild grass in English), a blend of wild rice oryza rufipogan and oryza sativa is now spreading in the paddy fields all over the state. It is listed as a "weed". It sheds most of its seeds before harvest, therefore contributing little to the overall yield. It blends with cultivated oryza sativa so well that it cannot be detected. Thus it competes with the cultivated rice and uses valuable nutrients, moisture and space threatening paddy yields.

Varinellu has been a problem and farmers had in the past managed this problem effectively by using paddy diversity. Farmers used different coloured paddy varieties like Thavalakkannan (brown), Allikkannan (red), Karinchan (black), and Malakkaran etc. to solve the problem.

"Varinellu is light green in colour can be easily identified from paddy varieties that have a different colour and be removed. We cultivate thavalakkannan, which is brown in colour, and remove all plants other than the brown ones during weeding. Since varinellu easily blends with other paddy varieties, in the next year a cross of varinellu and thavalakkannan will grow in the fields. The new variety is called 'thavalakkannan varinellu'. This variety usually looks like thavalakkannan (which will also be brown in colour) and the problem is back! So we cultivate Allikkannan, which is red in colour, in the next year and remove all plants other than the red ones. This time again a new breed will develop. To catch the red colour weed we go back to Thavalakkannan again thus alternating between different coloured paddy varieties. This rotation continues and successfully deals with the problem" says Vayakkodan Govindan, farmer from Cheruthazhan, Kannur. This practice is labour intensive and also needs paddy diversity. Both are not available today.

There were some traditional techniques to harvest varinellu. "Varinellu has many medicinal properties and the beaten rice made out of it is very tasty. Varinellu fodder is a favoured by cattle and they relish it very much. We used to cover the panicles of varinellu with baskets made with coconuts leaves or teak leaves. The falling grains were collected in these baskets and the baskets were emptied. This was risky and time consuming and harvest was very poor. So farmers stopped it", said C Govindan, Kutyatoor, Kannur. Though it is a weed, varinellu and oryza sativa belong to same family. If weedicides are used, that will kill both the crop and the weed and adversely affect the health of the paddy ecosystem. This complicates the problem further.

Traditional farmers have solutions for this. But they are also at a loss as diversity is fast eroding and paddy varieties of different colours are not adequately available now. Skilled agriculture labour is another factor which is disappearing. "Varinellu is spreading all over the state because most of the paddy fields are kept fallow these days. Varinellu needs to be removed otherwise it will spread", says Narayanan Panikkar, Maniyara, Kannur. "Chemicals are not the solution. We have to conserve traditional paddy varieties and train people in agriculture. This is the only solution" says Keeneri Kumaran, farmer, Kannur.

Ban on GE rice sought

During a meeting organized by the Directorate of Rice Research to felicitate "Innovative Rice Farmers", farmers' leader and former Agriculture Minister of Andhra Pradesh, Mr. Vadde Sobhanadreeswara Rao sought a ban on GE rice research. He pointed out that rice farmers and traders in the Basmati regions have successfully stopped GE research in their area to prevent contamination of their rice. He said there is significant demand in the international rice markets for rice grown in the south of India and GE rice research would contaminate the natural varieties. This, he said would affect farmer livelihoods negatively.

Adapted from "Ban sought on GM rice", Hindu Business Line August2, 2011 http://bit.ly/o8X427

FROM AROUND THE WORLD

WATER TEMPLES, SUBAKS, AND BALINESE PADDY CULTIVATION

Sreedevi Lakshmi Kutty

The beautiful Indonesian island of Bali has a deep and old culture of rice cultivation, embedded in religious beliefs, rituals and traditions. Over centuries the farmers have evolved a sophisticated system to manage their rice paddies in a sustainable and productive manner.

Paddy cultivation employs the largest number of people in the island of Bali even though tourism brings in more money. Endowed with fertile lands in the volcanic regions and sufficient rainfall, the rice terraces of Bali, considered to be one of the most productive agro-systems in the world, were managed through a sophisticated water management system controlled by the self governing local farmers' groups called subaks and the water temples. Dedicated to the water gods and steeped in traditional rituals, these temples and their priests were the fountainheads managing the rigorous social coordination required, within the community, to optimize water sharing amicably.

Rainwater which fell on the island flowed down through deep gorges and ravines and was channelled into irrigating the paddies through an elaborate system of highly interdependent canals and aqueducts. Along this irrigation system the Balinese had built a network of temples and shrines dedicated to the goddess of water. The subaks met in the water temples every year to determine the cropping patterns, the staggering irrigation schedules (from the highest terraces to the lowest) and resolution of water disputes among the paddy farmers at the different levels.[1]

This complex and fragile system required high levels of cooperation and coordination among farmers along the rice terraces to ensure the timely availability of water in the right quantity. It was designed in such a way that all farmers along the terraces received sufficient water for their paddy at the appropriate times, collectively managed pest infestation through synchronized cropping patterns and fallows across large areas at the same time. This deprived pest populations their food and habitat. However, this also meant that peak water needs, especially at the beginning of the sowing cycle had to be efficiently managed.[2]

A system which worked for over a 1000 years was finally broken by the dogma of green revolution in the 1960s which swept through Asian nations. Indonesia, faced with food shortages in the 1950s was open to suggestions for increasing productivity, an opportunity seized by the Asian Development Bank (ADB). The government encouraged farmers to use new high yielding varieties of rice from IRRI, fertilizers and pesticides and suggested continual cropping to increase output. In fact, they legally mandated the double and triple cropping thereby rendering the earlier system, controlled by water temples, irrelevant.

ADB also initiated a large irrigation project to support the new intensive cultivation. After an initial spurt in increased production, reports began surfacing from the government agriculture officers about "chaos in water scheduling" and "explosions of pest populations".[3]

"Attempts to mitigate the pest problem by introducing new crop varieties resistant to the existing pests resulted in the emergence of new pests thus destruction of crops by the brown plant hopper was reduced with the introduction of plant hopper-resistant IR-36, but this

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Prof. Lansing did not stop with writing to ADB, he continues with his work in Bali and the revival of water temple system. A decade back he along with colleagues also undertook a project supported by a decade of anthropological field work to create a computer simulated game theory model to test the efficacy of the water temples systems. Their study unequivocally established what he had observed on the field. The traditional water sharing and synchronization of cropping patterns coordinated by the water temples of Bali is the optimal way to ensure water along the paddy terraces and to minimize pest attacks. As part of the study they spoke with various farmer groups and found that what their model predicted in terms of risks/concerns among farmers was reflected in reality. The farmers in the higher terraces were more concerned about pest attacks (since they had more control over water) and farmers at the lower levels were more concerned with getting sufficient water in time.

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variety was quickly overwhelmed by tungro virus, which was reduced by the introduction of PB 50, which unfortunately proved susceptible to Helminthosporium oryzae. The cropped areas experienced dramatic output declines between 1982 and 1985. Crop losses due to pests approached 100%, irrigation flows became chaotic, and so on. Balinese farmers remember the episode as the time of "poso" (hunger and harvest failures)."[4]

Prof Lansing, an anthropologist, who was studying the water temples and subaks since the 1970s[5] was so appalled by the situation that he wrote to the ADB suggesting that the problems being experienced were a result of the disruption of the traditional system. According to field data synchronized harvests and fallows show pest related losses of about 1% as against over 50% with continued cropping. His suggestion was rejected out of hand by ADB, which continued with business as usual recommending use of pesticides rather than adopting the traditional practice of fallows.[6]

By the mid 1980s the Indonesian government slowly woke up to reality and officially recognized the efficacy of the Balinese water temple system, which was earlier referred to as the "rice cult" of Bali, in dealing with rice pest attacks and began reviving it and recommending it for pest control.

This is yet another example of the mindless application of green revolution technologies in ancient agrarian societies and negation of their time tested practices of crop or water management, pest control and diversity management. The Bali story is particularly relevant for many Indian rice growing states which have robust and proven traditional practices that have been relegated and lost due to the green revolution fervour.

Adapted from the various papers by Prof. Stephen Lansing

Footnotes

[1] Love Thy Neighbour- How Balinese rice harvesting can teach us a thing or two about collaboration. Stockholm Resilience Centre. http://www.stockholmresilience.org/5.57a5b5b812e52e41746800010792.html

[2] Lansing, S.J & Miller, J.H (2003) . Cooperation in Balinese Rice farming.

[3] ibid. [4] ibid

[5] He wrote a book the Balinese water systems titled Priests and Programmers: Technologies of Power in the Engineered Landscape of Bali (1991)

[6] Lansing, S.J. (1996) Simulation Modeling of Balinese Irrigation. In Canals and Communities: Small-scale Irrigation Systems, ed. by J. Mabry, pp. 139-156.Univ of Arizona Press, Tucson.

FROM AROUND THE WORLD

China says No to commercialization of GE rice?

China's major financial weekly the Economic Observer reported in September 2011 that China has suspended commerciliaztion of GE rice. The weekly quoted a person close to the agriculture ministry. This move has been welcomed by green groups around the world. China had done field trials of some varieties and had also faced GE rice contamination incidences in the past.

Adapted from "China says No to commercialization of GE rice?" September 25, 011. http://bit.ly/pf30oq

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