

cultivation, although in some places, improved species of paddy are also being used by some farmers. The common varieties of paddy being cultivated are *Mansuli*, *Taichung*, and *Radha-7*, while some years back, we (one-third of the farmers) cultivated the varieties called *Mansule*, *Madhise*, *Chhote*, and *Radha-7* in order to make a better profit. But these improved varieties needed chemical fertilizers, good irrigation facilities, and pesticides to control pests and diseases. When these requirements were not fulfilled, we lost half the harvest in some years. So then we reverted to cultivating our own local varieties, and among the most popular ones are almost 35 to 40 species. That is why we cultivate the different varieties of the local species. We do not only work on an individual level but also collect ourselves into different groups and work towards preserving and protecting the local species. In our village, on the basis of our yearly experiences with these different varieties of local paddy, we continue to grow them and alternate the seeds in trying to create continuity to our work and efforts at conserving the local paddy species.

Diversity in the local paddy species

In order to fulfill different usage requirements and needs, we have been preserving different local species. At present in Begnas Village, we have 16 collective development groups, and among the participating farmers, there are from nine to 43 species of paddy that are being locally cultivated. (table 1). Now we are planting the following local paddy species (table 2). These local species have many qualities that are suitable for our soil and climatic conditions, so we are giving continuity to our local species. Yet there are some qualities that we think it would be great to improve upon, so we have asked for assistance from the INSITU Conservation Program. With the help of this program, the local species like *Aanga*, *Thulo gurdi*, *Sano gurdi*, *Biramful*, *Pahele*, *Ekle*, and *Mansara* are being crossed with improved varieties like *Savitri*, *Himali*, and *Khumal-4*. In this way, if we could cross local with improved varieties, the local species would not disappear. In fact, many of the local varieties like *Marsi*, *Pahele*, *Thulo Marsi*, *Seto*, and *Jadan* are in the process of being lost, and some other species like *Anga*, *Rate*, *Chobo*, and *Jhinuwa* have completely disappeared.

Table 1. Collective Development Groups and Participating Farmers, Begnas Village

	Group names	No. of paddy species received in exhibition
1	Darathar Collective Development Committee (CDC)	43
2	Bisaunathar CDC	30
3	Majhthar CDC	30
4	Chaur CDC	21
5	Kotbari CDC	24
6	Aduwabari CDC	20
7	Poudelthar CDC	2
8	Archalthar CDC	19
9	Paurakhe CDC	18
10	Adhikarithar CDC	18
11	Sundaridada CDC	15
12	Talbesi CDC	15
13	Kalimati CDC	14
14	Kholbesi CDC	12
15	Simalpata CDC	9

Groups	Names of farmers	Species of paddy under cultivation
Archalthar	Tara Tiwari	16
Adhikarithar	Goma Adhikari	13
Poudelthar	Padam Raj Poudel	11
Bisaunathar	Padma Kumari Adhikari	11

Table 2. Common Paddy Species Found in Begnas Village

Main species	Reasons for being selected by farmers	Drawbacks	Interest of the farmers
<i>Ekle/Gurdi</i>	Good taste, long straws, soft, good rice grains, <i>ganjaune</i> , heavy harvest	Less in areas where water is not available	Long straws, heavy harvest, early crop, less wastage through easy dropping of paddy grains, not easily crushed, more rice, increase in cooked rice volume, able to resist disease
<i>Jetho buro</i>	Fragrant, good for serving to guests, expensive market price, used during festivals	Needs plenty of water	
<i>Kathe gurdi</i>	Semi-irrigated fields	Comparatively greater chance of being reduced to tiny pieces	
<i>Ramani</i>	Long straw, good harvest, able to resist fertilizer and water	Must have good irrigation	
<i>Lahare gurdi</i>	Long straw, good harvest, tasty, able to resist fertilizer and water.	Needs plenty of water	
<i>Bayami</i>	For medication (sprain, in suffocation)	Needs plenty of water	
<i>Jarneli</i>	Excellent for beaten rice (<i>chiura</i>)	Needs plenty of water	
<i>Anadi</i>	<i>Siramla</i> , for medication in state of dizziness		
<i>Naal tumme, mansara, pakhe jarneli, rate anga, aap jhuthhe, madhise, tunde, thapachini, etc.</i>			

We farmers want improvement in the quality and quantity of the paddy according to our interests and needs. But we lack the knowledge and technology to do that. Therefore, the farmers must select the species through their own presence and participation in the process so that by crossing different species, a great variety of species can be obtained, yet also keeping the original breed, so that the improved species can be strong and withstand local conditions. Hence, we feel confident that with the help of the in situ Program we will surely succeed in improving the local species.

Conclusion and recommendations

Our conclusions and recommendations are that the in situ Program will surely assist the farmers of this small Begnas Village in conserving the diversity of the local species of paddy and inspiring the local farmers to participate in collective activities, so we not only conserve the local species but also bring together maximum participation of the farmers so that the standard of life of the local farmers will also improve.

Question-and-Answer Session with Nepali Farmers

Q. 1. Everybody stressed crossing but who is actually doing it? Farmers? Scientists? Or is it done jointly?

Ans: The farmers in the village initiated the crossing program with technical support from LI-BIRD as and when needed.

Q. 2. Where do the male and female plants come from in maize crossing?

Ans: The male is an improved variety—*ganesh-1*—from NARC, and the female is a local land-race—*Thulo pahelo*.

Q.3. Are you willing to share the seeds of your crossing? If 'yes,' why? If 'no,' why not?

Ans: *Farmer 1.* Seed from crossing is community property, so it's up to the community to decide whether or not to share it.

Ans: *Farmer 2.* We are willing to share and, in fact, have already done so by supplying 250 kg. If our new varieties help improve the production of other farmers, we will share it.

Q.4. Today, large companies have the potential to spread biotechnology as a form of imperialism. Gandhi used the spinning wheel as a symbol of freedom. What should be the symbol of the farmers to fight against such domination?

Ans: One way to be self-reliant is to improve our seeds/varieties so that they are more productive or competitive, before the large companies grab away our genetic materials. The farmers should have control over the genetic resources.

Q.5. How will the new lines coming out of crossing *sathi* be developed and studied?

Ans: The decision to select or reject the outcome of the cross rests in community. No individual holds absolute rights over developing the lines.

Diversity Versus Mono-Cropping

Bidakanne Sammamma

DDS woman farmer from Andhra Pradesh, South India

Abstract

A farmer from Bangladesh describes crop diversity in her fields and gives the reasons for encouraging diversity versus mono-cropping.

I am trying here to explain the soil type, the problems associated with the soil in my area. You will find a lot of stones there, so farming is very difficult. The soil is black and you can see the amount of stones. In the areas where there is red soil, the depth is very shallow—not more than five to six inches—and below it there is a complete sheet of rock. So keeping in mind the soil types and the problems associated with rainfed agriculture in my area, the women try to grow a lot of crops in a given area so that they can be sure of getting at least one crop in the crop season.

We store different types of seeds of different crops and mix all these crops. Women, especially, play a vital in this mixing. Keeping in view the soil fertility, we observe the soil—which type of crop can be grown in a certain patch of land the woman owns. So women play a vital role and they mix all the different types of crops that can give food, fodder, and add to the fertility of the soil.

We grow a range of crops—at least eight to 10 crops in a year in a given area: you can see crops like *jowar* (sorghum), red gram, field beans, and cow peas. We grow this many crops to get some of the crops at one time and others at another time. Some crops will mature first, so they are harvested first, so we get food when we are hungry.

The main reason behind growing so many crops in a given period is that even if, due to any reason, some crops fail, we are sure of getting something. So we will be harvesting different crops over a period of a season of six months. Every time we go to the field, we will get something to take back to our homes to cook. At the same time, there won't be much work because during the period of six months, one crop will be coming at one time and another the next time and another the next. So the load is spread evenly on the women and not all at one time.

The second reason is that there are different varieties of *jowar*—compact-headed and loose ones. In our area, we sometimes get rain at the harvesting stage. When we get rain at this time, the compact-headed seeds germinate in the head itself. So we also grow the loose-headed variety. Even if there is drizzle for two or three days, this variety can overcome that problem. Unless there is a big drizzle for one week, I am sure of getting at least some *jowar* for consumption.

Keeping in mind the soil fertility, I also mix legume crops like field beans and *jowar*. We grow *jowar* also because of the fodder requirements of the animals we own.

Cow peas and field beans may not be important to you, and although we sow these crops in just a few rows, they are very important to us because they take care of the soil fertility and we also get very good nutritious food out from them. So they are important to us even though they are grown in small quantities. Now I will explain about the multiple uses of crops like red gram. We use the pulse for *dhal*, a curry that we eat with our bread and rice. We use the stalks of red gram for fuel wood and for thatching. This crop is very important to us; it is useful to us in a number of ways.

In the *rabi* (winter) season, we also grow a range of crops. We grow mustard with wheat for pest control because some insects that attack wheat will be attracted to mustard, and in this way pests will be controlled.

Foxtail millet is the first crop of the season in our area. When we don't have anything to eat in our homes, this is the first crop that will meet our hunger needs because most of the things stored from the earlier season will have been used up.

When we grow crops, we also keep in mind the fodder requirements of the animals we own. That is the reason we grow some varieties that will give more fodder for our animals.

One agricultural practice in our area is this: after harvesting red gram, the farmers plow back the land, so that whatever leaf-fall there is from the red gram will immediately go back to the soil. We are conscious of whatever we extract from the soil and we try to give back the same amount of things that we are extracting from the soil. This is very important to us.

The more crops we grow, the more the load will be evenly spread on us for harvesting them. More than that, we will also get more employment. The greater the diversity of crops, the more harvesting there is for different crops at different times; people in the village will get more employment when there is more diversity.

Women in our area do not prefer mono-cropping. The greater the diversity, the fewer the grains of each crop, so the women won't want to sell this small quantity of grain in the market. Neither will the men bother because of the small quantity; they will think that "even if I take this to the market, what is it that I am getting?" When you see each crop individually, it will be very small, but when we compare the grain production for all of them, there will be more grain in total. If we have a range of different crops in our homes, then whenever we feel hungry, we can consume them. With a single crop, we may or may not get a good yield. If the crop fails, we will starve for most of the year. You may think that if you get good crop, you may purchase some of the grains of different crops to eat, but even if you can get it in the market, poor women will definitely not buy so many different crops. They would rather spend the money on other things than food. If we have grains in our own homes, the satisfaction is different than when we buy it from the market. Even if you want to eat, you may not have the money, and even buying from the market, we will eat less and the satisfaction will not be there. If we grow a range of crops and have the different grains in our homes, then whenever children ask, we can cook different recipes from the different grains and provide them with nutritious food at the same time, which is not possible when we grow a single crop.

Our food, our knowledge, and whatever we are doing should not be a threat to diversity, but should enhance diversity. The types of food we eat now should also help in increasing diversity.

Women organized a biodiversity festival (called a *jatra*). Farmers from 75 villages attended this *jatra*. Using all local materials, there were exhibits of different traditional landraces and how they were used—which part of the plant is used for what purpose, like thatching, etc. Many farmers were inspired by this and have collected nearly 72 traditional landraces. They are extending all these seeds in 75 villages. Now they can crop at least 2000 acres of land with these 72 traditional landraces. After seeing this biodiversity festival, many farmers left the area understanding the importance and uses of the different crops. They are coming forward to cultivate the landraces, and in each village 20 farmers are cultivating these 72 different landraces.

Whatever inputs we are using for farming, the resources should be available locally and the farmer should not depend on any external resources. We want to use our own products; we want to use some of the green-leaf manuring crops. We give a lot of importance to soil fertility management. Whatever variety you may grow, unless the soil is fertile, we cannot achieve anything; we cannot achieve the potential yield even though the genetic potential may be there. So soil fertility is one of the most important things we are trying to address.

Our way of looking at the productivity of a farm is different. We generally don't look at yield only or yield per unit of land only or only general yield. There are many things we get from the farm, like uncultivated greens, medicinal plants, vegetables, fodder. So if you monitor all these things, they will be more than what you would get from a single crop. Everything is equally important in this whole farming system, so we look at different things in farming and not at a single thing.

Experiences Growing a Modern Rice Cultivar

Raksya Begam

Woman farmer from Bangladesh

Abstract

A farmer from Bangladesh describes her experiences growing a modern rice variety.

I'm from Bangladesh and my name is Rabia. I am here to talk about our experiences. The scientists told us, the farmers, that you can take a variety and plant it in your fields and you will get plenty—20 mounds of rice per acre. We were very simple; we believed it and were very happy to hear the news. We actually planted this variety. It was a dwarf variety, and the kind of straw we got from these plants was the type that if there was rain then all the straw got rotten and was no good for fodder for livestock, not even as fodder for the scavenger chicken. Although the straw mixed with cow dung created many insects, which were useful for chickens to eat. We also had to use pesticides and fertilizers and soon the whole land became hard like rock.

Previously we used to cultivate the local rice varieties of *Aaush* and *Aamon*. The straw of these varieties was long—taller—and was very good for fodder. It ensured that we could keep livestock and poultry.

Now, the scientists have always made claims. They showed us the profit—what we will get from the production of their varieties—but they never actually calculated the losses, the other losses that the farmers have to pay the cost for. Now we, the farmers, have realized these other costs. The situation right now is that the soil has become just like rock and the fertility is not the same as it was before. Now it also requires a lot of money to cultivate paddy or to remain in agriculture and the returns to the farmers are very poor.

Previously, the kind of variety we used to cultivate was tastier, compared to the modern varieties. It was also not a source of disease: it did not contain any pesticide or pesticide residues. After consuming these new rice varieties, we are now suffering from many diseases, so there are health problems along with the other problems. There are health problems in the livestock and poultry also, so the management of livestock and poultry is more difficult now.

On the other hand, uncultivated food is not available any more, at least it has really become scarce. But the scientists never calculated this serious cost to the farmers. So we farmers have now realized that we have had to pay too much for these new varieties and it is time to realize that we need to get away from them.

The older varieties had many other uses. We could use them as sources of energy and also as a kind of organic fertilizer. The dwarf—or modern—variety is not useful as the older varieties.

There is a proverb in Bengal, "Don't go to the field in the east." This is a local saying, which means, "Don't go to a place where you will hear bad information; it looks like the sun but it is not the sun." Now we realize that to the scientists, the farmers were not their objective—their main focus was not really to serve the interests of the farmers.

Is There an Imminent Crisis in Agriculture?

Abu Taher Rahamani
Farmer from Bangladesh

Abstract

A farmer from Bangladesh, with 22 years of experience, predicts an imminent crisis in agriculture.

I have been practicing modern agriculture for quite a long time and received the Presidential Award twice. I am here to share some of my experiences with the different varieties, especially the modern varieties, that I have planted on my own farmland. In terms of the productivity of a single crop, I have been able to demonstrate that some of the varieties performed well, but economically, I did not gain. In my 22 years as a farmer planting modern varieties, one thing I would like to say is that we are heading for an imminent crisis in agriculture. And we need the collaboration of the government and the scientists with the farmers. As scientists have noticed, the organic matter is very low, now it is 0.50 (the lowest) and 1.63 (the highest). This is the range in one area. We can talk about plant breeding or talk about the introduction of modern varieties, but unless we take care of the problems of organic matter in the soil, we will not be able to resolve the crisis in agriculture.

On my farmland, I am trying to make available more organic matter from my farm and I am also reducing the use of pesticides. Despite the fact that many people are aware of the dangers of pesticides, the use of pesticides is increasing, partly because of the companies' aggressive marketing techniques. Farmers are sometimes confused with this type of aggressive marketing and eventually they pay the cost of using pesticides. In my experience and from the literature available to me, none of the pesticides I am familiar with can reduce the attack to 50% or 60%. In contrast, partly from my own experience, from my own practice, and at the same time from some of the training I got for integrated pest management (IPM), I have been able to reduce the attack of pests by 80%–90%.

At the same time, seed is a very vital issue. You have to have good-quality, healthy seeds for the farmers. So this is a very sensitive area for the farmers. You have to have good-quality seeds for the experiments that we are trying.

And now there is more promotion of hybrid seeds around the world. They say that the hybrid cannot contribute to the interests of the farmer because they cannot keep the seeds. The farmers will not know the characteristics of the seeds the way they know the traditional varieties. So eventually it cannot be good for the welfare of the farming community.¹

My general feeling about the technology is that when you promote a technology, it is very important to understand the nature of the technology, whose interests it is serving, and how it is good for the farmer, or for that matter, who the constituencies of the technology are. Unless you know very clearly about that, then eventually the technologies will not be very fruitful.

When we decide about technology, certain characteristics are very important. One is that it should not be costly or it should be at least within the reasonable reach of farmers. Second, it should be verified by scientific procedures and by an indication that it can perform as they are claiming it is going to perform. Third, it should be gainful to the farmer—the recipient who is receiving it. It should be sustainable and also should be used by a large number of farmers.

So I appeal to the scientists to note what I have said. I hope you will take it as coming from the farmers and that you will take interest in these issues.

1. *Translator's comment:* He (the farmer) is emphasizing the question of whether the farmers can really keep these seeds in the household or if they can have any control over the seed system.