Living Farms

Committed to ensuring farming communities' access to and control over food and farming systems.

Report from a National Workshop on

"GREEN REVOLUTION IN EASTERN INDIA - WHICH WAY FORWARD?"

Sept 6th & 7th 2010

At IMAGE, Bhubaneswar

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Content…

Background

The Government of India had announced in its 2010 Budget that Green Revolution will be extended in Eastern India (Bihar, Jharkhand, Eastern UP, Chattisgarh, Orissa and West Bengal and had included a 400 crore rupees in the Rashtriya Krishi Vikas Yojana in the budget that year. In order to implement the initiative, a preliminary meeting with the State Agriculture secretaries/Directors of Agriculture of Bihar, Jharkhand, Chhattisgarh, Orissa, UP and West Bengal was held on 18th March, 2010 during the National Kharif Conference at New Delhi. Further, a meeting was held on the matter in July 2010 in Kolkata with the Union Finance Minister and Union Agriculture Minister and Agriculture Ministers of West Bengal, Bihar, Orissa and Chattisgarh and senior officials from Jharkhand and Uttar Pradesh along with IFPRI representatives. It was recommended by the Union Agriculture Minister that this proposed Green Revolution should be along the lines of the "Chinese model" driven by hybrid rice. A task force at the national level for the 'aggressive promotion' of hybrid rice was proposed. It was proposed that this task force would devise strategies to create clusters of villages adopting hybrid rice so that procurement centres are opened at these places for giving marketing support to farmers.

At a time when the Green Revolution's full impacts in states like Punjab are emerging on the economic, environmental, health and social fronts and in a context where no comprehensive balance sheet has been drawn up on the (earlier) Green Revolution in India, the new plan and package posed a lot of urgent concerns. This was all the more so given that Eastern India houses invaluable diversity in rice to this day. An immediate debate on the issue was felt to be important also given the continuing farmers' suicides across the country, including in Chattisgarh and the implications of the proposed Green Revolution in Eastern India on the unbearable agrarian distress being experienced by farmers and agricultural workers in the country, that too in the era of climate change. A 2-day workshop was therefore organized on September 6th and 7th 2010 in Bhubaneswar to discuss **"Green Revolution in East India - Which Way Forward?"** by Living Farms along with DRCSC, Kolkata, supported by ASHA (Alliance for Sustainable & Holistic Agriculture), Indian Social Action Forum (INSAF) and Chetna Organic. The following is a report of this workshop and its discussions.

Introduction

Debjeet Sarangi of Living Farms, Orissa

The launch of a new so-called 'Green Revolution' in Eastern India and Eastern UP comes as a surprise to many of us. The fund which is called the 'Rashtriya Krishi Vikas Yojana' has been so created to revive agriculture, as a response to the severe agrarian distress in the country and as a farmers-suicides relief measure. The Green Revolution in Eastern India proposals reiterate the fact the despite the severe agrarian crises, such as the one in Punjab, unfolding in various parts of the country, no lessons are being drawn by the Governments, the Planning Commission or the World Bank. This worrying situation has necessitated this workshop. This workshop aims to:

- Explore what are the implications of launching a Green Revolution in Eastern India, drawing from the experience of states like Punjab and based on the farming conditions here;
- Understand the particular vulnerabilities of the farmers in Eastern India, in spite of their wealth of knowledge and rich diversity of high yielding crops;
- Chalk out a reasonably clear strategy for creating sustainable, farmer-centric agricultural development programmes.

"India's agrarian distress – Where and Why?"

Dr.Sudhirendar Sharma, Ecological Foundation, New Delhi

Dr Sudhirendar Sharma began by stating that the subject of agrarian distress and its causes is well-known and much-ignored, and that he would speak on a related subject.

Recently, we witnessed the hike in salaries of our MPs so that it was comparable with executives and parliamentarians elsewhere across the world. The benchmarking was done with the members of legislatures elsewhere and not amongst the lowest strata of Indian society, namely the people below the poverty line. This is a live example of inequality being institutionalized by none other than the Parliament itself!

This is not an isolated case. Globalization in India has brought in a practice across corporate entities where the CEO earns nearly 500 times that of the average employee of the company. Likewise, our MPs earn almost 40 to 50 times what a housemaid would earn per month. Income

If you want to walk fast, walk alone. In the case of the State, it has walked very fast, walking alone and leaving the people behind. But the second part of the proverb says that if you want to walk far, walk together. That is, both we the civil society and the State need to walk together, deliberate issues and concerns pertinent to the people, ensure their participation and take us to the next step, onto the next stage.
- an African proverb.

inequality is thus an institution which is a taken in any organization one ends up working in.

Income inequality is perhaps most prevalent in the US, or in the UK and other European countries for that matter. In the eighties, 6% of the American GDP went into law and order maintenance, which was less than that to education and health. Post the 2008 financial crisis, the State started underwriting the costs of the meltdown to maintain the costs of the CEOs at their existing operating levels. Thus the State played the part of promoting the private sector, which had not delivered what it promised to deliver, that is, to remove the ills prevalent in the public sector.

State governments all across India are facing a crisis of credibility credit, which they try to constantly try to resolve in the form of window dressings.

This situation of income inequality is prevalent in what I call a 'deficient democracy', which is based on unequal principles. While the inequalities in a deficient democracy can also be social, as in caste and creed, I would like to focus on the economic inequalities. And while we talk about deficit in democracy, the corollaries exist in the form of coherence credit, compliance credit and credibility credit.

State governments all across India are facing a crisis of credibility credit, which they try to constantly try to resolve in the form of window dressings. The US model of inequality, which we seem to have adopted to a large extent, is to allow corporations to make profits and hope that the profits will be redistributed to the poor and the needy. In the Japanese model the inequality is distributed at the income level itself, hence removing the need for redistributing it.

The US model which we in India follow, allows a few to accumulate a lot, with the support of the State, following which the income inequality starts happening. We sing praises of the NREGA, but it is only a window dressing. What the poor get as an employment guarantee is only a part of the profit accumulated or a part of the tax that you pay. The Act does not stipulate a timeline beyond which the people below poverty line will no longer require the Act. It has created a situation where people are expected to be happy to be poor, because it guarantees a job. Interestingly, people in some parts of MP who were provided with toilets as part of a sanitation program are being looked upon as being above the BPL line. Hence, these people actually brought down the toilets that would have helped them. We seem to have created a situation where people believe that it is good to remain poor.

The US model which we in India seem to have adopted to a large extent, allows a few to accumulate a lot, with the support of the State, following which the income inequality starts happening. It is to allow corporations to make profits and hope that the profits will be redistributed to the poor and the needy.

This income inequality has led to consumerism. This in turn led to more dependence on credit, in turn leading to mortgaging and culminating in the financial meltdown. While this is only one problem, there are five more implications resulting from income inequality.

It has to be understood that we are party to these implications. We believe that elitism is efficient, that is, we believe that a certain section of people would like to be more efficient in trying to deliver whatever is to be delivered to the nation. Thus a large section of the Indian population is excluded from the process of development. This idea of 'exclusion is necessary' is what drives the Planning Commission to talk about 'inclusive growth' thus accepting that certain sections are already excluded. The third implication is increase in prejudice; the fourth being the general agreement that 'greed is good' and the fifth being the inevitability of despair.

When I was a student, I was taught to believe in the Norman Borlaug way – that fertilizers, chemicals and irrigation alone could save the world from drought and famine. But about a decade back, we had to begin wondering if Punjab's so-called success was really a myth. Anyone who has gone to Punjab and lived with the farmers there will tell you more. Punjab is no longer prosperous as it once used to be. Today, Punjab has perhaps the most polluted water bodies, deepening ground water levels, farmers dying of cancer, rising number of kidney and cancer speciality clinics being inaugurated by the government.

Just like Lord Macaulay set forth an agenda to make Indians believe that their education and culture are inferior to that of the English, we are led into believing that the Green Revolution system of agriculture is superior.

The Commonwealth Games, in spite of all its controversies, still managed to contribute to the nation's GDP. And the chief economists of our nation, Dr. Manmohan Singh and Montek Singh Ahluwalia, who are obsessed with double digit growth in GDP, do not realize that GDP does not reflect the growth of the common man.

Today, I see more and more 'erudite' people not reading at all. Even professors, economists and political readers do not seem to read at all. Thus the lack of knowledge of past disasters will lead to failures like Punjab repeating sooner or later.

The belief that privatization is the lone saviour of all peoples everywhere has led to the diminishing of the sense of community. Individualism now prevails leading to increased consumerism across all age groups. Even families have ceased to exist with products being targeted at members of the family as individual units.

Just like Lord Macaulay set forth an agenda to make Indians believe that their education and culture are inferior to that of the English, we are led into believing that the Green Revolution system of agriculture is superior. When one visits Orissa, we are hounded by hoardings of mines and minerals as if we were in an African nation.

We are not against people earning more, but we need to analyze what is the belief system that is driving them to earn more and how they plan to earn more. While the intention is the tall claim to reduce poverty, the actions do not corroborate with the intentions. This intent-action disconnect requires to be established well.

The income inequality which arises out of this disconnect leads to social unrest. This unrest leads to more investment in maintaining law and order, with

the intent of protecting the politicians and not the public.

Also, the belief that privatization is the lone saviour of all peoples everywhere has led to the diminishing of the sense of community. Individualism now prevails leading to increased consumerism across all age groups. Even families have ceased to exist with products being targeted at members of the family as individual units.

Stephen Marglin in his book, 'The Dismal Science' refers to these kinds of consumerist societies as 'imagined communities' which most of us are part of. They are rich and educated who live in gated communities and depend on private services and investments. As part of these 'imagined communities' we distance ourselves from the State, depending on generators when there is no power and buying our daily needs from the private sector. We do not take any proactive role in the governance of the nation nor are we interested in how the policies are drafted. Thanks to these disinterested 'imagined communities', it is easy for the State to announce new policies without looking into the deeper implications, knowing very well that most individuals are only concerned about their own survival and not about the policies that govern wider society. Thus, we the members of civil society need to engage with the larger populations. To do that we need to bring in newer ideas and issues to the table.

It is in this context that the government is trying to implement Green Revolution again in the eastern states. A political economy is at work here and we need to understand the dynamics of the same in order to actually find the places where we can effect change.

As mentioned earlier, the glorious days of Punjab are over and it is not the flourishing state it used to be. We need to challenge the popular perceptions and understand how the concentration of power is at the heart of the political and economic challenges. While Punjab did contribute to the food security of the nation and Punjabi farmers did get rich, there do not seem to be any systematic efforts to actually look into the balance sheets of Punjabi farmers today. Likewise, since the Governments always look at the national GDP they always overlook the fact that the farmers at the grassroots level are usually disappointed. Hence, we need to look at the balance sheet of individual farmers and check if they do secure profits.

These days, more and more farmers are pushed out of farming. And the money that they get for selling their land is assumed to be profitable to them. While this is a temporary respite, their livelihoods are lost forever. However, tax rebates and incentives are offered on a regular basis to corporations which enable them to secure greater profits. But none of this profit gets redistributed to the poor.

Our economic arguments are neither pro-environment nor pro-people. We look at balance sheet of corporations and as 'imagined communities' we assume that the State is doing well for us, oblivious of the fact that millions of people are being excluded from the system. To be included in the system, these people will have to be cognizant of the deliberations, the arguments and the tools to be able to discuss with the Government, so as to make it deliver on its promises.

I would like to conclude with an African proverb which says that if you want to walk fast, walk alone. In the case of the State, it has walked very fast, walking alone and leaving the people behind. But the second part of the proverb says that if you want to walk far, walk together. That is, both we the civil society and the

State need to walk together, deliberate issues and concerns pertinent to the people, ensure their participation and take us to the next step, onto the next stage.

"The new revolution by women of Andhra Pradesh – The Community Managed Sustainable Agriculture Experience"

Sri Vijay Kumar, IAS, Joint Secretary, SGSY,
Ministry of Rural Development, Govt of India

The presentation by Mr Vijay Kumar was about the work done in Andhra Pradesh when he was heading the Society for Elimination of Rural Poverty, an NGO of the Government of Andhra Pradesh, under its Rural Development Department. Now, Shri Vijay Kumar is with the Government of India away from AP and looking after the anti-poverty program of the Ministry of Rural Development. His current assignment involves scaling up of existing poverty eradication initiatives in AP.

The women farmers are the real champions of the revolution under the policy of the AP Government which we helped formulate. The vision was to lift every family up from the pangs of poverty, not just in the economic sense but in the sense of enhancing the voice of the poor, giving equal opportunity to women, providing income from multiple sources, led by agricultural incomes.

In the areas that we worked, the poor are now able to manage risks and are able to access basic health and educational services largely due to the efforts of the women there. This achievement was largely due to the mindset that these women displayed – the resolve not just to survive but also to prosper even in the face of adversities. The most important thing for anybody working with the poor therefore, is to believe in the capabilities of the poor.

The poor are made to remain poor because their capabilities are suppressed and they are not allowed to express their latent energies and thus remain stagnant. However, the spirit of self-help and voluntarism is so resilient in the poor; we use processes of social mobilization to get the poor to build their own institutions independent of others, which will unleash their energies, find new directions for their lives, and tackle the various problems that are faced by them.

The poor are made to remain poor because their capabilities are suppressed and they are not allowed to express their latent energies and thus remain stagnant. However, the spirit of self-help and voluntarism is resilient in the poor. The processes of social mobilization to get the poor to build their own institutions independent of others, will unleash their energies, find new directions for their lives, and tackle the various problems that are faced by them.

However this does not happen on its own. It has to be induced till a particular tipping point is achieved. This role has to be performed by the government and civil society. It is not in directly doing but by providing them the opportunity to come together, build their own plans and implement them. Throughout the course of my life, I have witnessed success whenever these basic principles were followed and operationalized.

Based on these assumptions, the SERP – Society for Elimination of Rural Poverty – an autonomous society was set up by the Govt. of AP in 2000, to initiate a process of state-wide social mobilization to ensure that poverty in the state is eradicated in a meaningful time frame.

In the ten years that have passed, the program has been able to reach out to almost 90% of rural poor households in AP. More than one crore women have organized their own institutions - that of self help groups and their federations.

At the base are the informal SHGs consisting of 10 to 15 members. The primary functions are saving and lending in times of individual need. But their power is multiplied when they form a federation at the village level. This village organization which has representatives from each of the SHGs represents the voice of all the poor people from that particular village.

Together, these people are able to lobby strongly on behalf of the poor, which as individuals they would not have. Similar organizations called Mandal Samakhyas exist at the mandal (block) level, covering 8,000 to 10,000 families. For the last six years, there have also been district level federations called zilla samakhyas. These various organizations have made their voices heard at different forums. These were supported by the state level support organisation, SERP.

Tackling the multiple dimensions of poverty requires building appropriate institutions, and this was achieved by SERP. By training and organizing women, they were able to create their own institutions and professional services for health, agriculture and marketing their produce.

The poor seldom get access to the government services due to them. This vacuum can be filled by the efforts of the poor themselves – by their institutions and their personnel. The SERP model tries to convey the message that since many of the government services are not accessible or accountable to the poor, they are provided with two choices. One is to keep quiet and accept their fate; the second is to build their own capabilities.

The second option has led to the creation of para-professionals, who serve as the knowledge link for the community. These internal service providers are accountable to their communities, which is what differentiates them from external service providers. Nurturing these service providers has been a very important aspect of the program in AP.

The critical part of the program in AP consisted of the community based practitioners, namely the women farmers. They are the ones who take this program to other villages.

Thus there are two elements of this program, the para professionals at the village level and the institutional leaders. These two elements joined together to provide better quality of service provisioning. They have created a community financing architecture in which poor households via their own savings and a corpus given by their Mandal Samakhyas now have easy access to finance at easy terms.

The state government has invested about Rs. 2,300 crores in this programme along with the World Bank and the Central Government; however, the SHGs' own corpus is double this amount. They have increased their own savings, accumulated interests and grants of about Rs. 4,650 crores. Most importantly, the program enabled these institutions to access credit directly from the commercial

banks. About Rs. 27,000 crores have been accessed by the SHGs cumulatively over the last 10 years. Out of the one crore households covered herein, 68% of the rural populace and 90% of rural households are part of this programme.

When social mobilization is seen as an indicator of social capital, we notice that the southern states – AP, Tamil Nadu and Kerala are still at the initial stages; Orissa appears to be in a better state; but Bihar, Jharkhand, UP and MP are rife with problems.

From the example in AP, we can infer that social mobilization is a critical factor for providing financial access to the poor. From studying millions of households, we have seen that the poorest of families can come above the poverty line provided they build their own institutions and adequate hand holding is given. The Govt of AP hopes that by 2015-16 the entire one crore households will be reached through this programme.

Further, we have helped these women with their livelihoods, namely agriculture, livestock and dairy production, along with skill-development for youth to access external opportunities. We are helping them also to link with service providers across the value chain, and in some cases even create their own service provision.

The women have been marketing their agricultural produce and helping farmers to get minimum support price for their paddy. They have been running bulk milk cooling centers in close to 3,000 villages. 80 lakh members are covered by life insurance, managed by their own institutions in collaboration with the Life Insurance Corporation.

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Vijayanagar district has an interesting model where the Zilla Samakhya itself runs an insurance scheme for cattle, and all claims are settled within 15 days. Vishakhapatnam also has the country's first community-managed health insurance for a district. In both these cases, no external insurance company is involved.

In addition, there are interventions in health and nutrition, to look at issues like under-weight babies, infant and maternal mortality rates, etc. In the field of education too, there are pre-school centres run in close to 600 villages. Gender equity and family welfare is also receiving attention with the setting up of counselling centres and ensuring cordial relations with the police.

While the entire programme was a holistic exercise of poverty alleviation, we realized that unless agriculture becomes profitable the farmers will not be able to come out of poverty. Hence in the fifth year of the programme we got into agricultural intervention**.**

Small and marginal farmers are extremely vulnerable especially in rainfed agriculture because of the risks associated with production and marketing. It is because of the entire Green Revolution paradigm of input and credit intensive agriculture that agriculture has become unprofitable, thus leading to severe food insecurity crisis.

A survey conducted in AP in 2003 showed that almost one third of the cost of production is due to synthetic pesticides and fertilizers; this also varies according to crop. Rent for land and the cost of seeds also account for huge expenses for the

farmer. If we bring down the cost of cultivation, we can then reduce the risks involved and increase profits. But more important than profit is the sustainability for the farmer.

In the Community Managed Sustainable Agriculture (CMSA) programme that we initiated to address the above issues, we managed to reverse the trends set by Green Revolution – which scientists know everything and farmers know nothing. We gave primacy to farmers and that too, the women. It is because of the importance given to women farmers that we were able to achieve rich dividends.

Meenakshi, who has come here from the tribal area of Srikakulam district, was not allowed to practise sustainable agriculture by her husband. But supported by her community group, she and her husband came to a deal to split their land into two halves, so that each could cultivate according to their specific interests. While she went ahead with sustainable agriculture methods, she reaped huge returns and her husband had to accede to her knowledge and now works along with her. She is now a state level trainer and inspires other women to take up SA too. The focus on women farmers is critical. It is upon them where most of the family decisions rest and they are guided by that.

The other paradigm shift was to move away from external input intensive agriculture to ecological farming based on the intrinsic knowledge of the farmers and best practices regarding the same. While this knowledge had to be validated, it certainly has given the farmers both economic as well as mental reprieve.

The conventional planning process has consistently neglected farmers' knowledge. Around five years ago, CSA (Centre for Sustainable Agriculture) in AP had established that pest management is possible without chemicals, which inspired me to get into agricultural intervention for this programme. In 2005-06, we introduced similar pilots in our programme and it yielded successful results.

Maintaining soil fertility in a sustainable manner using existing knowledge and use of local resources was the second level of intervention in bringing down the cost of cultivation. In addition, we also worked on rainfed farming, water, soil and moisture conservation as well as seeds.

The women farmers, because of their new found confidence, have also been able to negotiate land rents with the landlords. So in an iterative chain of processes, the women have been able to progress gradually from eliminating chemicals to increasing returns and now practising holistic farming.

The initial three years served as an incubation phase when SERP, resource NGOs and the women's organizations worked closely together. Since 2007, leadership among women served as the primary steering factor. Each layer of women at the SHG, village, mandal and zilla levels have contributed extensively. Besides these, a woman from each village also serves as the extension agent accountable to the SHG at the federation level. There is also a cluster activist for a group of five villages each.

Natural farming led by people like Subhas Palekarji, and Bhaskar Save was taken up. This zero-cost natural farming promotes biodiversity as opposed to monocropping. This has helped address food security and nutrition.

Extension costs are also very inexpensive at Rs. 100 per acre. The intervention practices are launched through the extension agent.

Two years back, we **used the resources from NREGA into a critical intervention called drought-proofing to assist farmers in rainfed areas during drought**. Watershed management in the forms of trenches, conservation furrows, farm ponds and composting were practised. These were complemented with appropriate cropping practices.

In 2009-10, almost 3 lakh acres of land belonging to SC/ST farmers have been brought under rainfed sustainable agriculture practices and this year the plan is to cover about 10 lakh acres. Thanks to the withdrawal of pesticides and fertilizers many of the farmers are also able to catch fish from the paddy fields.

Agronomical crop management started at 25,000 acres in 2005-06 and 17 lakh acres in 2009-10 against a targeted 20 lakh acres (due to weather vagaries). In 2010, we have reached 28 lakh acres for the kharif crop, which is about 12% of the cultivable area in the state of AP.

Food security through sustainable agriculture is perhaps very critical here. A tribal village in Vishakapatnam was able to substantially reduce their food requirement from external sources, after they shifted to SRI cultivation.

There are various myths surrounding Sustainable Agriculture, but we have been able to prove that yield is in no way affected by Sustainable Agriculture. Scaling up is also not an issue. Also, the government authorities from the Agriculture Ministry might be sceptical about NPM. However, this myth has also been shattered. The benefits are there for all to see. A landless poor farmer from Kurnool district has been able to get Rs. 54,000 as net income. We have also seen net incomes raised from Rs. 20,000 to Rs. 60,000.

In this model, we hope that every poor farming household is able to get an increase of at least Rs. 12,000 per annum. The Govt. of AP would like to reach all villages in the state by 2014-15 covering about 40 lakh farmers and one crore acres of land with SA and at least 40% of this land would be would be chemical free. By 2018-19, I foresee about 70-80% of the area coming under such evergreen cultivation. This has also made a very important difference to our own assumptions on poverty eradication.

In my present assignment as Jt. Secy. in the Rural Development Ministry, I am also responsible for the National Rural Livelihoods Mission, which has been set up by revamping the erstwhile SGSY program. I plan to incorporate SA as an integral part of the strategy. So the larger issue of scaling it up across the country is going to be addressed in the new intervention.

I have spoken to several state governments and their rural development departments. They are very keen to include this as part of their poverty eradication strategy. I really look forward to grassroots organizations and CSOs to be part of this program. By working together, we can leave behind a richer and greener earth for our children and grandchildren. I look forward to your support and we are ready to support in operationalizing this dream.

"Impacts of the Green Revolution on Punjab"

Sri Jarnail Singh, Kheti Virasat Mission ,Punjab

Growth of agriculture in Punjab is only in terms of fertilizers, chemicals and heavy machinery. The indiscriminate use of heavy machines, which has been continuing for several years, is not compatible with the natural system of agriculture.

Out of the many crops in Punjab, some areas are famous for cotton, others paddy, and some others maize. But particularly for the farmers in the Malwa belt famous for cotton, the amount of chemicals used was so much that there came a time when they had to stop growing cotton once and for all.

Following this, the Government's policy allowing the introduction of Bt Cotton resulted in the control of the Seed. The trader who supplies the seeds now controls agriculture.

Until this, agriculture was intertwined with the culture of the people. The interdependency among the people has been destroyed with the introduction of GM technology. The excessive use of fertilizers has also resulted in the large presence of nitrates in the water. A report states that when a bag of urea is used in a field, one third gets leached to the bottom, one third evaporates and pollutes the air, and only a third is actually used by the crop. In spite of the increase in use of chemicals, the grain stock of India has remained static for 20 years. Further, the residues of the chemicals we use have also entered our food chain thus destroying the natural order.

Land of five Rivers becomes
Land of highly contaminated water

The deadly Contaminators are:

Chloride	**Selenium**
Nitrates	**Arsenic**
Cadmium	**Zinc**
Lead	**Mercury**
Sulphate	**Magnesium**
Sodium	**Organochlorines**

While agencies provide loans to grow 'food', we are only cultivating poison in the form of fertilizers and pesticides. But the quest for so-called 'food security' has resulted in the destruction of diversity.

This has resulted in chronic diseases like cancer. There is also a train in the Bhatinda-Faridkot cotton producing belt called the 'Cancer Express' with a majority of its passengers being cancer patients who go to Bikaner in the neighboring state for treatment.

This system of agriculture has rendered the farmers unemployed. Our children do not want to be associated with agriculture anymore.

The Ecocide of Punjab: Pushing Punjab out of life

- **Animal and plant diversity wiped out.**
- **Almost entire peacock population, common sparrow, firefly, butterflies and earthworms lost.**
- **Large number of medicinal plants and herbs vanished.**
- **Pesticide contamination at alarming level in Ramsar site Harike wetland endangering aquatic life.**

The stagnation in the yield is furthered with the increase in mechanization. The number of tractors has increased so much that even farmers with 2-3 acres are provided with one. This is

accentuated by banks willing to offer loans for farmers with fragmented pieces of land.

Globalization in the form of multinational companies is also not favourable towards farmers. High value farm produce is now being sold for cheap rates destroying the markets for the farmers and pricing them out.

Our farmers' organization thus demanded that direct payments should be made for their produce. But the traders, aided by the Government, said that this proposal was unacceptable. This model therefore has borne harm to farmers on multiple fronts. Children are not getting education, with very few pursuing college studies. Even worse, the children have lost hope in agriculture.

Companies like Tata and Reliance are willing to pay even twice the rate for our lands to do organic farming. But having studied their model for the last eight years, we have realized that natural agriculture is the best way out. We have been conducting trials in several villages, but we are still not able to convince the majority of the farmers. This is a result of them getting acquainted to the notion of huge profits and nothing else. This is in spite of the fact that they are losing considerably because of their wild dreams.

Kavitha Kuruganti from Kheti Virasat Mission, Punjab added to this:

In the 138 development blocks of Punjab, 108 are classified as dark zones with respect to ground water. Environmentally, chemicals have leached into ground water and it has been declared unfit for consumption in several villages. And today, Punjab is being dubbed as the cancer capital of India with a special 'Cancer Express' carrying people from Bhatinda to a charitable hospital in Bikaner.

Economically, Punjabi farmers have become India's most indebted farmers. In spite of the media coverage, Sharad Pawar pleaded ignorance when asked about this situation by a Tribune reporter.

Green Revolution does not have positive connotations anymore and it is unfortunate that our policy makers, right from the PM down to the secretaries, are still in denial regarding this. The social ramifications are also alarming. Although direct correlations may not exist, substance abuse is extremely high amongst the Punjabi youth. Women no longer meet you in the drawing room with the men and discuss agriculture, because they feel dissociated from agriculture. Youth dream of going abroad for reasons not known even to them.

Farming is no longer viable in Punjab. In the weekly shandies, livestock don't get sold but second hand tractors do. Besides these social changes, reports indicate that village like Jajjal in Bhatinda has around 52 infertile couples out of 400 families living there. Malerkotla in the vegetable belt of Ludhiana has seen almost every married woman experience at least one miscarriage in the past 15 years. Unless the government realizes that GR has left a huge negative aftermath, it is truly a sad state of affairs for all of us.

Chhatisgarh's response to Green Revolution

Shri Manhar Adil, Chairperson of the Chhattisgarh Agrotech Society, Chattisgarh

For the last few years, the Central Government along with the Prime Minister and his cabinet have been talking about ushering in a possible second Green Revolution in 6 states of India and this was announced this year at the cost of Rs. 400 crores. But it appears that they have not considered the effects of the earlier Green Revolution in the first place.

During the first Green Revolution we thought that increase in production would boost our economy and provide self reliance. But our farmers and landless labourers have suffered its negative impacts to a large degree.

The six states where the second Green Revolution is planned are all rice-producing states. With a large number of small and marginal farmers depending on 1-2 acres of rice cultivation scattered across different plots, is it possible to practise Green Revolution in these states?

Instead, if we were to consolidate these scattered land plots, plan and help the farmers raise two crops under a land reform program, it will automatically usher in a revolution.

Consumption of chemical fertilizers in India is 115 kg per hectare today, while in Chattisgarh it is only 52 kg per hectare which they want to increase. Our farmers are used to organic farming; they have different options like vermi-compost, blue-green algae, green manure. But these have been discarded ever since MNCs started prescribing urea. Our farmers are thus forgetting the traditional methods.

All forms of food, milk and water are now being polluted with these chemicals. We should insist upon the Government to conduct a systematic socio-economic survey of these states and take a decision based on the existing conditions.

Queries & Responses:

* *Both Jarnail Singhji and Kavitha mentioned that women in Punjab refuse to acknowledge their farming roots anymore and that the youth are leaving the country in search of livelihood. But the newspapers report that people from Bihar are migrating to Punjab to work as agricultural labourers and women from Bihar and other states are getting married to Punjabi men. What is the real condition in Punjab now?*

Response: It is a fact that labourers from other states of India are going to Punjab. People from Bihar and UP contribute a lot to Punjab's economy. They work as vegetable vendors, in industries and also in the fields because they are paid lesser than Punjabis. Hence, Punjabi labourers are migrating overseas.

* *If the condition of labourers in Punjab is as bad as you report it to be, why then do labourers from Bihar and Chhatisgarh and elsewhere migrate to Punjab in search of work?*

Response: Agricultural labourers in Punjab work at atleast Rs. 200 per day while labourers from other states are willing to work at Rs. 100 per day. At least two lakh voters from Bihar working as vegetable vendors reside in Ludhiana. As a result of short term benefits of chemical farming, the Punjabi farmers who were

used to bicycles suddenly started owning motorcars. But now that the situation here is not so good and they cannot maintain the same standard of life, they prefer to go abroad.

* *Has there been any decrease in the use of pesticides and fertilizers in Punjab?*

Response: It has certainly not decreased. On the contrary, the usage is increasing by leaps and bounds. The farmers are not aware about the actual effectiveness of chemicals, but they are not in a position to stop using it as well.

* *If the farmers do know about the consequences of using chemical inputs, why then do they continue to degenerate their lands with indiscriminate use of chemicals?*

Response: If one takes chemicals and tells a Punjabi farmer that his yield will increase tenfold if he uses those chemicals, he is bound to use them. He is concerned about his immediate profit and will not worry about consulting others. That is why Punjabi farmers are driven towards indiscriminate usage of chemicals on their fields.

* *When there was a period of food shortage in India, we imported wheat (PL480) from the US to meet the crisis. Do you think there was any other way the food crisis could have been handled other than the GR? And why was Punjab selected for testing then? Similarly, why are the eastern states chosen for implementing the second GR?*

Further, are the inequalities you talk about practised across all states? For example, West Bengal which has been talking about inequalities for 32 years is now saying that agriculture is no more viable because cost of production and output are the same. But Kerala following the same principles is yielding different results. What is your take on this?

Response: When Norman Borlaug first developed his hybrid variety in Mexico and entered into discussion with India, he did not find acceptance here. However, Pakistan was interested in listening to him. Due to political implications, India then accepted Borlaug's agricultural ideas. While Borlaug's intentions might have been noble, his vision was extremely myopic and could not see beyond increasing yield. If one drives through Punjab, you will notice that the fields are dark green through extended use of urea. There are no birds around, the agriculture is almost lifeless.

A scientist from the Punjab Agricultural University was telling me that some people from the 'Kheti Virasat Mission' were doing some magic in getting better yield through organic agriculture. This is the state of agricultural scientists and the application of the alternative moment on the ground. The state government also belittles the achievements of the organic movement.

Now, the MNCs are looking for new testing grounds to launch their chemicals. Since there is a lot of negative publicity in Punjab, they have to seek solace elsewhere which might explain why they are going towards the eastern states. Of course, it is difficult to figure out the exact nature of this design, but definitely there is a larger conspiracy playing in the background.

Regarding the inequalities, the people are migrating in large numbers because of mismanagement of existing resources. But our ministers take credit in introducing new trains with names like Janshakti and Shramajivi, not knowing that people are migrating in large numbers in search of livelihoods.

The average production rise which promised 4.5 metric tons per hectare during the initial phases of the GR has now come down to 2.2 metric tons per hectare. Orissa had much larger yields with almost 5-6 metric tons per hectare which has

come down dismally. The soil in Punjab has lost its nutrient strength and the government of India has taken a peculiar decision of earmarking Rs. 200 crore rupees for reclaiming the degenerated soil. Simultaneously, it plans to spend Rs. 400 crore for launching the second GR in eastern India. Orissa, Bihar, West Bengal and Jharkhand are filled with small and marginal farmers, making them soft targets for the entry of the MNCs with the promise of bumper production. That is why, eastern India is the launching pad for the second GR.

* *In spite of having PDS and NREGA in Chhatisgarh, why would you say people are still migrating out of Chattisgarh? Why is the cultivation of hybrid rice increasing in the same state?*

Response: I must accept that with the launch of NREGA and improved PDS, migration of Chhatisgarh has come down in the last two years according to official records. Also, it is true that hybrid rice cultivation is increasing in the state, but only in the central plains, that is in districts like Durg, Dhamteri and parts of Kanker. It is because the average yield in Chhatisgarh is quite low at 1.6 metric tons per hectare in comparison with the rest of India. To compensate for this, large famers having consolidated land holdings of at least 20 acres go for the use of hybrid varieties. As far as the 72% small and marginal farmers are concerned, they have not accepted the hybrid varieties.

Response: I would like to add some points on why GR is being introduced in Eastern India. In addition to the fact that corporates usually enter areas where there is scope for market expansion, the unchallenged existing notions surrounding food security is another important reason. The Malthusian argument that food grain production growth rate has been lower than the population growth rate is constantly being put forward to say that if we shift from this (intensive, GR) system we will fail to maintain the food security of the country. This idea has been left unchallenged by both civil society and people elsewhere.

If the intention is to achieve food security, why is production restricted to rice in eastern India? Why are we not concentrating on production of millets in rainfed regions? There is also the reality that a World Bank document from 2006 pointed out that Punjab, Haryana and western UP have lost their capacity to contribute to the grain basket and hence the focus should move towards the eastern regions. The government seems to have followed this with the launch of the second GR four years after the recommendation was made. This opens up a whole market for hybrid rice, hybrid seeds, irrigation pumps, herbicides, fertilizers, etc. Hence it is vital for us to challenge the notion of our policy makers - the fallacy of producing food in a concentrated region to cater to the rest of the nation, in the name of food security, thereby destroying that region as well as the other neglected regions.

Other sharings

Punjab has witnessed large farmers taking land on lease from small farmers and cultivating. This phenomenon is now happening in Orissa, especially coastal Orissa with disastrous effects on the poor. They are reduced from landowners to sharecroppers, especially in the case of dalits. This situation is extending to Bihar, Jharkhand and also West Bengal.

During the pre-Green Revolution times in Punjab, the big farmers used to give some lands on lease to the small farmers to cultivate. But now with the advent of

chemicals and mechanised farming, labour requirements have come down to a minimum. It does not really matter whether we have to cultivate 20 or 50 acres, the amount of time and labour needed is almost the same which the big farmers can do on their own.

In the era of chemical agriculture, you apply lots of fertilizers. This results in your field being covered with never before seen weeds. You then apply weedicides. Use of chemicals brings in unwelcome pests which you try to remove with pesticides. But there are varieties of pests which we have not eradicated even after 30 years. But when we adopted natural agriculture in the last six years, all these problems have vanished.

The effects of Green Revolution are there for us to see. Around 60% farmers of the rainfed areas grow crops other than paddy and wheat; Orissa has about 84% small, marginal farmers and sharecroppers; and it is more than 70% for the nation. If our agricultural policy does not reflect their interests, then what is the purpose of the Green Revolution?

There are two types of farmers' organizations in India. One talks about radical land reform while the other talks about crises like the 2010 Seed Bill and marketing of agricultural produce. The two groups seem to act on a mutually exclusive basis, unfortunately. It is important for the dalit/adivasi organizations representing small and marginal farmers to raise their voices against chemical farming and the need for a differently oriented policy. It is critical that the demand for cancellation or withdrawal of GR should come from the small marginal farmers and the sharecroppers. A lot of work needs to be done in this direction in the near future.

In Bolangir, grand preparations are underway to launch the second Green Revolution. Punjab is being repeated in Orissa with cotton fields covering a lot of area on either side of the road. Bolangir has good yield of millets, grams, mung, onion etc. But all these crops are fast disappearing due to cotton cultivation. Jatropha which is used for making bio-fuel is also getting introduced in a big way.

Further, an irrigation project is being planned which will result in the displacement of people from 29 villages. The project will most likely provide irrigation for only 3 to 4 years, but the impact of such projects rising from the second Green Revolution is crushing our people in states like Orissa.

Orissa has about 84% small, marginal farmers and sharecroppers. If our agricultural policy does not reflect their interests, then what is the purpose of the Green Revolution?

SESSION 2

What would be the implications of Green Revolution in Eastern India?

Introduction

Kavitha Kuruganti

This session will feature presentations on the experiences of hybrid rice from across Asia and the implications of the same in terms of yield and profitability. We also have speakers talking on the diversity of local rice varieties developed by indigenous communities of farmers. We will also discuss the enormous thirst that the first GR had for ground water and its implications for eastern India if the second GR gets underway in a similar fashion. And finally, the potential impact of chemical fertilizers if the same model of GR is replicated now.

"Hybrid Rice – experiences from different places"

Dr Debal Deb, Ecologist

I am going to focus on the Malthusian facade around the pressures of a growing population and predictions of hunger and starvation. This fantastic assumption is what is driving the second GR in eastern India. Hence, we need to focus our attention towards the aspect of agricultural production, which are usually evaded by agriculturalists and policy makers.

We have falsely assumed that hybrid rice is the best of all possible options to prevent food shortages. However, famine/starvation is never known to have been caused due to lack of food availability; it is caused due to lack of access to food.

Secondly, we do not seem to have sufficient evidence to suggest that hybrid rice is more productive or more nutritional. Finally, have we tested all available alternatives? These are questions that are generally evaded by the State.

Data on the productivity of hybrid rice is generally fragmented and inaccessible. But based on official data obtained from Vietnam, China and Philippines, which we will assume in good faith, we will try and get some insights.

A Government of Vietnam publication mentions that there was minimal improvement in the yield of hybrid paddy during the 14 year period from 1992-2006. It recorded only 0.1% increase in annual growth while the traditional variety yielded 2.4%. This in spite of an 8% growth rate in the usage of hybrid variety in the country. So with the abnormal increase in the land brought under hybrid varieties, Vietnam registered only 2.1% more output over the 14 year period.

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In the case of China, the production from hybrid rice between 2003 and 2006 hovered around 12 tons per hectare, almost double compared to Vietnam and other Asian countries. But after 2006, it declined slightly, climbed back to 12 tons

per hectare and declined again till 2009, with estimates of 9.8 tons per hectare till May 2010. Official sources say that this is due to depletion of soil nutrient resulting from overuse of chemicals, which is something that goes hand-in-hand with hybrid technology.

This trend is seen across other Asian countries. In the case of Philippines, Vietnam and other Asian countries like Bangladesh, most of the hybrid rice varieties were imported from Thailand and China. This is likely to happen in India too. According to the Vietnamese government document, expenditure on this extension program and accompanying R&D from 1993-2005 was recorded at US$ 5.5 million. In addition, the hybrid rice varieties have also been supported in the form of subsidies but there has not been any substantial increase in output.

China official sources say that decline in production from hybrid rice production from hybrid rice is due to depletion of soil nutrient resulting from overuse of chemicals, which is something that goes hand-in-hand with hybrid technology.

The acceptance of hybrid rice has gradually decreased in Vietnam because both farmers and consumers have lost interest. One reason being that it does not taste very well, the document mentions that it tastes like paper. Of all the hybrid seeds imported, 15-20% did not meet the standards set by SPUB and was not usable. Further, the price is not dictated by the government and is set by international markets and prices rise arbitrarily.

Whether prices are subsidized or not, the price of these hybrid varieties will have to be paid through our taxes alone. This is to the tune of US$ 15-25 million a year. Further, there is no assurance that the imported seeds will be of standard quality.

With poor outputs from hybrid rice and changing consumer demand, China has not been able to meet its requirements even with hybrid rice, as quoted in a FAO paper. It is because these varieties have poor adaptability to local environmental conditions, because they are designed for only one generation. After that farmers will have to go back to buying seeds. It has been designed that way so that governments and farmers remain dependent on the companies for the seeds.

Rice geneticist Van Quen, also the chairperson of the International Rice Commission, writes that hybrid rice is susceptible to blast disease during the summer season and this is especially true of imported varieties. Secondly, they are not adaptable to a wide range of conditions that include flood and drought. These are quoted in the first chapter of a 2008 publication of International Rice Commission.

The Technophilia Paradigm

So far, no modern rice (including Hybrid) cultivar has ever been produced in any country that can withstand

1. Drought, 2. Flood/ Submergence, 3. Soil salinity

4. Pest attack, 5. Pathogen outbreak

All these properties are found in folk rice varieties.

Van Quen has documented the failure of hybrid rice varieties in India and in other countries. He cites examples of the introduction of blast resistant and gallmidge resistant varieties introduced in 1980s in AP and MP and now also in Chhatisgarh through Raipur University. Not only did these varieties fail, but they also contributed to new types of pests and diseases.

It is globally accepted that no hybrid variety produced anywhere is capable of withstanding stresses like drought, flood, soil salinity, pest attack and pathogens. However these qualities are present in one or the other indigenous variety. Be it the Sunderbans with its salinity of soil, or the 76 drought hit districts across India or the flood prone regions of South India, pest and pathogens continue to attack the conventionally irrigated farms despite the introduction of so-called HYVs which are replaced year after year in the hope of resisting attacks, without success.

In contrast, our farmers have come up so many amazing innovations. Without even knowing what DNA is, they have come up with double grain and triple grain varieties. When we showcased these varieties to genetic engineers including some at IRRI they could not believe that it was possible. We are conditioned to believe that these varieties and farmers are backward and unscientific, so we dump them on the wayside in favour of so-called modern agriculture.

There is also the myth that hybrid varieties yield exceptionally high outputs, which has been disproved even in China like I mentioned before. In Vietnam and India also, it has never exceeded 6-6.5 tons per hectare. But the small and marginal farmers have been reporting 70 – 75% milling recovery rate for traditional varieties, which is at least 10% higher than the 60% milling recovery rates of any hybrid variety. By that, whatever be the production, 10% is immediately cut off, because of the failure of milling recovery.

The myth that traditional rice varieties are low yielding has also been disproved in Orissa, Chhattisgarh, Tamil Nadu and other states. In my own experience over 15 years, we have grown 686 varieties and we have quantified it with the internationally accepted scientific method of the quantification of rice yield. We have identified 7 varieties which yield 7.3 tons per hectare with zero agrochemical input, which is definitely more than the 6 tons obtained from hybrid varieties and agrochemical inputs and irrigation. The panicle density or number of grains per sample for Bahurupee, a traditional variety, is 603. But the most popular HYV called Shoila or NTU 7070 which is supposed to have maximum panicle density is only 240. Despite these scientific evidences, we are still led to believe that traditional varieties are not productive enough.

Do we really need to increase rice production? Our central pool had stocks of 25.2 million tons of wheat and 220 million tons of rice as of 1st December 2009. For the period up to March 2010 alone we have 21.6 million tons of rice and 7 million tons of wheat. So we have 0.13 tons of rice and 0.29 tons of wheat per capita, which is sufficient to sustain every individual for a year and a half even if there is no production for this year.

When we talk about food security, we need to consider the 'hardware' – that is, the diversity of seeds and crops, and also the 'software' – the traditional knowledge of ecological agriculture. Unfortunately, our farmers are driven to reject traditional techniques and adopt the ones which are unsuitable for their conditions. They are forced to use urea and other artificial nitrogenous fertilizers on random varieties leading to destruction of the crop, and whereby the blame lands on the traditional varieties.

Thanks to these myths, we have not only lost pure traditional varieties and genetic characteristics but also cropping practices. This one field in Kerala is

home to 220 plant species including medicinal plants, fodder, etc. in a stable manner. We also have modern techniques like SRI now accepted worldwide as scientific. These are testimony to the idea that food security is indeed possible without hybrid varieties.

Lastly, we need to question do we really need to increase rice production in the first place? Our government's central pool had stocks of 25.2 million tons of wheat and 220 million tons of rice as of 1st December 2009. For the period upto March 2010 alone we have 21.6 million tons of rice and 7 million tons of wheat. So we have 0.13 tons of rice and 0.29 tons of wheat per capita, which is sufficient to sustain every individual for a year and a half even if there is no production for this year.

There was a controversy in 2002 that our parliamentarians were discussing about dumping some 32,000 metric tons of cereals into the Arabian Sea. So our objective of producing excess food is not to feed hungry mouths but to rot or to be dumped into the sea.

We therefore need to develop new rationales for scientific approaches to existing problems rather than developing new hybrid crop varieties. We have to set up a legacy where scientists question authority and not follow authority.

Prof Radha Mohan – interlude

Hybrid varieties are fertilizer- and water-intensive. Fertilizers are produced from non-renewable sources like fossil fuel. When we focus on only increasing current production through fossil fuel-based fertilizers we forget that the future situation is going to be exacerbated even further leading to more desolation among our farmers. It is only the farmers who commit and will commit suicides, not the dealers, government officials or scientists.

"India's jeopardized rice diversity"

Dr Ilina Sen, traditional seeds conservator and a Professor in the Wardha Medical College

The Jeypore tract is an area that lies on the border between Chhatisgarh and Orissa. Local wisdom states that rice was actually born here and then went on to different peoples across Asia. Today, rice is the staple food of a large number of people feeding more people than any other food crop.

The concept of the Jeypore tract stems from a time when state borders did not exist and the the adivasis of the area – the kondhs, the gonds, the bhatras etc., together with their collective wisdom developed this crop for all of us. Despite all the damage done to the crop by external agents, these areas still contain a huge genetic diversity of rice crops.

The variety of seed with two or three grains mentioned earlier is known as Jugal or Ram Lakshman in Chhatisgarh. There are also varieties that can withstand drought, salinity, grow in deep or shallow waters, on hill slopes, in lateritic or any type of soil.

> How do we reverse the present trend of decreasing availability & access to food in the absence of adequate delivery mechanisms?
>
> It has to begin with the validation of indigenous knowledge, especially the practices of indigenous women.

These adaptations have taken a very long time with many farmers contributing to the preservation and continuation of this diversity.

The politics of food and seed began in the late sixties when India was facing severe famine and hunger. There were two diametric schools of thought in the agricultural research establishment then. One believed that scientific research on native varieties has the potential to provide good yields and feed the nation. The other believed that HYVs, seeds and crop varieties needed to be imported to tackle the food scarcity issue.

Dr. Richharia of Chhatisgarh who has worked in what has now become the Agricultural University of Raipur has documented the diversity and characteristics of native varieties. He had also selected certain rice strains with good potential for increased yields at an experimental farm. But the other lobby which eventually triumphed, believed in importing seeds and HYVs from institutions such as the International Rice Research Institute in Philippines. This was a great setback in the struggle to preserve the indigenous varieties of seeds. And the struggle continues today.

> On the one side, we are fighting to keep our people's sovereignty in terms of food and seed intact, but on the other hand our policies are directed against this sovereignty. Unless the general trend is reversed and we convince ourselves that our policies need to preserve and promote indigenous knowledge and heritage; and to give up the mega industrial development that we seem to have opted for, I am afraid that our rice varieties will become extinct one by one like the fate of the Jarawas of the Andamans.

The eminent scientist who led the other lobby in championing the GR passed on the control and sovereignty of productive resources from farmers to the corporates. In the continuing struggle to save indigenous varieties and sovereignty many have fought for the interests of the farmers – to identify, preserve and promote indigenous seeds and motivate farmers to grow them. However, this was a losing battle due to an aggressive State which promotes the interests of the seed and fertilizer companies. The challenges in winning this struggle are manifold.

The primary challenge is in marketing. There appears to be only a niche market for indigenous seeds even though it involves very low input costs. There are some crops with medicinal benefits too. But we have not adequately researched the many benefits obtained from indigenous crops. Since this common yet unproven knowledge comes coupled with the absence of a market, it becomes increasingly difficult.

To add to this, the issue of food security got mixed up with that of food sovereignty. With the recent scandals of food stock being sold as cattle feed to the US and being dumped into the sea, there are serious questions being raised about the intentions of our policy makers. We claim that the HYVs are for the purpose of increasing food security but we do not have the infrastructure or the mechanisms to solve the hunger of the masses.

Utsa Patnaik's study called 'The Republic of Hunger' documents how the average consumption of cereals has gone down in the last three decades because of decreased access to food. The National Nutrition Monitoring Bureau's data also indicates that the Body Mass Index of a large section of our population is below 18.5 which is the minimum level of nutrition required for humans.

How do we reverse this trend of availability of excess food but absence of adequate delivery mechanisms? It has to begin with the validation of indigenous knowledge, especially the practices of indigenous women.

These women are the usual seed preservers, which they do by fumigating the seeds, hanging them over the kitchen fire and the like. In a situation where seeds are bought externally year after year, this kind of inherent knowledge and the substantial role of women in agriculture is lost, thus also affecting their status.

How do we validate sovereignty? This can has to be done by reversing existing trends of dependence, which even MS Swaminathan does by discussing about food diversity. To counter this, the Government is withdrawing fertilizer subsidies since it is keen on promoting 'development' in the form of large industries, mining and land acquisition.

On the one side, we are fighting to keep our people's sovereignty in terms of food and seed intact, but on the other hand our policies are directed against this sovereignty**.** Unless the general trend is reversed and we convince ourselves that our policies need to preserve and promote indigenous knowledge and heritage; and to give up the mega industrial development that we seem to have opted for, I am afraid that our rice varieties will become extinct one by one like the fate of the Jarawas of the Andamans.

"Possible water scenario in Eastern India post-Green Revolution"

Shri Himanshu Thakkar, South Asia Network on Dams, Rivers & People (SANDRP), Delhi

The Ministry of Agriculture's agenda for the kharif crop this year is increasing irrigation in the eastern regions through minor irrigation methods using ground water, which is abundant in the region. There is scope also for expanding areas under rice using SRI in the uplands with assured irrigation facilities in Bihar, Chhattisgarh, Orissa, western UP and West Bengal. But a cursory glance shows that there are very little uplands in such regions, which makes the entire promotion a farce. Talking about water at the macro level and assuming it will impact at

The Agrarian crisis and large dams

- Everyone from the Prime Minister, the President, down to the farmers agree that India's agriculture is facing serious crisis. Farmers are committing suicides in thousands every year. Agriculture growth rates are down to 1-2%, yields are stagnating or declining, and canal irrigated areas are decreasing in a number of states.
- Everyone also agrees that every farmer would benefit from better water management
- India continues to be blessed with a bountiful monsoon which can be a great resource for every farmer if put to use through local water systems.
- GW is India's lifeline: That lifeline is in serious crisis
- Only way to sustain this lifeline is through local water systems, recharging ground water.

the micro level is ironic. If we want to understand the big picture we need to start from where we stand, which is what Mahasweta Devi once said. Hence, this is what I will try to do with regard to the water scenario in the eastern states.

There are a huge number of dams in eastern India – 618 large dams. There is not really an increase in the number of dams from 2002 to 2009. Interestingly, West Bengal which \has the highest irrigation intensity among eastern states has also very few large dams. Similar is the case with UP which has the second highest irrigation intensity.

If we look at the live storage capacity of big projects in eastern India, Orissa comes first and UP next. However, Orissa does not have the highest irrigation intensity. UP has further exhausted 70% of its ground water potential.

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The mid term appraisal of the 11th Five Year Plan, which was passed by the National Development Council, has mentioned that the Special Focus Group including the agri-business leaders in the eastern region need to focus on harnessing ground water for cultivation of rice, wheat and maize. This, the appraisal says, has to be pursued with a combination of infrastructure and incentives. While the Ministry of Agriculture allocated Rs. 400 crores from Rashtrya Krishi Vikas Yojana this year for extending Green Revolution to eastern India, the 2009-10 Annual Report of the Ministry of Agriculture does not have a word on this. This raises serious doubts about hidden intentions behind the sudden promotion of Green Revolution in eastern India.

We need to take a closer look at the irrigation situation in the states. In last decade, the net irrigated area in Bihar actually dropped by a significant margin of almost a million hectares. But the gross irrigated area has remained almost stable declining towards the end of the decade. However, the gross rainfed area has not dropped much. This is largely due to the emphasis on ground water utilization in Bihar. The new Bihar Ground Water Irrigation Scheme plans to irrigate 9.2 lakh hectares by installing 4.64 lakh units of shallow tube wells covering 34.7% of the paddy cultivation in 2009. This is actually an impact of what is happening in the rainfed areas, where the paddy coverage dropped by 37% in 2009, in maize 20%. The hydropower generation in Bihar also reflects on the water availability.

Proportionately, the rainfed area is much higher in Chhatisgarh, but the situation is fast changing there as well. Of the different regions of Chhattisgarh – only 5.7% of northern hill region and Bastar plateau are irrigated. Only 28% of the net sown

area and 40% of the plains are irrigated. Chhatisgarh is also an exception in that canal irrigation dominates the scene.

Out of the 62 million hectares of the net irrigated area in India, more than 60% is irrigated by ground water today. But Chhatisgarh is also falling prey to mechanization. Amidst joy that Chhatisgarh's domestic product has improved by 11.5%, the Chief Minister advertised in dailies that 1.5 lakh pumps have been set up. This is twice the number of wells that existed 7 years ago, indicating that ground water is now being exploited at twice the rate. Further, the yield is still low and the compound annual growth rate of rice yield in Chhattisgarh in the last 5 years is actually negative. So there is no growth in yield of rice in spite of all the external inputs.

In Jharkhand, the area irrigated is very low. The rainfed area is much higher but there is a drop in the area irrigated in the last 6-7 years. Also this region sees very high annual rainfall. Large parts of land in Jharkhand have a very low pH – acidic pH. The net sown area is only 28% of the geographic area; cropping intensity is just 114%; and canal irrigated area is lower than the tank irrigated area. This is unique to Jharkhand.

While there are some comments that Jharkhand has increased SRI utilization, some figures released by the Agricultural Secretary report that land under SRI was 10,000 hectares two years back and 14,000 hectares last year.

As seen earlier land area irrigated by canals is lower than that irrigated by tanks in Jharkhand. Irrigation by dug wells is more than that by tubewells. Also, minor surface irrigation is more than medium and major projects. The percentage of irrigated land is very low and the plan is to increase rice production to 2 tons per hectare by the end of the 11th Five Year Plan. The plan is also to increase irrigation intensity from the current 12% to 40%. Hydropower generation has been declining steeply in the past 25 years indicating that the availability of water in the rivers is also declining.

In Orissa, there has been an increase in both the net and gross irrigated area and the net rainfed area has declined in proportion. Canal irrigation still dominates the picture but has been slowly declining in the last decade with ground water irrigation increasing by 200% in one decade.

At a national level therefore, official data reveals that area irrigated by major and medium projects has been decreasing in the last 16 years. Even after spending Rs. 142,000 crores on such projects there is a decline of approximately 4 million hectares at the national level.

One of the prominent myths is that projects like the Bhakra project have helped increase our food grain production from 50 million tons in 1950 to 233 million tons in 2008-09, and thus contributed to food security. But a study by the World Commission on Dams concludes that large dams contribute only 10-12% towards increase in food production. As Arundhati Roy wrote we also do not get to know the details about post-harvest losses and losses due to lack of storage space. So

> Eastern India has a huge untapped potential for ground water, surplus labour, greater incidence of sunlight and more potential for what can be done. There are several alternatives that we can explore - organic farming, local water systems, indigenous varieties, pulse seeds, oil seeds, flood tolerant local varieties, better use of existing water infrastructure, etc.

the agrarian crisis has a lot to do with the agenda of large dams as it has to do with the agenda of GR.

The agricultural growth rate has been very low at 1-2% over the last two decades. Net sown area has remained stagnant at 141 million hectares and it is not likely to increase. National food grain production has remained static at around 200 million tons for a long period. Only in the last 3-4 years has there been a slight increase. Ground water depletion is rampant all over India but more so in the north western states. In this situation, the scope for growth seems to be limited in most parts of India for various reasons like hydrological reasons, topographical situations and so on.

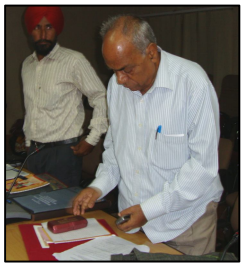
But Eastern India has a huge untapped potential for ground water, surplus labour, greater incidence of sunlight and more potential for what can be done. All these factors have got the World Bank, IWMIF, Ministry of Water Resources, Central Water Commission talking about to push for bigger projects and a Green Revolution in Eastern India.

There are several alternatives that we can explore - organic farming, local water systems, indigenous varieties, pulse seeds, oil seeds, flood tolerant local varieties, better use of existing water infrastructure, etc. And we can learn from success stories like Gujarat which has seen a remarkable agricultural growth rate in the last 6-7 years. While people may claim that this was because of Modi and Sardar Sarovar, an EPW article attributes this to the local water systems.

It started with the Saurashtra Well Recharging Movement in 1990, followed by a check dam movement. These helped to recharge the local water systems which have led to increase in water available to the people. The major areas contributing to the growth rate are from Kutch, Saurashtra and north Gujarat which incidentally do not get water from the Sardar Sarovar. If we have to focus on improved agricultural development, then we ought to learn from lessons such as those from Gujarat.

Implications of the proposed Green Revolution in Eastern India on Seed Sovereignty:

Natabara Sarangi, Organic Farmer and Seed Conserver from Orissa



I am here to speak about indigenous seed varieties – their conservation, collection and distribution among farmers. Scientists must be aware of Von Liebig who is considered the father of chemical fertilizers. In 1840, he rejected the role of humus in crop production. But after 20 years, the same Liebig declared to the world that he was wrong and that it was humus that matters.

During British rule in India, several people sought to introduce chemical farming. Later came the Green Revolution which wiped out seed diversity, particularly of rice and wheat and HYVs (High yielding varieities) began to rule.

An article from OUAT titled 'Production and Inflation' published on 29th July 2010 mentions that farmers who have been using HYVs for over 20 years did not record any noticeable yield; in fact, the yield became less.

In some parts of Orissa, farmers are trying to conserve and revive indigenous varieties and practices. I am one of them and even though I may not be faring very well in indigenous rice seed preservation, production and distribution, I am in touch with a lot of like-minded people who support us in our work. As a result, I have been able to conserve 330 indigenous varieties of rice in the last 10 years. Scientists may discredit the use of these varieties but we do not pay much attention to them.

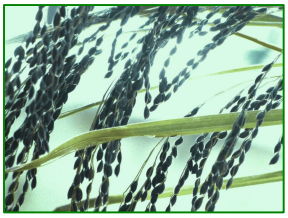
Farmers who have been using HYVs for over 20 years did not record any noticeable yield: in fact, the yield became less. – 'Production & Inflation', an article published by OUAT, Bhubaneswar.

While working with an organization called Sambhav in Orissa, we found that indigenous varieties which consume less water are possible solutions even for global warming. They also require shorter periods of time to mature compared to HYVs. In Orissa, if we transplant them in September, they bloom in October, unlike HYVs which might even need upto 160 days for maturing. Indigenous varieties do not release toxic materials into the atmosphere. There are also some varieties which are flood/drought resistant, with varied periods of maturation, adaptable to upland, medium and low land.

Dr. Richharia had selected some 11,000 varieties of rice from the fields of Orissa and Chhatisgarh prior to the Green Revolution. I have some of these varieties, 1242 is the best variety for boiled rice, *Champa* is a variety which yields 5.5 metric tons per hectare.

We are also trying out varieties to grow in saline water in states close to the sea. One variety called '*kolikati dhana'* which we have tried in Jagatsinghpur in Paradip grows well in saline water with a potential to yield 4.5 metric tons per hectare.

We have a flood resistant variety called '*Kania Patia'* which can stand in water-logged fields for 20-25 days and can yield upto 4.5 tons per hectare.



There are other varieties - *dhania patia* and *hati pinjara* which yield 4 tons per hectare, *palasia* – 4.5 tons, *egaro bouli* -- 5 tons; drought resistant varieties – *bara keari, sahana, botali, bakula manji, kalua. Sahana* is drought resistant and matures even in the absence of rain for 15 days. So it is a poor person's variety.

There are also varieties which mature in 40 days and harvested in 50 days. Their yield is low but will be sufficient to feed farming households. This is harvested in the month of *sravan* (August) in Orissa, the grains are ground and made into a paste and smeared on the forehead of Lord Jagannath during the festival of *Chitalagi Amabasya*. This shows that farmers are capable of producing rice before August 15th.

We have developed another variety *'Prachi'* which gives an average yield of 5.5 tons per hectare. If it is grown in the SRI method, it can definitely go up to 8 tons per hectare. It is also adaptable to different climatic and topographical conditions.

We also have 15-16 scented varieties. *Kala Jira* is very popular in Orissa. Two years back a breeder scientist from Swaminathan Foundation from Jeypore requested for some seeds. We had given it to them since they are working on

seed conservation. But they have now promoted the seed and now own an area-specific patent on that. Likewise there are *solari, gobindobhog* – a variety from West Bengal; *Pimpudi Basa* – from Mayurbhanj and also Krishna Bhoga. No doubt the yield is less, but it will never go lesser than 3 tons per hectare.

We also have few varieties like *saro khiro*, a Mayurbhanj variety; *balami,* a Dhenkanal variety; *purno kesari,* a Nayagarh variety which are quite old and used to be found everywhere but not now.

We have shown that if we set our minds and heart to it we can definitely conserve indigenous varieties, find out more varieties and then give a befitting reply to the GM seed giants.

Emerging water issues – Current irrigation, projected irrigation demands and industrial uses:

Shri Saroj Mohanty, Paschim Odisha Krushak Samanwaya Samiti

Green Revolution and water conflicts go hand in hand. I will keep my discussion focussed on water issues in Orissa. The Hirakud is as big as the Bhakra in Punjab. In Punjab, the use of urea and DAP is now more than 2 quintals; in the irrigated patches of Orissa, use of chemicals is around 150-190 kg. A recent study shows that usage has gone upto 195 kg in some areas. In such places, farmers have come to understand that increasing chemicals does not necessarily result in increased yield. They are however not able to quit chemical farming since they look upto the Punjab model as a prototype. In southern Orissa, apart from the undivided KBK districts, millet farmers have switched over to cotton and started practicing chemical intensive farming like that practised in the irrigated patches of Sambalpur and Baleswar districts.

This also needs to be seen in the light of 2008-10 being the dark period when many farmers were forced to commit suicide. 2009 saw 38 farmers dying and there have been more than 3000 farmers taking their lives in the last ten years. These are figures from the Crime Bureau. Unfortunately, the government does not admit it or puts the blame on previous governments.

When we talk about food security, we should be clear that it is for the food security of tribals, small and marginal farmers, landless agricultural labourers, and the forest dwellers that we are concerned about.

We need to be alarmed when small, marginal farmers and sharecroppers are switching to chemical farming because it is they who committed suicides in the hundreds. They are forced to believe that if they practise chemical farming on their small plots of one acre or 50 decimal pieces of land and then practice sharecropping on another 2 acres of land, they will be able to obtain higher yields to compensate for the increase in the cost of essential commodities, education and health.

We sometimes talk about farmers' greed, which might be true in some cases. But mostly it is the basic needs which force farmers to give up traditional farming and now they are paying the penalty for it. The nationalized banks offer loans on compound interest; cooperative and other banks do not offer loans to small farmers. SHGs, microfinance institutions and private moneylenders offer loans at

the rate of 35-70%. Farmers who borrow loans at these interest rates are forced to commit suicide since they cannot repay them. However, only a fraction of the money borrowed by farmers was found to be used for minimum needs like health; the majority was used for fertilizers and other inputs for their crops. When the rain fails, pests infest and the crop fails, the farmers are faced with no way out but death.

Green Revolution has already penetrated the culture and mindset of the people. Orissa has already received Rs. 80 crores towards this purpose. If the government uses this money for subsidizing fertilizers and pesticides, farmers will use it for growing cotton only. So when the government introduces an enticing scheme, most farmers who would not have even thought about using chemical fertilizers will end up accepting it and start digging their own graves.

When we talk about food security, we should be clear that it is the food security of tribals, small and marginal farmers, landless agricultural labourers and the forest dwellers that we are concerned about. Most of the land under the possession of these people belongs to rainfed areas, non irrigated belt or land on hill slopes. And most of our governments, irrespective of what party rules, are not concerned about them. There is no insurance for their crops, no compensation even in the case of drought in the KBK districts except for some work for which they get Rs. 50-100 per day.

In all these years of independence, we have not thought about uplifting these people, without which it is not possible to talk about their food security. And if we think allocating Rs. 400 crores for the second Green Revolution is going to solve these problems, then it is worrying.

Three dams have been constructed in Orissa – the first one was the Hirakud, the second Rengali and the third, constructed recently in Kalahandi is the Indravati dam. Rengali Dam, built 22 years ago, displaced people from more than 200 villages but did not irrigate even one hectare of land. Only the industries are using the water and by the time the feeder canals are built more industries will only benefit from the dam and not the farmers. Kashipur is about 150 km from the Indravati Dam. Water released from the dam through the Tel River is flooding very year now.

Irrigation capacity of all the big dams constructed after independence has decreased to a very great extent due to various reasons. According to a survey we conducted, 50,000 acres out of the initial command area of the Hirakud dam does not receive any water now. The canal system still exists but it fails to provide water to these areas. The government also admits this as a fact. But the Orissa government still keeps signing MoU after MoU for water provision to industries. In addition to this, there is the danger from HYVs and chemical based agriculture which utilize more water. Hence, we are not sure if there will ever be water for farmers in the future.

Orissa government keeps signing MoU after MoU for water provision to industries. In addition to this, there is the danger from HYVs and chemical based agriculture which utilizes more water. Hence, we are not sure if there will ever be water for farmers in the future.

The Hirakud Dam is used for generating electricity and for lift irrigation. Most of the 600 lift irrigation points were closed in 2008-09 because the water level reduced to 615m in the reservoir as against a benchmark of 630m. And now it is supplying water to the steel and aluminium industries

which are water intensive. Apart from this, the industries also extract ground water without proper permission, at depths of 400-900 ft. Farmers downstream are supposed to use this water for the winter crop in the coastal belt that covers Jajpur, Puri, Kendrapara, Baleswar and Jagatsinghpur. With 16 MoUs signed already and water being used for industries, will there be any left for farmers? Further, indiscriminate mining in Keonjhar, Mayurbhanj, Sundargarh and undivided Koraput have also led to pollution and drying up of water sources.

The KBK region is a drought-prone area with low rainfall. Streams that originate in the bauxite hills in Niyamgiri, Sijimali, Kutrumali, Baflamali and Panchkatmali are the only sources of water in these districts. So do the small rivers like Nagabali, Banshadhara, Shan and Bara rivers in Kashipur and other small rivulets from Panchkotmali. However, the government remains ignorant of the fact that the industries take water from these sources and will leave nothing even for the proposed second Green Revolution.

> We cannot deal with the issues like water, seeds, chemicals or Genetically Modified crops.... independent of one another. We need to question the entire politics of 'development' and economic policies prompting it.

In order to counter these issues, we cannot deal with seed, chemicals or GM independently. We need to question the entire politics of 'development' and the economic policies prompting it. But the government has already designated the areas where this is being done as 'red' zone. It has become very difficult to do any kind of organizational activity or raise voices for the deprived and the poor. So challenging the second Green Revolution is going to be even more difficult.

During the first Green Revolution, owners of 10 acre lands were taking the lands of small farmers on lease. But now in western Orissa, the same owners are leasing out their lands to small and marginal farmers. The small farmers are still holding on to their lands and it is not clear what type of agriculture they will engage in. During drought, farmers without patta are not offered compensation or insurance. A law for safeguarding the interests of sharecroppers was enacted way back but no political party has shown any interest in implementing it. There is no institutional support for the small and marginal farmers. So unless we raise our voices in unison, we cannot take the agenda of the farmers ahead.

The millet growing farmers of KBK do not have any facilities for marketing, cold storage, MSP or insurance. Hence they are shifting to cotton cultivation. The ones who provide the cotton seeds also provide the fertilizers and pesticides and eventually also procure the crop from them.

The KBK farmers need to say that since there is no water now nor any provision in the near future, and since the policy favouring chemicals is only causing more harm to the soil, the entire investment of Rs. 80 crores should be invested for the development of small & marginal farmers and sharecroppers growing millets in KBK districts so that they can take up organic farming. They have been sidelined and ignored since independence. They should be given subsidies on organic fertilizers and training to use them.

Peoples' rights to their seed, water, forest, land and decision-making are being snatched away from them. We should therefore raise a united voice against all these issues to realize the farmer's demands.

Fertiliser scenario with the proposed Green Revolution:

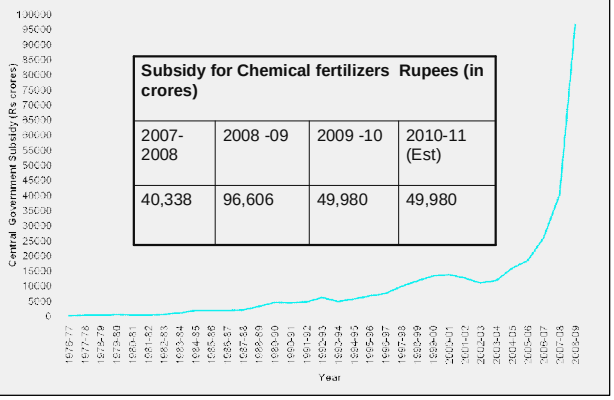
Jaikrishna Ranganathan, Greenpeace India

The fertilizer subsidy which at times even crosses Rs. 100,000 crore is not producing food but actually the food crisis!

I would like to focus on how the funding and promotion of fertilizers are fundamentally wrong. The reason is that soil is an ecosystem in itself having a lot of organisms interconnected with each other. But governments and agricultural scientists seem to have forgotten this. When soil is treated with chemical fertilizers, it disrupts the entire soil ecosystem. Basically, the fertilizer subsidy which at times even crosses Rs. 100,000 crores, is not producing food but actually the food crisis! The long term use of fertilizers (not just imbalanced use) is at the root of the problem.

Central Government Fertilizer subsidy trends

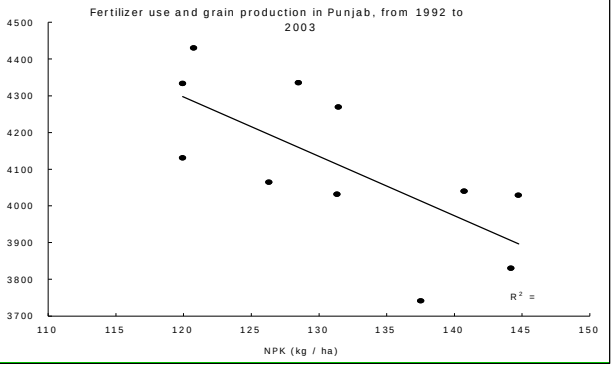
Subsidy for Chemical fertilizers Rupees (in crores)			
2007-2008	2008 -09	2009 -10	2010-11 (Est)
40,338	96,606	49,980	49,980



According to a Greenpeace report on fertiliser subsidies, it has been identified that fertilizers were used indiscriminately where the Green Revolution was supposed to have flourished and now the soil fertility has declined considerably, especially in Punjab. The fertilizer subsidies started at Rs. 60 crores in 1977 and reached close to the defence budget of Rs. 90,000 crore in the recent past. The prices also keep fluctuating, the reason being that fertilizers are not completely made in India.

In addition to nitrogen, the production of fertilizers needs potassium, for which we depend on international markets because of inadequate mine deposits in India. When the price increases elsewhere in the world, it rises here in India. It is for this reason that the government subsidizes the industry to provide fertilizers at cheaper rates to farmers. However, this price system does not help the farmers one bit; rather it helps in funding the wrong inputs to the soil and funding inefficient industries. This anomaly is also reflected in the yield. Unfortunately, not many studies are being done on the performance of fertilizers in India. Most available studies simply show that fertilizers are effective, to promote vested interests.

Poor soils and less crop yields



One study conducted in Punjab over 13 years documented the per acre usage of fertilizer. It revealed that while fertilizer usage kept increasing the yield remained the same. While initially 1 kg of fertilizer resulted in 25 kg of grain, now it has decreased to 8 kg of grain with the same amount of fertilizer. It is true that Punjab might be an extreme case but the government has acknowledged this problem and discussed it in the 11th Five Year Plan. As we can see from an excerpt from the 2009 budget speech, "***In the context of nation's food security, the declining response of agricultural productivity to increased fertilizer usage in the country is a matter of concern. To ensure balanced application of fertilizers, the govt. intends to move towards a nutrient-based regime, instead of the current product based regime.***"

Chemical fertilizer consumption in Orissa
(per hectare of gross cropped area)

District	2008-2009
Bhadrak	150
Balasore	133
Jajpur	123
Sambalpur	114
Bargarh	108
State Average	62

Ref: Dept of Agri, 2008-09 Govt.of Orissa,

However, the nutrient based regime is also not to help the farmer but the industry. This is because the fixed subsidy and the fixed fertilizer prices stipulated by the government do not help the industry to cover production costs. The nutrient based subsidy however deregulates the fertilizer prices in the market. Since April 2010, there is no regulation on any fertilizer except urea, on provision of added concession for a while. This is not reflected in the market because there is no real change in the prices this year and farmers are not really feeling the pinch. But whenever the crude prices increase eventually, it will come as a rude shock to farmers. And then, we will understand what the government has done and the restrictions it has spun off by fixing fertilizer subsidies and increasing market prices.

On paper subsidizing nutrients is about fixing prices separately for nitrogen, phosphorus and potassium and not on the basis of the price at which the farmer is buying. While there is lot of talk about direct subsidies, there is no move towards implementation; the MRP is also not controlled. Essentially, the new subsidy scheme for fertilizers is primarily to reduce expenditure, deregulate the market, increase profits for industries and destroy soil fertility.

When we look at state-wise usage of fertilizers, AP comes first followed by Punjab and TN, with West Bengal ranked very high and Orissa, Chhattisgarh, Jharkhand and Bihar ranking very low. Orissa uses 62 kg per hectare compared to 220 kg per hectare in Punjab. But the usage in seven districts in Orissa is very high because of the Green Revolution / intensive agriculture in those districts. The fertilizer usage per hectare in Bhadrak is 150, Baleswar is 133, Jajpur is 123, Sambalpur 114, whereas the national average is only 112. Indeed, there is no universal recommendation about safe or unsafe levels of fertilizer usage. But there is no doubt that extended usage of fertilizers over long periods will degrade soil fertility.

However, the government does not seem to be doing much for subsidizing organic manure such as farmyard manure and vermi-compost. The National Food Security Mission which aims to bring productivity in the eastern regions

too identifies support to fertilizers and manure on its list of things to do. In comparison, only Rs. 29.87 lakh was offered as part of the National Project on Organic Production. Further, the National Project on Soil Health and Fertility has plans worth Rs. 425 crores but no activity in Orissa. Last is the Rashtrya Krishi Vikas Yojana which technically does not deal with fertilizers but the Government of Orissa has spent Rs. 7.6 crore on the promotion and implementation of vermi-composting. Even if we take all these different efforts it still comes nowhere close to the Rs. 62,000 crore for chemical fertilizers.

Fertilizers have not just depleted soil fertility; they have also made the soil toxic. A Greenpeace study reported that 20% of all wells in a sample in the Malwa region of Punjab have nitrate levels higher than the established WHO standard of 50 mg per litre. Fertilizers also contribute to 6% of all harmful emissions contributing to global warming.

A study was conducted in the Maneswar block of Sambalpur district. Of the 17 GPs in Maneswar only 80% receive irrigation. We interviewed 200 people - 146 from the irrigated region and 54 from the non-irrigated region. Our focus was to identify if the farmers were using organic manure, the problems they faced with regard to using organic manure and their expectations from the government. We found that this is highly productive region. The average landholding is 8.72 acres irrigated by canals as well as rainfed. The crop yields are 1.6 tons per acre which is above the national average of 1.5 tons per acre. This shows that Sambalpur, Bargarh, Bhadrak regions of the command area are one of the most productive regions and comparable with Punjab and the Godavari basin. But farmers notice that there is a downward trend in yield in the past ten years.

Farmers have begun to use 4 to 5 quintals of fertilisers since they are worried about soil fertility. Highly fertilized soils have poor water holding capacity and farmers dependent on rainfed agriculture will have problems due to this. 20% of farmers have not seen any living organism in the soil for the last 15 years. Interestingly, 89% of the farmers agree that chemical fertilizers is the the reason for soil degradation. But they still use it because they are stuck in a trap.

There is a high demand for organic manure because they have seen the benefits of high productivity and increased soil fertility. The problem lies in inaccessibility. 65% of the farmers are not aware about subsidies on fertilizers and 91% farmers feel that prices are still not affordable and no one knows that the

Farmers' Preferences

- 67.5% of farmers would prefer organic fertilisers over chemical.
- If direct subsidies are provided, 60 percent would prefer only organic, and 98% would choose both the fertilisers. Only 3 farmers felt that they would only choose chemical fertilisers.

nutrients get subsidy. Only 7% knew about other schemes for organic manures. However, 67.5% farmers said that they prefer organic fertilizers over chemicals. And if direct subsidies are provided 60% would prefer to go for organic while 90% would choose both.

During a public hearing which we organized on 29th August, 2010, we put forth the findings from the social audit and hope to take these recommendations forward to the policymakers.

Queries & Responses:

In all the discussions we have had so far, we are yet to discuss about bio-piracy. The threat of corporatization in the grabbing of indigenous knowledge is too large to be ignored. Even in Chhattisgarh, Syngenta Corporation offered to work with Indira Gandhi Krishi Viswavidyalaya to use the indigenous genetic material for collaborative research; farmers there put up a fight and got this agreement cancelled. This can happen anytime, anywhere and hence we need to work an effective strategy to handle these threats.

Irrationality always seems to creep in when technology is driven by the market. We have never heard of 'injudicious use' in the case of farmyard manure. But this is very common with chemical fertilizers because of the aggressive push by the market. This needs to be stated in an academic manner if we are to look at a sustainable and rational framework. As we have seen, even if we want non Bt cotton, it is simply not available. This drives people towards making irrational decisions. And this cannot be tackled unless we bring about better discourse and better articulation of the harm created by market driven technologies.

Another important outcome of GR technology is that the entire input provision system – fertilizers, fungicides, etc. – are placed in the hands of the input dealers at the village level. The farmers follow the input dealers like a herd because they get the material on credit in the hope of better returns. However, they end up being debtors without benefits.

It is common knowledge that the government is promoting hybrid rice. In Gorakhpur, UP, large posters for promotion of hybrid seeds are being put up. But neither the government procurement centers nor the agents and the traders purchase it at the minimum support price. Further, the husking machines available at the local level are not suited for dehusking hybrid rice, so the farmers have to travel long distances to get their hybrid rice dehusked in the rubberized machines. To add to the troubles, if the hybrid rice is not consumed within 6 hours of preparation, it becomes unfit for consumption.

Some parts of West Bengal like West Medinipur, Bankura, Purulia and Birbhum face scarcity of water. There is also a fear that the whole of eastern India will become part of the red corridor. So the governments might try to gain power and take control of the red corridor, which might be another reason for introducing GR here. There might be a hidden political agenda in addition to the financial / market-driven one.

Inspite of complaints of bad governance in Bihar for 15 years, the state still registered above-average agricultural growth rate. Last year though, there was negative growth. When banks issue loans in Bihar, 10% of the loan is paid as commission. In order to avoid this farmers borrow from moneylenders. These problems result in migration of 80,000 to 100,000 people to other states and countries. A survey shows that the income that these people would have brought

to the state is Rs. 15,000 crore. This is apart from the sizeable population who have migrated to the Middle East. The economic progress in Bihar is due to this. GR has been introduced in the state with a budget of Rs. 21 crore. In the past decade or so all the agricultural schemes failed miserably. The people who went to Punjab or Maharashtra learnt the modern agricultural techniques and brought GR to their villages. But the situation has not deteriorated like Punjab because the floods caused by the Himalayas bring with it rich top soil. Thus all damages caused by chemical fertilizers are replenished by these fresh layers of fertile soil. Organic farming in Bihar is also growing rapidly. But in essence we have to remember that the introduction of GR in eastern India has political motives.

The present government in Bihar has allowed Vijay Mallya to take 100 acres of litchis in Muzaffarpur for producing liquor. Litchis can fetch Re. 1 in the local, Rs. 5 in Mumbai or Rs. 15 in the export market. But when used for producing liquor it fetches Rs. 100. A lot of maize is also grown in Khagaria for producing liquor.

Few years ago, Monsanto lured peasants to plant hybrid maize in 200,000 hectares. The crop failed miserably. Again, Du Pont and other MNCs along with their subsidiaries repeated the same 'experiment' with similar results. The newspapers refused to carry this news because of control by the corporate. The government refused to accept that this had happened, but with repeated protests they accepted it.

No matter how much scientific evidence is presented, money rules the roost. We also have to present our views in the vernacular languages to reach the common people. By staging seminars, dharnas or meetings in Delhi or Patna we can influence only a handful of people who are already convinced. We need to force political parties to take this up as part of their agenda or else people will resort to arms and try to resolve it in their own way.

We need to identify what was it that ignited the political will in AP to bring 40% of the land under sustainable agriculture. This will help in states where the land under SA is not even 1%. There are talks about conspiracy in organic farming too. We will have to discuss about these doubts too. We have activists in Orissa talk about ground water exploitation. When DFID and World Bank talk on similar lines, they shut down the Lift Irrigation Corporation. Under J.B. Patnaik, 6% of the electricity produced in Orissa was going to the agricultural sector. In the last 2 years, it has come down to less than 2%. We need to find out what are the future plans for reducing electricity for agriculture and how do we handle that threat.

What would really sustain farmers and secure food for all?

Highlights of the First Day

Kavitha Kuruganti

On the first day of this workshop, we explored how the Green Revolution does not help create and improve livelihoods sustainably but forces farmers to walk on the path towards suicides. We got a graphic picture of the disaster unfolding in Punjab today. We also questioned the rationale of the state and central governments in ushering in this Green Revolution in eastern India. We got strong reactions about how rainfed farmers have been cheated because of marginalization due to their practice of ecological farming. We urged governments to support these farmers' traditional methods of biodiverse farming and water-conserving techniques which do not harm the soil. We also heard facts about the failure of hybrid rice in South East Asia and China. There also are financing angles in terms of the creation of markets for seed and fertiliser industry. All this seems to point towards a hurried approach at the policy makers' table without looking at the alternatives present.

There was discussion about the rich rice diversity that was born out of the traditional knowledge of farmers which meets varied environmental and socio-cultural conditions also. Around this, we raised questions of seed sovereignty and bio-piracy, and we spoke about the need for control to rest in the farmers' hands.

Regarding the issue of irrigation, we got an overall picture of the status in different states. We saw that hybrid rice will result in sharp increase in water requirement and thus cause imbalance in the sustainability. There already exists conflict in the different needs of water – for industry, agriculture and drinking.

We heard how when farmers are given priority in well-designed government programs there is a possibility of scaling up agro-ecological innovations in farming. This is ever so true when the farmers are women with visible results in the improvement of lakhs of people's livelihoods in AP. This brought the forth the question of why there seem to be some stories of excellence in government programs and many stories of cover up and industry friendly measures. The need to explore why only some stories succeed was thus discussed.

"IAASTD and its recommendations"

Prof T K Bose, Member of (former) West Bengal State Farmers' Commission

I will try to summarize the findings of the 2500 page report of the *International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD)*, released in April 2008. It called for a fundamental change to reduce hunger and poverty, improve rural livelihood, and facilitate equitable environmentally, socially and economically sustainable development. IAASTD was an undertaking by major institutions such as the World Bank, FAO, UNEP, UNDP, WHO with representatives of governments, civil society, private sector and scientific institutions worldwide. 59 countries have signed in agreement to the report with the exception of the US, Canada and Australia. It is a thorough appraisal of global agriculture resulting from a sincere 4 year effort of 400 scientists.

The global assessment was elaborated under 8 major themes – i) Natural Resource Management, ii) Environmental Sustainability, iii) Bio Technology, iv) Climate

Change, v) Human Health, vi) Market and Trade, vii) Local Knowledge and Community-based Innovations and viii) Woman led Agriculture by Applying Agricultural Knowledge, Science and Technology.

IAASTD helped to establish that agricultural knowledge, science and technology (AKST) is not only about production and productivity, but is multi-functional in that it addresses local and global concerns like bio-diversity, economic management and climate change. The major findings are:

Agricultural knowledge, science and technology (AKST) is not only about production and productivity, but is multi-functional in that it addresses local and global concerns like bio-diversity, economic management and climate change. - IAASTD

AKST has contributed to food production and security through a strong focus on increasing yields with improved germ-plasm, increased inputs (water, agrochemicals) and mechanization.

Benefits to the people have been uneven across regions due to organizational capacities, socio-cultural factors, and institutional and policy environments.

Emphasis on increasing yield has had negative consequences on the environment in many cases. For instance, 1.9 billion hectares and 2.6 billion people today are affected by significant land degradation. Alarming withdrawal of underground water for irrigated agriculture has caused increased salinity and water pollution affecting millions of people.

IAASTD projects that there will be increased demand for food over the next 50 years due to different patterns of food consumption. Global cereal demand is projected to increase by 75% between 2000 and 2050 and global meat demand is expected to double. More than three-fourths of this demand would be in developing countries adversely affecting poor consumers and poor farmers.

The environmental shortcomings of agricultural practice associated with poor socio-economic conditions create a vicious cycle in which poor small holder farmers have to deforest leading to overall degradation.

The challenges facing agriculture will require more innovative and integrated applications of existing knowledge, science and technology (formal, traditional and community-based), as well as new approaches for agricultural and natural resource management.

Emphasis should also be on strengthening farmer knowledge, agricultural and natural biodiversity, farmer-managed medicinal plants, local seed systems and common pool resource management regimes.

Sustainable development can be achieved by including diverse perspectives and scientifically well-founded options, like the inclusion of social scientists in policy and practice of AKST helps direct and focus public and private research, extension and education on such goals. IAASTD recognizes agriculture as a multi-output activity producing not only commodities but also non-commodity outputs such as environmental services, landscape amenities and cultural heritages.

Opportunities targeting resource poor farmers and rural labourers require innovation and entrepreneurship.

Innovative institutional arrangements are essential for successful design and adoption of ecologically and socially sustainable agricultural systems.

Without basic national institutions and infrastructures in place, opening national agricultural markets to international competition may offer short term economic

benefits, but can lead to long term negative effects on poverty alleviation, food security and environment.

The open market has created intensive export-oriented agriculture resulting in more adverse consequences such as exploitation of soil, nutrients and water, unsustainable soil or water management and exploitative labour conditions.

AKST investments need to take into account the multi-functionality of agriculture, by both public and private sectors, to help advance development and sustainability goals.

AKST policies and practices have increased production and new mechanisms for food processing. Reduced dietary quality and diversity and inexpensive food with low nutrient density have been associated with increasing rates of worldwide obesity and chronic diseases.

> Agricultural knowledge, science and technology (AKST) investments need to take into account the multi-functionality of agriculture, by both public and private sectors, to help advance development and sustainability goals.- IAASTD

Relevant approaches to agricultural innovation need to be adopted for achieving development and sustainability goals. Policies and practices undertaken in many countries as 'transfer of technology' are not suited to the advancement of sustainability and development goals.

While public-private partnerships are to be encouraged the establishment and enforcement of codes of conduct by the universities and the research institutes can help avoid conflicts of interest and maintain focus on sustainability and development in AKST.

Addressing gender issues through greater involvement of women's knowledge, skills and experiences will strengthen AKST and advance progress towards sustainable development.

Challenges in agriculture and livelihood

The main challenge of AKST is to increase the productivity of agriculture in a sustainable manner while addressing the needs of small scale farms and creating realistic opportunities where the potential for improved area productivity is low and where climate change may have its most adverse consequences.

AKST should also radically improve food security and enhance the social and economic performance of agricultural systems for sustainable rural livelihoods and wider economic development. It can help to rehabilitate degraded land, reduce environmental and health risks associated with food production and consumption.

Other challenges like vaccine development to prevent animal diseases, mitigation of GHG from agriculture, reducing the adverse effect of climate change should also be resolved by application of appropriate AKST through institutional support.

IAASTD has defined Food Security as per the 2001 FAO report on the 'State of Food Insecurity'. Food Security is a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life. Food sovereignty is defined as the right of peoples and sovereign states to democratically determine their own agricultural and food policies.

AKST can increase sustainable agriculture production through several means which will be explored in the following sections.

NRM and Environmental Sustainability

Natural resources like soil, water, plant and animal diversity, vegetation cover, renewable energy sources, climate and ecosystem services are fundamental for the functioning of agricultural systems and for social and environmental sustainability.

Options include improving nutrient, energy, water and land use efficiency; improving the understanding of soil-plant-water dynamics; increasing farm diversification, supporting and enhancing agro-ecological systems, promoting the sustainable management of livestock, forest and fisheries and enhancing biodiversity conservation.

The following **high priorities are proposed for action in NRM:**

Use AKST to identify the causes of declining productivity due to NRM and develop AKST-based on multifunctional approach of NRM.

Promote research on AKST-NRM programs for developing better strategies on resource resilience, protection and renewal.

Strengthen human resources in support of NRM through research, training and education, policy and partnership promoting awareness of the value of ecosystem services.

Develop networks of AKST promoters (farmer organizations, NGOs, government and private sectors) to enhance the collective benefits from NRM.

Linking of locally generated NRM knowledge and innovations to private and public AKST.

Develop AKST actively with various stakeholders to reverse the misuse of natural resources and ensure environmental sustainability for future generations.

Human health and agriculture

Despite increased global food production, under-nutrition is still a major global problem, causing over 15% of the global disease burden. Protein energy and micronutrient malnutrition remain huge challenges across geographies. Food security can be improved through policies and programs to increase dietary diversity and new technologies for production, processing, preservation and distribution of food.

Ill health in the farming community can in turn reduce agricultural productivity and the development of appropriate AKST. Apart from fatal accidents in mechanized agriculture, other important health hazards include agrochemical poisoning, transmissible animal diseases, toxic or allergenic agents and noise, vibration and ergonomic hazards.

Options for action in above areas include collaboration in the conservation, development and use of local and traditional biological materials; incentives for and development of capacity among scientists and formal research organizations to work with local and indigenous people and their organizations.

Local knowledge refers to capacities and activities that exist among rural people in all parts of the world.

Trade and Markets

Agricultural trade can offer opportunities for the poor, but current arrangements have major distributional impacts among and within countries. This has not been

favorable for small scale farmers and rural livelihoods. These distributional impacts call for differentiation in policy frameworks and institutional arrangements if everyone is to benefit from agricultural trade.

Climate Change

Climate change has the potential to irreversibly damage the natural resource base on which agriculture depends. Agriculture contributes to climate change in several major ways and climate change in general adversely affects agriculture.

Additional warming will have increasingly negative impacts in all regions. Water scarcity and the timing of water availability will increasingly constrain production.

Floods and droughts are increasing and expected to amplify in frequency and severity and there are likely to be significant consequences in all regions for food and forestry production and food insecurity.

Equity

Improving equity requires synergy among various development actors, including farmers, rural labourers, banks, civil society organizations, commercial companies and public agencies.

Key options include equitable access to and use of natural resources, particularly land and water, system of incentives and rewards for multifunctionality including ecosystem services and responding to vulnerability of farming communities.

Bio Energy

Rising costs of fossil fuel, energy security concerns, and increased awareness of climate change and potentially positive effects for economic development have led to considerable public attention to bio energy.

Reliance of traditional bio energy (eg. wood fuels) can pose considerable environmental, health, economic and social challenges. New efforts are needed to improve traditional bio energy and accelerate the transition to more sustainable forms of energy.

First generation bio-fuels consist predominantly of bio ethanol and bio diesel produced from agricultural crops (maize, sugarcane). The diversion of agricultural crops to fuel can raise food prices and negatively impact global hunger. This is also exacerbated in cases where small-scale farmers are displaced from their land.

Next generation bio fuels such as cellulosic ethanol and biomass-to-liquid technologies allow conversion into bio-fuels from more abundant and cheaper feed stocks. This could potentially reduce agricultural land requirements per unit of energy produced and improve lifecycle of GHG emissions.

Investments

Better targeted AKST investments, explicitly taking into account the multifunctionality of agriculture, by both public and private sectors can help advance goals of sustainable development.

Public investments are needed for global, regional, national and local public benefits, food security and safety, climate change and sustainability. Efficient use of land, water and biological resources requires investment in research and development.

Women in Agriculture

The proportion of women in agricultural production and post harvest activities ranges from 20 to 70%; their involvement is increasing in many developing countries.

Urgent action is still necessary to implement gender and social equity in AKST policies and practices to better address development processes.

Urgent action is also needed in strengthening the capacity to improve the knowledge of women's changing forms of involvement in farm and other rural activities in AKST.

It also requires giving priority to women's access to education, information, science and technology and extension services to enable improving women's access, ownership and control of economic and natural resources.

Reviving Agriculture – experience-sharing by farmers of Community Managed Sustainable Agriculture programme

Ms Meenakshi, Ms.Kumari & Mr. Ram Babu from Andhra Pradesh

(From left) Ms.Meenakshi, Ms.Kumari & Mr. Ram Babu **From a time**

Ms. Meenakshi: From a time when our forefathers did not use any external inputs, agriculture has changed slowly in our area as elsewhere. Soon we found that we were actually eating toxic food. Our health was getting affected. Costs were increasing. We were borrowing from moneylenders at high interest rates. Our lives were being controlled by external agents and we were trapped in a vicious circle. Then this government program called *Community managed Sustainable Agriculture Program* came to our village. We were initially hesitant but when the pesticides which were supposed to protect farmers' livelihoods were being consumed to commit suicide, we were ready to take on farming without chemicals. There were some *kalajatas* by which messages were given. We were given training, films were shown. Once I was convinced I then tried to convince my in-laws and my husband to try it. Since they were not very keen, I asked them to give me half an acre, that is, fifty cents. I would try ecological farming according to the training while the in-laws keep on with the chemical farming. If the yields are lower and I ended up incurring losses in my experiment with ecological farming, I promised to make good the loss somehow. My family agreed to this. After practising natural farming I harvested 15 bags of paddy, whereas the rest of the family harvested only 12 bags. Further, the quality of my grains was also better. There was more grain that came out of the milling in my piece of land. I also incurred lesser costs while getting more yield, with the net income was higher than the other plot. So today my family is convinced and they are all practising non-chemical farming".

Shri Ram Babu: "I am designated as a 'Community Resource Person' in the government program run in AP. We engage in dialogue with other farmers in different districts. We talk about the effects of pesticide use on crops and how cost-ineffective pesticides are. There are farmers who incur up to Rs.5000/- on

external inputs for paddy cultivation. Four years back, they gradually stopped the application of chemical pesticides, once this programme began. They found that the quality of the produce improved. Slowly they began understanding that they need to address soil fertility issues also by not using chemicals on soil".

There are different methods of addressing soil fertility. Shri Ram Babu also talked about NADEP compost, sanjeevani and other methods. They have methods by which 1 kg FYM is converted into 40 kg. of organic fertilizer. He talked about how fertilizer use has also come down quite a bit. From more than 3 bags that were getting used earlier, today it has come down to 10 kg of urea and 30 kg of DAP. He said that they are gradually addressing all these issues in this program and yields are quite good. They are therefore addressing the issue of chemical fertilizers and hope to remove them from their farming completely.

Ms. Kumari: Ten years back, the women in Kumari's village formed SHGs at the sub-village level. 10-15 women formed themselves into one group each. They had a slightly formal structure at the Panchayat level, which federated at the mandal (block) level. These together came under district level federations, mainly centred around thrift.

They were able to establish linkages with banks from where they started accessing Rs.50,000 to Rs.1,00,000 for various livelihood activities for the members of the group. Four years back, they began what they call the NPM program. The women's groups started appointing village level activists who received Rs.1,000/- as salary. At the cluster level they created one other post as the cluster level activist for Rs.4,000/-. There were district level workers also. This whole program ran on the extension support provided by these different activists at different levels. They were mainly involved in training and advising farmers about using local resources productively, how they could use different kinds of leaves and other natural materials which are available free of cost.

Today they are able to carry on without borrowing from moneylenders because agriculture is no longer investment-driven. In their district, this program has already spread to 19 of the 38 blocks, and they plan to cover all the mandals in the district by 2014. She also mentioned how sub-committees have been formed within the SHG system in AP, from the village level upwards for the purpose of monitoring. These committees convince farmers to not fall prey to the publicity stunts of various companies to buy their chemicals. She added that this practice is happening in all the 22 districts of AP. They were trying to become seed-self-reliant and were also trying to become independent of chemical fertilizers too.

Discussion

Q. Prof Bose: Is soil fertility management practised in sustainable agriculture, a combination of fertilizer and organic? To what extent will the present scenario lead to sustainability, with regard to the use of fertilizers and organic farming?

A. Kavitha: These farmers do not want to use chemical fertilizers at all because they use the Subhash Palekar model and related techniques. The people driving this program want chemical fertilizers also eliminated and not just chemical pesticides; however, they also leave it to the comfortable pace of farmers, rightfully so. The emphasis is not on enforcement but in communicating the benefits of organic farming to farmers and letting them plan at their own pace. Some reduce the usage of chemicals gradually while some others do it dramatically overnight. Both pictures are available within the project.

Q. Prof. Bose: To what extent is fertilizer and organic manure used in the program?

A. Kavitha: A large part of the program is focussed on elimination of chemical pesticides at this stage. From preliminary data available, we know that there are around 50 organic villages, which implies that they have dealt with both fertilizers and pesticides and there are around 150 pesticide-free villages. The program is moving in an incremental fashion at a pace decided by the farmers.

Q. Prof. Bose: Having understood the political sensitivity in this particular context, I would like to know if the diverse groups of people particularly the women forming the SHG groups are politically influenced by the parties in developing the farming system.

A. Kavitha: It is indeed true that women-centred groups in different states are viewed as ready vote banks. But it is also true that women-centred groups in AP received free gas stoves from Mr. Chandrababu Naidu and still did not vote him back to power. They had their wisdom around what they will do. It is also true that states have tended to look at these women SHGs as groups that they can use for electoral politics.

"Agro-ecological approaches to food security: the SRI experience"

Dr Shambu Prasad, Professor XIMB, Bhubaneswar

I would like to start by introducing this book '*Dilemmas in Agriculture – A Personal Story*' by a farmer from AP, a middle class person who went back to his native village in AP in the Chittoor district. The farmer, Narendranath, was a human rights activist influenced by Masanobu Fukuoka's 'One Straw Revolution'. He started writing this from the encouragement of his friends in 2002 and he finally ended up writing it a few years later. NPM story was not quite a phenomenon when Naren was writing this. Narendranath passed away a year back. The two questions that I am trying to pose are (i) Will the story look different if people from the 'GR in the eastern region' workshop were to write this? And (ii) If it was not written in 2002, but in 2009 or 2010, what would the situation with regard to agro-ecological approaches be?

During the course of my presentation I will try to suggest that the agro-ecological approach is the way forward. In the words of Prof. Norman Uphoff, 'modern agriculture started in 20th century and agro-ecological approaches are basically what might be seen as the post modern agriculture.'

The Green Revolution is basically an exercise in which international agricultural research experts sitting on the poverty of farmers are promising them a future, which sometimes poor and marginal farmers can never access. There is a story that research can be developed in an international agricultural system, customized or adapted by the national agricultural system, taken by extension department to farmers and civil society organizations. This is a linear change where farmers and civil society organizations have probably very little to offer in the way innovation occurs.

A few weeks back I heard Prabhu Pingaly, who is now advising the Bill and Melinda Gates Foundation on agriculture. He was speaking very eloquently about agricultural renaissance, about how very many donors including his own organization are getting into agriculture because Green Revolution is a great export that we need to take forward. Green Revolution is an export, which we should take

to Africa – AGRA as it is said. But the whole talk had not a single mention about the number of farmers who have committed suicide in the country.

Pranab Mukherjee, is quoted by the Telegraph, that second Green Revolution needs the active involvement of the farmers from all the six states selected in the eastern region because it has been four decades after the seeds of the Green Revolution were sown elsewhere. If you look at the monitoring mechanisms, there is not a single farmer or a civil society organization in any of the schemes that are there under the Green Revolution in the eastern region, so there is no sense of 'active involvement'.

At the international level it could be true that famine was averted in ways due to the Green Revolution, but the key point here is that the natural resources have been exploited a lot even as we have increased production of a few grains considerably. In fact, in a newspaper advertisement, when Ram Vilas Paswan was part of the government, he was trying to tell farmers that the government is doing the farmers a favour with the kind of fertilizer subsidies available and they had not increased the fertilizer price at all.

While the kind of stress that we are maintaining to keep our so-called food basket going is increasing, the per capita availability of rice in India has more or less remained at the same level for a long time. On one side, we have substantial increases in the Fertilizer Subsidy. On the other, we use 34 – 43% of the irrigation water for rice production which amounts to about 3,000-5,000 litres per kg of rice produced.

The agro-ecological approach argues for a move away from a mechanical way of looking at agriculture to a more biological way of looking at it. It gives more emphasis on ecological perspectives and microbiological knowledge; it is more participatory, less expert-driven with more concern for environment.

The agro-ecological approach results in the improvement of natural capital – increase in water retention, soil fertility improvements and other kind of things. – from the study done by Jules Pretty & others.

We have to see if it is advisable to continue along the present technological path or look for better alternatives. The Green Revolution in a sense is losing momentum. Our policy makers want to replicate Punjab in Eastern India. The main features of Green Revolution or modern agriculture were based on mechanization, reliance on exogenous inputs, genetic enhancement and today, on globalization and free trade. But the agro-ecological approach argues for a move away from a mechanical way of looking at agriculture to a more biological way of looking at it. It gives more emphasis on ecological perspectives and microbiological knowledge; it is more participatory, less expert-driven with more concern for environment.

Green Revolution leads to an increasing cost of pesticides, decreasing environmental quality and stagnation of yields. These are not just matters of opinion but real trends that we need to contend with. And in this case, it is suggested that SRI (System of Rice Intensification, or even System of Root Intensification when the principles are applied to other crops) seems to present some interesting alternatives by working on a slightly different principle on managing the genotype-environmental interaction and enhancing the genetic potential by managing the plant, soil, water, nutrients efficiently, giving better produce, better roots, better plants.

A more comprehensive worldwide study on agro-ecology was done by Jules Pretty and others in 2009. It was submitted to the World Bank with the disclaimer that 'we are not responsible for the study'. They had analyzed 286 projects in 57 countries looking at a large number of farmers and processes. There was a 54% increase in the number of farmers and 45% increase in yield over the 4 years. Reliable yield

comparisons indicated, from over 198 projects, an average yield increase of 79%. There was a variation in results – 25% to 100%. In half of the projects it was between 80--100%. So, using agro-ecological approaches like SRI, farmers have been able to do well in the last decade based on the study by Jules Pretty and others. It is clear that the agro-ecological approach results in the improvement of natural capital – increase in water retention, soil fertility improvements and other kind of things.

Further, a great improvement in the social capital with stronger social organizations and the success of NPM in AP is related to the community based organizations. The Green Revolution actually has no space for any of these positive side effects. It only has probably negative side effects. But the benefits of agro-ecological approach have arisen despite existing national institutional policies rather than because of them.

When we compare SRI with the spread of hybrid rice, the latter gets more investments. When SRI was discovered in 1999, no one knew about it and there was just one island in Africa that was taking up SRI. In a matter of 10 years we have crossed probably about 40 countries and the number is increasing. Obviously it doesn't mean that whole of India is practicing SRI, but basically we are talking of over one million farmers or acres across. These numbers again need to be verified, but these are very conservative estimates that we are talking of.

Members of the SRI Google Group would know that there recently was a website of ICRISAT putting together a preliminary figure of the spread of SRI in India. Roughly speaking, about 45-50% of the districts based on the figures that we have got are actually from what might be considered as Green Revolution in eastern region. So, the question to be asked is if the eastern region states are already showing ways forward in agriculture. It is so important to learn from them rather than pushing an outdated technology of the Green Revolution paradigm.

A report that came from an article in research policy says that environmental NGOs such as Greenpeace or Soil Association have put more energy into banning transgenic crops or securing strong regulations than promoting research agenda for alternative technological paradigm such as agro-ecological innovations. The kind of research and investment that is needed to promote agro-ecological approaches has been extremely limited. During a discussion at the National Institute of Plant Health Management, Hyderabad in March this year we were asking the question about why the phenomenon of NPM which is being up scaled through community based organizations, is not considered as mainstream agricultural practice? This is a huge challenge with regard to the way we look at the institutions.

Prof Prasad then went on to explain the technical aspects of SRI in a presentation peppered with a lot of photographs. He then shared other information on developments on the SRI front from across the country.

SRI, as many people here in Orissa and other places know, has been extended to other crops, especially in Uttarakhand and Bihar. There are experiments in rajma, in sugarcane, in finger millet, maize and soyabean. Some of these experiences were put together to try and talk to the National Food Security Mission. Anil from PRADAN shared his experience of adaptability of the crop during drought in Nalanda in Gaya district, Bihar. In fact there is an ongoing study by the SR Tata Trust partners to see whether SRI does have better adaptability with regard to drought. One way by which farmers have managed this is where the crops have survived because of the shorter cycles for transplantation, farmers have what is now spoken of as playing with the monsoon because monsoon is becoming more and more variable. A phenomenal increase was seen in wheat-related SRI in Bihar from 278 farmers to 11,756 farmers in 2009-10. So, we are speaking about growth rates that are way above 4% agricultural growth rate, which the Planning Commission is planning very hard

to achieve. Climate proofing is also going to become increasingly important. It is about time that the National Food Security Mission took up the cause.

In 2006, we brought out a book during the first national conference on SRI, to look at the experience of SRI across the country. There was only a footnote mentioning what was happening in Orissa. When I started looking at experiences here in 2007, we realized that we had a situation where there was experience lying with civil society and by the directive of the Ministry of Agriculture, it was quite possible that the local department of agriculture could have taken it up, try it and then say it doesn't work. So we tried talking to the Director of Agriculture – we spent a few months trying to collect these experiences. Since the first meeting saw huge debates on organic vs. inorganic, SRI and hybrid vs. native strains, he suggested that we should not push this debate too much at that point of time.

We had the CRRI way of doing SRI, but we also had Natabara Sarangi's own experiences doing SRI and so on. A year later we tried strengthening this alliance, looking at what organizations and people think and how we could actually use this to have a dialogue with the State Government. We want to have the Agricultural Production Commissioner and the Director of Agriculture to look at how we can actually implement some of these ideas within the regular processes. Through that we want to scale up sustainable agriculture. We had dialogues and debates again with the Directorate of Agriculture. There are conflicting objectives in an agricultural policy. Part of the policy wants you to enhance and get your fertilizer consumption to national average. During that workshop we asked all the stakeholders – government, civil society organizations, and farmers – to look at different faces of SRI and how it has spread. One of the interesting things was that in tribal parts of Orissa people started greeting each other by "Jai SRI", instead of saying Ram Ram! That showed that SRI was being picked up as a people's movement. When Norman Hopoff visited Orissa in 2008, he was so fascinated that he never removed the bag that he had, which said 'Jay SRI'. He was quite excited with the kind of movement and the festive atmosphere that was there on SRI in this state.

We have seen several inspirational stories of SRI. Chandra Satpathy, an 80-year old farmer, is experimenting in Mayurbhanj district of Orissa, Barun Majumdar from Tripura, who actually single handedly brought about this transformation in Tripura. We also want to ask questions on what are the key constraints on taking SRI forward, rather than it being determined at Krishi Bhavan. As a consequence, we have been able to integrate SRI with the Orissa Government's own plans of Rashtriya Krishi Vikas Yojana or NFSM schemes. There are still problems with it, but that is a different issue altogether.

We also shared our experience of learning alliance with people in Bengal. Farmers in Orissa actually had learnt partly from farmers in Bengal. Those in the southern parts learnt it from Andhra Pradesh, but the pioneers in fact got stuck where they were, whereas Orissa was able to move much forward.

In this space, we have to ask how the eastern region can become a leader in agriculture again. That's a question from which we need to think about issues of distress in agriculture—what can Punjab learn from Orissa, Tripura and other states rather than what can the eastern states learn from Punjab; what can Orissa and the eastern region give back to India; and how do we generate various kinds of schemes to take this forward.

We had four rounds of discussion with National Food Security Mission, partly because of the support from Sir Dorabjee Tata Trust which brought NABARD along. NFSM agreed that SRI is a great thing, but they did not have any precedence of giving money to NGOs to support agriculture. We were urging them to fund the

consortium. Let the consortium try and do the monitoring of any program. We will have CRRI, we will have the Directorate of Rice Research, but also value the knowledge that has come from other kinds of sources. We of course ambitiously called it JAISRI – the Joint Action Initiative on SRI, but ICAR is not going to accept this easily at all.

Hopefully this consortium will get launched. We are checking if we can establish Regional Resource Centres, how can they strengthen research on SRI, issues on soil fertility which are still often contested, can they create an innovation fund where we can stock nationally – some of these recommendations have been accepted.

Kerala's planning for sustainable agriculture

Dr V S Vijayan, former Chair, Kerala State Biodiversity Board and Member, Western Ghats Ecology Expert Panel

Background: Kerala, like many other States in the Country realised that: the air that we breathe, the water we drink, the food that we eat, the soil where we cultivate are contaminated, contain poison. Result:

- Heavy metals and pesticides in fishes
- Even mother's milk contains poison
- Proportion of unhealthy people is on a rapid increase
- Number of hospitals with modern facilities is on race
- Pharmaceuticals keep flourishing
- Decline and disappearance of biodiversity Slide insert

Kerala State Biodiversity Board realised that of all the ecosystems, biodiversity loss is the highest in the agro-ecosystem and decided for

Formulation of Organic Farming Policy.

***Process of formulation and introduction of the Policy*:**

- Draft preparation: team : VSV (KSBB), Thanal ; One scientist each from KAU and Agri. department
- First draft released by the Hon'ble CM; discussion followed for two days.
- Participants: Agri. Department, KAU, organic farmers, other farmers, civil societies, individual experts, leaders of farmers Unions
- Objections from KAU, and Agri. Department mainly on yield
- Suggestions and recommendations incorporated
- The draft was taken for regional discussions; four regional discussions. Participants: Local agri. Officers, Agri. Scientists, farmers, research institutions, individual experts
- Discussion of the final draft at a meeting chaired by the CM

- Participants: Department heads, KAU representatives, Farmers' representatives, civil societies, experts.
- Each sentence of the policy was read out and got approved. Disagreement only for the period of implementation 5 or 10 years to make Kerala Poison free
- Placing at the Cabinet for approval.
- Discussed at a senior level meeting at TVM. Participants: Agri. Depart's head; KAU scientist; Thanal, Farmers' leaders. Recommendations / suggestions / inputs incorporated. The final draft was prepared.

Main features of the Organic Farming Policy

☞***Strategy: Ensure seed sovereignty of the farmers and the State***

- Establish seed villages exclusively for organic farming.*(*Seed banks and seed cooperatives at farmers' group levels, to produce, store, share and supply good quality seeds, Monitor seed storage, transport and sale, Keep a vigil on GM by LSG, BMC, Agri. Dept)

☞***Strategy: Ensure quality organic manure:***

- Through crop rotation, cover crops, leguminous crops, green manure and green leaf manure.
- Providing cow, buffalo, duck, fish, poultry and goat
- Strategy: Ensure quality organic manure :
- Through crop rotation, cover crops, leguminous crops, green manure and green leaf manure.
- Providing cow, buffalo, duck, fish, poultry and goat
- Encourage the production of various types of compost in the farm itself, including vermi-compost.
- Encouraging indigenous species of earthworms
- Ensuring the quality of organic manure by monitoring the same by a centralized testing laboratory.
- Consider Municipal wastes as Municipal resources:
- Decentralised units to manufacture organic manure from biodegradable wastes
- Organic waste treatment plant should be made compulsory for the flats.
- Ensure production of green leaves and, extraction of silt from the rural ponds, tanks, reservoirs, streams and rivulets for augmenting the fertility of the farm lands;
- Use Mahatma Gandhi National Rural Employment Guarantee Programme for the above

☞ ***Strategy: Ensure water availability***

- Conservation of wetlands – ponds, tanks, lakes & rivers and mangroves
- rejuvenate and protect traditional water resources including fresh water lakes,
- ensure rain water harvest and conservation,
- disallow new bore wells and restrict use of existing bore wells,
- Ensure organic farming approach in all the watershed development areas
- Establish testing facilities for soil, water, micronutrients and microorganisms at least at the block level and introduce the system of providing Soil Health Cards.
- Conduct training programmes for resource persons at the Local Self Government Institution level on soil and water conservation measures

☞ ***Strategy: Compact Area Group approach***

Collective farming and not individual, Organise organic farmers groups, especially women groups, clubs, SHG's, etc.. Each group should be of a minimum five members (as stipulated under the Participatory Guarantee System of Certification)

☞ ***Strategy: Promote a mixed farming approach for livelihood security and ecological sustainability***

- Make crop-livestock (including poultry) integrated farming as part of organic farming,
- Emphasis Kerala's traditional farming approach of integrated farming of dominantly coconut with cattle and poultry.
- Develop Bee-keeping, fisheries, duckeries and similar enterprises as part of the mixed farming programme.
- Promote decentralized production of livestock feed from locally available resources, avoiding spurious ingredients such as growth promoters and hormones.
- Develop linkages between organic farmers and livestock growing farmers for exchange of manure for fodder.

☞ ***Strategy: Launch an intensive campaign on organic farming in the form of a popular movement: "Jaiva Keralam"***

- Organise Organic Mela
- awareness programmes through:

  - Electronic and print media

  - Seminars and workshops for all sections of the society including teachers, traders, farmers, government and semi-government officials in the related area.

☞ ***Strategy: Capacity Building for farmers, implementing officers, agencies, and local self- government members***

- Conduct training programmes for agriculture officers.
- Training for 10-20 unemployed youth in each Panchayat (50% women) designated as "Karshaka Sevakar", to assist farmers in organic farming.

☞ ***Strategy: Establish Producer Companies promoted by organic farmers***

Facilitate establishment of Organic Farmer Producer Companies or similar concerns with share investment by the organic farmers and the LSGs.

☞ ***Strategy: Establish storage and transportation facilities***

- Establish separate and decentralized storage facilities for organic farm produce to ensure its organic integrity and help farmers in certification processes.
- Provide separate local transportation facilities for organic produce to nearby domestic markets.

☞ ***Strategy: Develop channels for marketing of organic produce***

- separate markets / facilities for organic produce
- Direct marketing / linkages to end users: schools, hostels, hotels, hospitals, Ayurveda centres, SHG's making food products and food-based industries in the State.
- Disallow large private retail corporations through suitable legislations.
- Facilitate organic farm produce outlets in all the districts, with the help of Governmental and Non governmental organizations.
- Tourism industry should be encouraged to use organic produce from local producers for their hotels and resorts to the extent possible.

☞ ***Strategy: Develop a simple certification process in the State for all organic farmers***

- Encourage the Participatory Guarantee System of Certification for small and marginal farmers to supply to the domestic market.
- NGOs accredited by the PGS Council of India shall be authorised to help implement and monitor the PGS system in the State

☞ ***Strategy: Provide financial incentives for promoting organic farming***

- Provide interest-free loans to organic farmers, especially small and marginal farmers.
- Set in place production linked incentive system supports.
- Provide financial assistance during conversion period; two years for annual crops and three years for perennials.
- Promote revolving funds system.
- Introduce a State led insurance scheme for small and marginal organic farmers.
- Introduce pension for organic farmers.

☞ ***Strategy: Encourage the use of renewable energy sources***

- Expertise and finances should be given for use of biogas plants, solar energy and wind energy wherever feasible to reduce dependence on external energy sources.
- Develop appropriate small farm machinery for reducing energy, cost and drudgery.

☞ ***Strategy 20: Introduce organic farming in education institutions***

- In educational institutions, prisons and juvenile homes, through academic inputs.
- in all schools to have organic vegetable and fruit gardens as well as paddy,
- In adjacent vacant lands available, if no space in the school campus.
- Necessary support from Local Self Government Institutions.

☞ ***Strategy: Phase out Chemical Pesticides and Fertilizers from the farming sector***

- Ensure phased restriction / ban of sale and use of chemical agricultural inputs parallel to the implementation of the organic farming policy in the region.
- Through necessary legislation stop the sale and use of the highly toxic Class-1a and 1b pesticides as a preliminary step.
- Declare and maintain ecologically sensitive areas with rich biodiversity and natural resource base (e.g. water bodies), as Chemical Pesticide and Fertilizer-Free Zones.
- Conduct periodical analysis of water, soil, milk and crops at the district level where pesticides continue to be used and the data made public.

☞***Organisational set-up for promotion of organic farming***

An Organic Kerala Mission (OKM) to:

- integrate the activities of various depts.

- implement the organic farming policy

Structure: A General Council chaired by the Honourable Chief Minister

An Executive Committee chaired by the Honourable Minister for Agriculture

☞ ***Model organic farming by the KSBB***

In Padetti village of Palakkad in 100 acres out of 400 acres of paddy land.

Financial support: Biodiversity Board

Technical support: Thanal

In collaboration with the Padasekhara samithi (Farmers Collective) & Agriculture Dept.

The myth that organic farming will be a failure is disproved

1st crop: 1.2 mt

2nd crop: 1.6 mt

3rd crop: 1.8 mt

The farmers had no loss, while input is less; they got premium prices.

Expenses for production: Organic: Rs. 6.44 / kg, Chemical: Rs. 8.25 / kg.

Organic Vegetable garden in Padetti Village

Out of 69 families in the Padasekharam 33 families have developed Vegetable gardens.

Production during 2 seasons last year: 5 mt, Income in last two months: Rs.3, 600 /

Padetti Model for the whole of Kerala under the Organic Kerala Mission

The target for the current year is 50,000 ha.

☞***Kerala State Biodiversity Board gives support for:***

- Bee-keeping
- Mushroom cultivation
- Purchase of cattle
- Water harvesting
- Solar energy
- Biogas
- Homestead farming
- Vermi-composte
- Compensation for yield reduction

☞***KSBB document the changes in:***

- Plant community
- Soil micro and macro fauna
- Birds
- Butterflies
- Concentration of pesticides in sediments, selected fauna, straw and cow milk
- Training local students to monitor bird and butterfly fauna

☞***Paddy Mission of Kerala***

- Waste lands are being converted for farming
- Unused paddy land is being taken over and leased out to interested farmers.

We are determined to see our agro-biodiversity is restored & ***Mothers milk is free of poison with in 5 – 10 years***

Biodiversified farming systems for small and marginal farmers

Shri Anshuman Das, DRCSC, Kolkata

Some possible options for food and livelihood security of the small and marginal farmers:

Some Common Problems of small and marginal farmers

- Very small amount of land, often fragmented, per capita available land around 0.08 hectare
- Low land, which becomes uncultivable due to long and unpredictable water logging condition
- Or land remained fallow as un-irrigated
- Unpredictability of climate (rainfall / temperature / fog / storm)
- Where irrigation facilities are available, land is used intensively, but only a few crops are grown in large scale. Most of these are input intensive / water demanding hybrid varieties.
- Soil fertility lost, pest attack increased
- Common land disappeared, collecting food became difficult
- disappearance of many aquatic organisms and water shortages
- loss of local variety fruits, vegetables, crops, birds, animal

Resulting in to

- Suffer from seasonal or long term shortages of food and gainful employment. Some farmers produce enough food in a good year, but their production levels are highly unstable.

- Depends on few crops and overuse of agrochemicals has resulted in malnutrition, especially among vulnerable groups such as landless families including rural artisans, indigenous people, female headed households etc., who are dependent on collection of wild plants, animals, fish / crab etc.

- Farmers have lost their collective knowledge and control over vital inputs (seeds, tools, nutrients etc.) and have become dependent on external experts' & institutions, who often promote irrelevant ideas / methods.

- The increased use of toxic chemicals in agriculture affects health of both farmer and consumer, reduces populations of many beneficial insects and micro organisms, and often results in destruction of pest-predator balance causing pest resurgences and widespread crop losses.

Expectations

- Yield quantity will be increased
- Yield quality will be up
- Yield frequency will increase (decreasing fallow seasons)
- Self sufficiency will be increased (less will be purchased from outside, a market to be created from / within the farmer community)
- Farmers' health will improve (food secured)
- Wage equity achieved and new job created
- Local resources and associated knowledge will be documented
- Soil erosion will be less
- Diversity will be increased
- Reserves for seed and soil to be created at community level will be created
- Collective management capacity will be created

Interventions:

- ✓ **Cropping sequence (mixed/relay/intercropping/crop rotation)**
- ✓ **Multistoried arrangement**

Enhancing Diversity

Interventions

- ✓ Household level - Nutrition Garden with compost / vermicompost / liquid manure, chicken / duck / pig / goat shed, seed storage

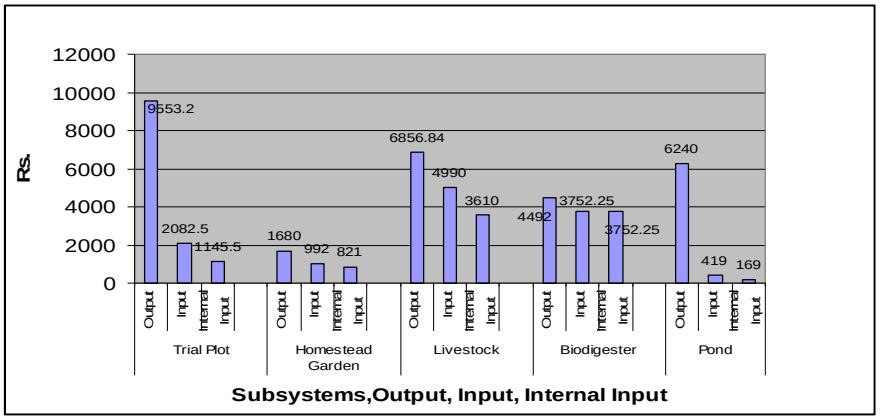
5000 such gardens 50~60 sq m, 15~20 varieties of crop, 7-14 kg vegetable per week, extra income of Rs.250 per month after consumption

- ✓ Small Farm level - Integrated farming with various subsystems

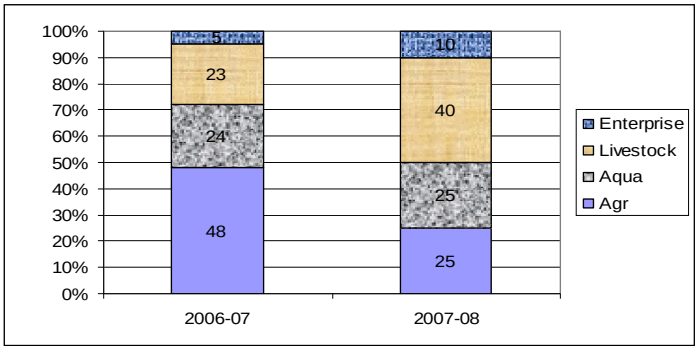
800 such farms, example rice-fish-duck-azolla with the help of land shaping, income can increase more than 100%.

Impact: diversified output/income

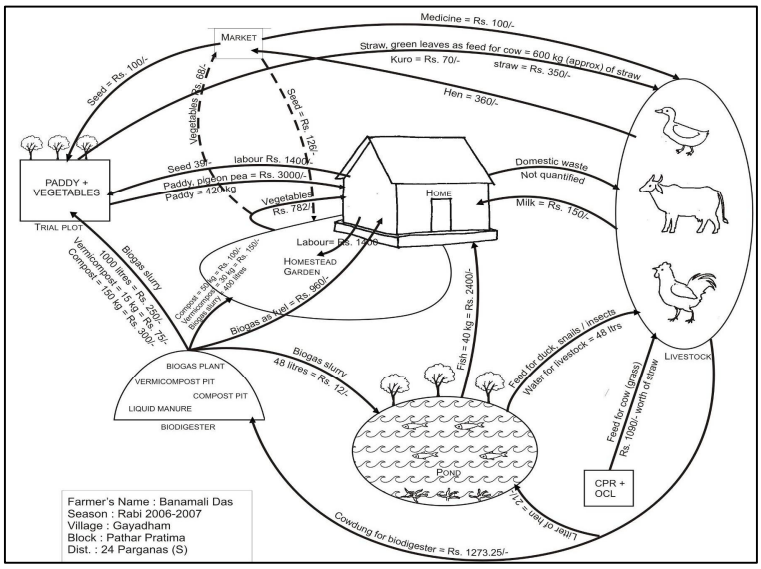
Summary: Land shaping cost 5000 INR as loan. Total input 12235.5 INR (9497.75 INR is internally generated), Total output 28222 INR + own consumption 13000 INR



Impact: reducing livelihood dependency on single enterprise



Impact: energy/input cost/calorie/biomass recycling within the system – making the system more stable



Interventions:

✓ Medium/Small Farm level : Relay cropping

1500 acre of single crop to double crop, 300 acre of double crop to triple crop, extra Rs.3000~4000 income from 1/3rd acre of land.

✓ **Fallows/Common land level - dry land - Mixed cropping**

✓ **Fallows/Common land level - dry land -Common property resource management**

More than 70 km roadside/canal bank/pondbank planted with multi-purpose trees benefiting 1500 landless families to meet food-fodder-firewood demand especially during lean season/disaster.

✓ **Rain water harvesting/Pond bank management- dryland**

Step pond and life saving irrigation - More than 12 such step ponds benefiting landless groups in terms of mandays creation for digging/renovation, pisci-culture, mixed cropping in permanent fallow, vegetables on the pond bank etc.

✓ **Grain bank**

Supply of grains during lean season

More than 225 grain banks with 2500 household with reserve for 60 day's food.

- ✓ **Soil water conservation and plantation**
- ✓ **Saving crop genetic resources**

Summary

- Mixed cropping of plants with different root depth & structure, resulting in optimal utilization of water & nutrient & higher resilience against environmental stress.

- Multi-storey agro-forestry extend growing season and reduce soil erosion, while enhancing carbon sequestration.

- Use of locally adapted plants, animals etc. reduce the need for high external inputs (water, synthetic feed, petrochemical by products etc.)

- Biological soil inputs, which enhance capacity of soil to store water, carbon & nutrients reducing need for synthetic chemicals / soil nutrients.

- Soil & moisture conservation steps that improve stress tolerance, reduce soil erosion & siltation of water bodies

- Integration of animal, bird, micro organism etc.

- Enhancing cooperation and capacity.

Conservation of rice diversity in Eastern India: way forward:

Shri Jacob Nellithanam, Richharia Campaign, Chattisgarh

System of wheat Intensification Chhattisgarh Experience –

Experiments at Jan Swasthya Sahyog, Bilaspur

JSS- Organic Farming for Improved Nutrition

- JSS is a health care Organization
- Health and Nutrition of population scary
- More than 60% has BMI below 18.
- Particularly women and children & ST's
- Green Rev had reduced crop diversity and neglected rain-fed farming areas
- GR reduced soil fertility and productivity of small and marginal farm families.

Beginning of Intensive Organic Program at JSS

- Started in 2002 with Experiments in Millets at JSS Ganiyari Campus.
- First Experiments in Finger millet and Kutki and line sowing of local rice varieties
- In Chhattisgarh farmers primary crop is rice due to concentrated rainfall of 1200-1400 mm(period mid June to mid Sept)
- Need to focus first on rice productivity arose and SRI system came to light as best option

Exploring the Potential of SRI Principles

- JSS learnt SRI from famous Organic Farmer L .Narayana Reddy
- Direct seeded dry land rice was the agronomic changes to SRI principle of early transplanting.

- First Year trials yielded 6 tons/h with a local variety Dubraj (premium rice)
- This is more than double the yield of farmers
- JSS Ganiyari fields are poorest of soils (Bhata)

Traditional Wheat Farming

- Local-Desi wheat are grown on Kharif fallows without any irrigation
- Uses moisture conserved in-situ during Monsoon
- Good field preparation & green manuring helps conserve moisture and nutrients
- Good yields of 3 tons /ha can be achieved with quality varieties
- Moisture used by this method is from capillary rise happening during winter months which is conserved by the soil mulch of dry topsoil
- Application of 1-2 irrigation judiciously can improve this yields
- The application of SRI principles has potential to take these yields to 3 times the average achieved by farmers today in Madhya Pradesh and central India with quality wheat which fetches better price.
- SWI methods can be applied to produce Barley for processed nutritional supplements, cattle feed and brewing industry also.

Wheat Cultivation issues Chattisgarh

- Chhattisgarh is not a traditional wheat area
- Concentrated monsoon up to 1400 mm turns most lands to paddy fields
- Preparation of land after paddy harvest is difficult and where feasible is delayed to December rather than optimum sowing in November
- So yields are very low where ever wheat is grown. 1 t/ha approx
- Irrigation is very limited for winter crops
- Optimum temperature range of 12 to 25 degrees not available through out the crop duration especially the reproductive phase

Experimentation of SWI in Chhattisgarh by JSS, Bilaspur

- We started in 2006 in small plots
- Used traditional varieties sourced from MP
- First was line sowing and inter culture to conserve moisture, reduce irrigation
- Poor soil of experimental field(3-4 inches) made 3 watering necessary
- Achieved 3 tons/ha yield organically
- Better soils could have achieved 4-5 tons
- Areas in MP with better soil and temp ranges can achieve 6-7 tons per hectare

Methods for SWI in central India developed in JSS

- Pre sowing irrigation and application of well digested compost or vermi compost
- Thorough preparation of land must using bullock power traditional tools like blade harrow (Bakkhar).
- Sowing in depth to ensure germination without irrigation.
- Marking of lines using marker and furrow opening using cycle wheel hoe to put seeds at proper depth for germination
- Inter culture using cycle wheel mainly for moisture conservation and aeration.
- Inter-culture for weed control and moisture conservation
- aeration.
- Inter-culture after every watering using cycle wheel hoe.
- Do inter-culture when good soil friability is achieved after irrigation
- Furrow opening before irrigation will help reduce water input.
- Pre-sowing and first irrigation after one month essential

Great Potential for Wheat Areas

- Water saving in Ground water dependant areas
- Power saving during winter in shortage states
- Quality wheat for markets, processing industries
- Double price for farmers producing quality wheat
- Can claim Carbon Credits in future.
- Establishment of traditional seed diversity to combat climate change

The workshop was concluded with a declaration prepared by the delegates and summing up by Lingaraj Bhai, froom Orissa.

Participants engaged in preparing the Declaration

Declaration

We, the participants of a national workshop on "Green Revolution in Eastern India: Which way forward?" - Farmers, activists, scientists and consumers from Orissa, West Bengal, Chattisgarh, Bihar, Uttar Pradesh, Madhya Pradesh, Andhra Pradesh, Kerala and Delhi - have conducted in-depth analysis of the consequences of Green Revolution and noted that:

- **The Green Revolution that has been undertaken in India in the past has proven it ecologically unsustainable, environmentally hazardous, and economically non-viable and is a threat to the existence of small/marginal farmers and sharecroppers. It has left its irreparable socio-cultural, environmental, health and economic impacts on the farming communities and consumers. Green Revolution only denotes negative implications for the Eastern region too and there is nothing to be rejoiced about the current proposals.**

- **Green Revolution will lead to violation of seed sovereignty of farming communities through bio-piracy and seed monopolies.**

- **Instead of the failed Green Revolution model, sustainable agriculture for the food and livelihood security in Eastern India, based on the inherent strengths/constraints of the region should be promoted.**

- **Green Revolution practices which have already made inroads in the Eastern states have also left their well-documented negative impacts in terms of creating economic and environmental unsustainability of farming in addition to increasing the vulnerability/risks of our farmers, including pushing many farmers towards suicides and greater indebtedness.**

- **Eastern India has invaluable genetic diversity of crops which farmers have evolved over centuries to suit various growing conditions and preferences and this is a heritage which is endangered by the promotion of Green Revolution seeds and technology.**

- **Food and livelihood security of the poor is subverted by the decision imposed by the Union Government on the peoples of the six Eastern Indian states to push for the new phase of Green Revolution with a thrust on hybrid seeds technology. We question the rationale of the government in bringing in this Green Revolution and strongly believe that techno-centric production models adopted so far do not address real food, nutrition and livelihood security.**

- **Hybrid rice experience from all over Asia shows that this is a failed technology increasingly rejected by farmers and consumers; importantly, the promotion of hybrid rice ignores the available diversity in the region. This is certainly not the answer to any problem of the farmers. Neither is GM Rice.**

- **Irrigation and agro-chemical requirements are going to increase with Green Revolution models, which cannot be sustained in the face of climate change, depleted water resources and existing agrarian distress.**

- **IAASTD (International Assessment on Agricultural Science & Technology for Development) report to which India and 58 other countries are signatories which have already pointed out that smallholder ecological farming is the only way forward, should be adopted by the governments. IAASTD report, released in April 2008 called for a fundamental change to reduce hunger and poverty, improve rural livelihoods and facilitate equitable environmentally, socially and economically sustainable development. GR model clearly contradicts this.**

The workshop concludes that it would be a great irony and unpardonable if the RKVY or other funds meant for alleviation of agrarian distress actually end up pushing the small and marginal farmers in Eastern India towards greater distress through short sighted decisions on Green Revolution. Instead, many agro-ecological approaches to farming, along with institutional innovations that allow for farmer-centric sustainable agriculture should be immediately acknowledged and promoted by the government. Farmers practising sustainable agriculture should be incentivised, including by integration of NREGA with sustainable bio-diverse ecological agriculture.

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Programme Schedule

GREEN REVOLUTION IN EASTERN INDIA: WHICH WAY FORWARD?

Conference Hall, IMAGE, Siripur Chhak, Bhubaneswar

September 6th and 7th, 2010; Organised by Living Farms

September 6th

9.30 am – 10.00 am	Registration	
10.00 am – 10.15 am	Welcome and introduction to the workshop	Shri Debjeet Sarangi, Living Farms.
Session 1 **Green Revolution then, New Revolution now,In the Chair: Dr Manhar Adil, Advisor to the Minister for Agriculture, Chattisgarh,Co-Chair: Dr Baburam Singh, Orissa Univ. of Agri Technology**		
10.15 am – 11.00 am	India's agrarian distress – Where and Why?	Dr Sudhirendar Sharma, Ecological Foundation, New Delhi.
11.00 am – 12.00 pm	The new revolution by women of AP: CMSA experience	Shri Vijay Kumar (IAS), Jt Secretary, SGSY, Ministry of Rural Development, Government of India.
12.00 pm – 12.45 pm	Impacts of the Green Revolution on Punjab	Shri Jarnail Singh Majhi, Kheti Virasat Mission.
12.45 pm – 01.15 pm	Discussion	
Session 2 **What would Green Revolution in Eastern India mean? In the Chair: Prof Radhamohan, Former Information Commissioner, Govt of Orissa**		
02.00 pm – 02.45 pm	Hybrid Rice – experiences from different places	Dr Debal Deb, Centre for Interdisciplinary Studies.
02.45 pm – 03.30 pm	India's jeopardized rice diversity	Dr Ilina Sen, traditional seeds conservator and Professor, Wardha Medical College.
03.30 pm – 04.00 pm	Possible water scenario in Eastern India post-Green Revolution	Shri Himanshu Thakkar, South Asia Network on Dams, Rivers & People.
04.00 pm – 04.15	Seed sovereignty implications	Shri Natabara Sarangi, well known rice conserver and organic farmer.
04.30 pm – 05.00 pm	Emerging water issues – Current irrigation, projected irrigation demands and industrial uses:	Shri Saroj Mohanty, Paschim Odisha Krushak Samanwaya Samiti
05.00 pm – 05.30 pm	Fertiliser scenario with the proposed Green Revolution	Shri Jaikrishna Ranganathan, Greenpeace India
05.30 pm – 06.15 pm	Discussion	

September 7th

Session 1 **What would really sustain farmers and secure food for all?** **In the Chair: Shri Lingaraj Pradhan, Convenor, Paschim Odisha Krushak Samanwaya Samiti**		
09.30 am – 10.00 am	Reviving Agriculture – experience-sharing	Smt Meenakshi, Smt Sarojanamma and Shri Rambabu from Andhra Pradesh
10.00 am – 10.45 am	International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD) – major findings, themes and options for enhancing rural livelihood	Prof T.K.Bose, Former Dean, Faculty of Agriculture; Director, Agricultural Research Bidhan Chandra Krishi Viswavidyalaya and Member, State Agriculture Commission, West Bengal.
10.45 am – 11.30 am	Agro-ecological approaches to food security: the SRI experience:	Dr Shambu Prasad, Science, Technology & Society Studies expert and Professor, XIMB, Bhubaneswar
11.30 am – 12.15 pm	Kerala's planning for sustainable agriculture	Dr V S Vijayan, former Chair, Kerala State Biodiversity Board and Member, Western Ghats Ecology Expert Panel
12.15 pm – 01.00 pm	Biodiversified farming systems for small and marginal farmers:	Shri Anshuman Das, DRCSC, Kolkata
01.00 pm – 01.30 pm	Will GM Rice provide any solutions?	Dr G V Ramanjaneyulu, Executive Director, Centre for Sustainable Agriculture, Hyderabad
01.30 pm – 02.00 pm	Conservation of rice diversity in Eastern India: way forward:	Shri Jacob Nellithanam, Richharia Campaign, Chattisgarh
02.00 pm – 02.45 pm	Lunch	
Session 2 **Way Forward** **Facilitator: Kavitha Kuruganti, Kheti Virasat Mission**		
02.45 pm – 03.15 pm	DISCUSSSION	
03.15 pm – 04.15 pm	Group work and presentations: Brainstorming on how to stop proposals related to unsustainable farming and promote sustainable agriculture	
04.30 pm – 05.00 pm	Summing	a panel of speakers

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