Learning and experiences of the PETRRA project, BANGLADESH

BOOK: 4/10

Newspaper articles

PETRRA – an experiment in pro-poor agricultural research

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Poverty Elimination Through Rice Research Assistance (PETRRA), 1999-2004

a project funded by DFID, managed by IRRI in close collaboration with BRRI

Book 4. Newspaper articles

English Daily (editorial page)

4.1 Biotechnology for Food Security: Risks and Rewards. The Daily Star, September 30, 2003

4.2 Shrimp Culture: Death or Dollars? The Daily Star, September 2, 2003

4.3 The Veritable Vegetable Grower. The Daily Star, August 12, 2003

4.4 Research for Rich Rice. The Daily Star, July 30, 2003

4.5 What They Need is New Knowledge. The Daily Star, July 22, 2003

4.6 The Ladies with The Lamps. The Daily Star, July 17, 2003

4.7 Tales of the Tale Enders. The Daily Star, July 8, 2003

4.8 As They Sow, So They Reap. The Daily Star, July 1, 2003

4.9 Seeds for Survival. The Daily Star, June 25, 2003

Bangla Daily (editorial page)

4.10 Biotechnology in Agriculture in Bangladesh Context (Krishite biotechnology abong Bangladesh prekhhit) The Daily Bhorer Kagoj, October 3, 2003

4.11 Rice Research and 'Resource-Poor' - A Travelogue (Dhan gobeshona o 'sampad-daridro' ekti brhomon britanto) The Daily Bhorer Kagoj, September 12, 2003

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Biotechnology for food security: risks and rewards

Abdul Bayes

REPRINT

The Daily Star
September 30, 2003

In a recent seminar organised by the Centre for Policy Dialogue (CPD) at the BRAC Centre, eminent economists and agricultural scientists dwelt, albeit indecisively, on the sensitive issue of biotechnology. The topic, admittedly, is of top-most importance in the wake of ongoing realities related to rice production, particularly in developing countries like Bangladesh. Here the green revolution, allegedly, tends to gradually groan under a regime of declining yield rates, the complex problem of insect and disease pressure and other problems. Thanks to the organisers, especially CPD and IRRI-PETRRA, for floating a debate that warrants the best available empirical evidence relevant for poor people in developing countries. Such debates should help identify the most appropriate ways that molecular biology based research might contribute to achieving and sustaining food and nutrition security.

Safety and security

Two of the well-known researchers from the International Rice Research Institute (IRRI) Dr. Mahabub Hossain and Dr. Swapon Kumar Dutta set the tone round the table at the very outset. They made preliminary remarks on scientific evolution in molecular biology over the last two decades, the genetic base of living organisms, and the ability to develop processes and products useful for food security, nutrition and human health. These two speakers succinctly summarised the potential and the problems of biotechnology. While the issue is being debated both in the developed and the developing world, according to them, the premises are quite different and hence a grandiose generalisation should be shelved. Developed nations stand against it as with almost stagnant population growth for decades, they have a consequent craving for food safety, while developing countries imperative is food security.

It shall be noted that about 1.2 billion people mostly in Asia and Sub-Saharan Africa live in a state of absolute poverty with an income of less than US Dollar 1 a day. About 800 million people are food insecure and 160 million preschool children suffer from energy-protein malnutrition, which results in the deaths of over 5 million children under the age of 5 years. Thus the whole issue boils down to a debate between food safety and food security.

Problems and potentials

I assume that my readers are well informed of the potential of biotechnology as this is by now articulated and known. Even then, to put it simply, biotechnology can bring forth a revolution not only in food production – in a regime of declining land and rising population – but also in the realm of nutrition for the poor. One example should suffice to sound the semantics.

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Vitamin-A deficiency affects 400 million people worldwide, leaving them vulnerable to infections and blindness. Iron deficiency affects 3.7 billion people, particularly women, leading to higher maternal deaths and infant mortality. Developing micronutrient dense rices, with higher amounts of iron, zinc and pro-Vitamin-A, can have a tremendous impact on the health of low-income people. Conventional breeding when combined with biotechnology can provide powerful tools to achieve this goal.

There is another point to ponder. The big multinational companies – the candidates for criticisms on this count – have reportedly backtracked in recent years from rice biotechnology as they observed the dominance of small holders in Asia and the high transaction costs of enforcing intellectual property rights under a weak judicial system. By and large, both in developed and developing Asia, the public sector needs to be the vanguard of rice biotechnology.

Bangladesh perspective: complacency and concerns

The Bangladesh perspective on potential and problems – quite obviously – was on board for threadbare discussions. Bangladesh is one of the most land scarce countries in the world with the cultivation frontier closed almost half a century ago. The green revolution that swept over the last decades helped a balance between growth rate of population and food. Most of the gains of the green revolution came from improved rice and wheat varieties developed by the Bangladesh agricultural research institutions in collaboration with international research centres. Two-thirds of the cropped area is now being covered by modern varieties and 55% of the cultivated area is now under irrigation. In tandem, population growth rate also declined appreciably, say from 2.2%-1.5% per year in the 1990s.

While complacency could be in one corner, concerns loom large elsewhere. Every year, 2 million people are added to the existing stock putting a pressure on food supplies of 0.56 million tons a year, just to maintain the same level of per capita consumption. Despite the claim of self-sufficiency in food and the calm it confers upon the nation, occasional imports invoke inquiry into the claims made so far. The easy option of realising increased rice production has already been exhausted and Bangladesh is poised to reel under a regime of losing cultivated areas at more than 1% per annum due to growing urbanisation, population pressure and leaving land for non-rice crops. In this scenario of an almost closed cultivation frontier, declining yield and increasing population in Bangladesh – a country that stands with higher population density than America when all people of the world are pushed into that country – must strive for the alternatives, especially the opportunities created by rice biotechnology.

It is also because 60% of the children under age five are underweight and more than half are stunted. More than 70% of pregnant women suffer from anemia due to iron deficiency. In rural areas, where three-fourths of the people live, malnutrition is acute due to lack of knowledge or financial capacity to buy a balanced diet. Since poor people consume nearly 150 to 170 kg. of rice per year, incorporation of a small amount of iron and pro-Vitamin-A in rice could go a long way in meeting the deficiencies in these micronutrients.

For and against

There are a lot of risks too. Concerns about food safety, ethical points, environmental implications and socio economic risks were also deliberated upon by the authors. Taking all the risks into consideration, the authors noted that samples drawn from a large section of

civil society and agricultural institutions seem to support biotechnology in certain conditions. For example, biotechnology could be supported provided it is done by the public sector and is free for farmers. Health and environmental assessment would need to be done before the release etc. Those who declined to support put forth various arguments such as, the development of pests to destroy food sources, dependence of farmers on private companies, additional production of rice not needed and gene transformation is unethical etc.

Riding the risks

Given the growing constraints on future rice availability in Bangladesh and the devastating micronutrient deficiency among the poor households in rural areas; the rice biotechnology issue should be left neither to rhetoric nor to emotions. In the seminar mentioned before, I sensed emotions engulfing economics and rhetoric ruling over realties on the ground in the case of a few. We think that society needs to rise above all rhetoric and emotions and seriously start a systematic inquiry into the nexus soon. Dr. Mahabub Hossain and others provided sufficient food for thought for a safe and secure world of food, particularly in the context of Bangladesh. It is felt strongly that biotechnology could be the key to the upcoming crisis, but the questions raised must be kept in mind. We have to seek answers to the questions raised rather than throwing away the question itself. Allow me to remind my readers that had we not hailed the adoption of modern rice technology in the 1960s and 1970s, we would have, probably, experienced a worse food situation. Many of the forecasts at that time turned out to be futile. We can only hope that we shall be able to find a judicious path for our survival.

Suggested citation:

Bayes, A. 2007. Biotechnology for food security: risks and rewards. Reprinted from The Daily Star, September 30, 2003. In: Magor, N. P., Salahuddin, A., Haque, M., Biswas, T. K. and Bannerman, M., editors. PETRRA – an experiment in pro-poor agricultural research. Newspaper reprint no. 4.1. Dhaka (Bangladesh): Poverty Elimination Through Rice Research Assistance Project, International Rice Research Institute. 4 p.

Shrimp culture: deaths or dollars?

Abdul Bayes

REPRINT

The Daily Star
September 02, 2003

The purpose of my visit to Khulna – the first ever in my life – was not anything relating to shrimp culture, although I knew that greater Khulna holds the key to the culture that grew out of our dire need of dollars from foreign countries. As time passed, shrimps began to show potential as an important source of foreign exchange, accounting for, perhaps 6% of our export earnings and about 3% of world export of shrimps. At a global level today, about one-third of the shrimps are reported to be farmed here compared to barely 5% in the 1980s.

This is the dollar-side of the development. We should never be oblivious to the dark side. Since shrimp culture started to surge, local conflicts emerged with land grabbing, environmental degradation, a considerable number of people were dashed below the poverty line and a host of adverse impacts were felt. The imputed costs of such hazards should be added to the revenue earnings to arrive at sustainable development of the sector. For a long time I have been hearing newspaper stories about the socio-economics and politics of shrimp culture. In fact, if one scans through the news and views relating to the deteriorating law and order situation in greater Khulna one could, perhaps, come to the conclusion that the lion's share of this deterioration is owed to shrimp cultivation and related issues.

While in Khulna, in connection with Poverty Elimination Through Rice Research Assistance (PETRRA) sub-projects, I visited the Coastal Development Partners (CDP) office. CDP, along with 15 other small non-governmental organisations (NGOs), act as partners of the various projects that PETRRA tends to support. Akhtarul Alam Tutu heads this organisation. The posters pasted on the wall of the office gave me the impression that CDP is involved mostly with issues relating to the poor. It is not a micro-credit organisation as classical definitions of NGOs would suggest, but an organisation engaged in facing human rights violations, environmental hazards, repression of women and above all, highlighting human values. And of late, the organisation associated itself with the dissemination of rice diversity technology to the poor in the coastal areas.

It is there I came across the 'unknown' costs of shrimp culture that CDP has been striving to dig out. It goes beyond the calculus of the principles of profit maximisation. I have newspaper clippings with me from August 2003. Throughout the month, cases of terrorist attacks, human rights violations and other vices surrounding shrimp culture are reported almost every day. During the last three years, I was told, 55 persons were killed, and 42 incidents of assaults and 17 instances of poisoning of fish/shrimp ponds took place.

Hearing the horrors, I expressed interest

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in visiting some shrimp ponds called *chingri gher* – places I have never visited before. Next day, I drove to the ghers located in a village named Magura Ghona under Dumuria thana. A narrow semipucca road passes through the heart of the village and I had to step down from the vehicle for a walk of a kilometer or so to the *ghers*. My a priori reasoning suggested that people of that village should be relatively better off than others, since infrastructure development and other linkages connected with shrimp culture should shower positive benefits on the villagers (besides the fact that they could increase their earnings from the culture).

As I stood at the fag end of the village, I could see vast tracts of lands turned into ghers by developing polders. These are agricultural land that historically the people of that locality leaned on to meet the food security need by producing rice. In the past, when cultivation of crops was the mainstay, ecological balance was maintained, indigenous technologies were adopted and an egalitarian approach to the preservation of common properties was in evidence. But gone are those days with the advent of shrimp cultivation. Unplanned growth of the projects, absence of proper regulations and above all, lack of governance grievously gave way to an unsustainable development.

My hypothesis turned out to be wrong as I began to talk to the villagers. People of the village that I met seemed to be perturbed, panicky and powerless in the face of known man-made catastrophies. They informed me about three phases that shrimp cultivation passed through over time. First, there was a time when the owners of the *ghers* – with money and muscle power – used to grab land of the poor without paying them a penny. This was the early stage of the so-called *blue revolution* and a business of the 'big'. Second, then came a time when collective farming was developed in some places but the poor were deprived of their due shares from the farms. And now, in many places, small farmers are themselves doing the cultivation – instead of renting out land – to eke out a living but problems mounted rather than mitigated.

One example should suffice to show the severity. Recently, a 6 km. long canal was occupied by goons to develop ghers and cultivate shrimps in the water of the said canal which is a common access resource passing through nearby villages. Water flowing to and from was stopped by building barrages causing a host of adverse impacts. The poor villagers objected to this barrage in the canal and were threatened by the powerful *mastans*. Some of the villagers were reportedly put under criminal cases. While the police were looking for those poor villagers to arrest, they were, allegedly, least interested to kick out the devils from the dens. As I was told, huge sums of money from the goons and the powerful gher owners force them to turn a deaf ear to the 'development' that took place in the canal.

More interestingly, the day I visited the spot, the local member of parliament (MP) came to the place to remove the barrage and thus allow access to common resources by all people. This was an appreciable job done by the local MP. But unfortunately, no sooner had he left, the villagers complained, than the barrages inside the canal were put back again.

I was told that the rent from leasing out land for shrimp cultivation – Tk. 1,200 per *bigha* – is much less than that for rice cultivation. The soil fertility is seriously affected due to the intrusion of the saline water into the fields and the yield rate is down by 20%-30%. Witnessing a decline in the yield of agricultural crops and the lack of access to common resources, poor farmers are gradually forced to lease out land for shrimp cultivation. There are no winter

crops anymore – pulses, oil seeds and vegetables and the collapse of cattle raising has had serious economic and nutritional consequences not usually counted in the economics of shrimp culture. *"There have been many reports of 'khas' lands (government owned lands) being used for shrimp farms illegally by influential members of the society, sometimes in possession of false property deeds, and in some cases with the support of the local police or government officials. Violence and intimidation towards small-scale shrimp farmers in order to appropriate their lands is also reported to be widespread"*, says one report on shrimp cultivation and its impacts.

And to visit some of the developing countries counting on shrimps, look at the following observation. *"Shrimp farmers in Thailand left behind an ecological desert. These farms are hardly useful for other economic activities. Outside investors are enriched, local people are pauperised. Development runs above the heads – very little trickles down to them"*.

I recall that a few years back, Bangladesh shrimp exports shrank following European Union (EU) objections to some of the aspects relating to production and distribution. Quite obviously, the buyers need not be blamed and gracefully some of our exporters took the pains to upgrade their processing plants and production process. The wake up call helped create an atmosphere where the non-economic costs of shrimp cultivation deserve attention.

The above mentioned observations should not be taken as a negative attitude towards shrimp cultivation and export. After all, we all want dollars but not at any cost. We want the growth of shrimp cultivation to take place under a regime where a) access to common properties are not encroached upon; b) small farmers have the freedom to reap the rewards from shrimp cultivation; c) productivity of agricultural land is not adversely affected; and d) the rules of the game are such that both economic and non-economic costs are duly calculated to point to sustainable development of the sector.

To this effect, many steps need to be on board but allow me to cite a few: a) the industry should fully acknowledge its responsibility in using the best of resources to ensure environmental sustainability, economic viability and social equity; b) there should be an unrestricted access for third party monitoring all aspects of production, distribution and technology used; c) there should be improvement in pond design, water exchange and pollution control; d) existing farms should comply with national land use polices, strategies and legislation; e) future development of the sector should be based on consultation with the local community; f) specific commitments to uphold human rights should be at the top of the agenda; and finally g) all farms should fall under the seal of quality to meet the environmental and humanitarian needs of the industry.

I now draw the attention of the readers to news paper reporting of 15 days of July to justify the title of the write-up: 'Shrimp culture: deaths and dollars'. In fact, the following reports are just the tip of the iceberg. Everyday, on average, one incident of death or other crime was reported to take place in greater Khulna. Perhaps this drives home the point that deaths and dollars have unfortunately become regular phenomena:

- July 1: Tk. 100,000 stolen from shrimp farmer in Demra, Bagherhat (Janakantha);
- July 4: Firearms and ammunition seized from a shrimp farm in Rampal (Daily Shebok);
- July 10: Court cases filed by widow against 10/12 persons for the murder of Yakub, a shrimp farmer (Daily Shebok);

- July 10: Fries worth Tk. 100,000 looted from shrimp farm in Rampal upazila (Daily Purbachal); and
- July 12: A gang fired at Abdul Malek (48), a shrimp owner from Zamira village, Phultala upazila (Daily Shebok);
- July 14: No arrests following the murder of shrimp farm owner in Phultala upazila.

The government should take the situation very seriously before this vital sector becomes sick resulting perhaps in deaths and loss of dollars.

Suggested citation:

Bayes, A. 2007. Shrimp culture: deaths or dollars? Reprinted from The Daily Star, September 2, 2003. In: Magor, N. P., Salahuddin, A., Haque, M., Biswas, T. K. and Bannerman, M., editors. PETRRA – an experiment in pro-poor agricultural research. Newspaper reprint no. 4.2. Dhaka (Bangladesh): Poverty Elimination Through Rice Research Assistance Project, International Rice Research Institute. 4 p.

The veritable vegetable grower

Abdul Bayes

REPRINT

The Daily Star
August 12, 2003

I was visiting a few projects that are reported to be 'pro-poor'. We have been hearing about 'pro-poor growth', 'pro-poor policies' etc. for a long time. Closer scrutiny sometimes, showed that there was often a slip between the cup and the lip. It allegedly, appears pro-poor serves but the rich. I wanted to know whether all that were called 'pro-poor' projects were in reality just that, or if 'pro-poor' was a rhetorical term. Thanks to the Poverty Elimination Through Rice Research Assistance (PETRRA) project under the aegis of IRRI for allowing me to visit some of their 'pro-poor' projects. On the way to my mission, the Rangpur Dinajpur Rural Service (RDRS) officials of Thakurgaon engaged in PETRRA projects introduced me to a person. They were narrating how a penniless person rose to the prominence among the poor. I wanted to meet him and he courteously called on me.

Deprivation and desperation

Khairul Islam (45) never thought that doomsday was at his doorstep. Nor should he have thought so. Because, his father owned 11.5 acres of land to be inherited by three sons. But the brothers, allegedly, betrayed Khairul by managing all lands from the father and thus depriving him of his due share. At that time of the disaster, he had three sons and a wife. Soon after, in 1991, his wife died and he had to marry Parul Begum to look after the children and the household. Khairul was confident that he could overcome the crisis but the constraint was cash money. Desperate as he was to feed a family of five and another to join very soon, he went to a *mohajan* and borrowed Tk. 20,000 at an interest of 10% per month. All that he had of his own were: a) a house made of mud and straw; b) 10 decimal homestead land and c) a jug of seeds of *lal shak* (red leafy vegetable).

Somebody told Khairul that NGOs could help him with credit to carry out income earning opportunities. He approached RDRS but, painful as it was, the prayer was rejected on the plea of poor credit worthiness of Khairul. A few days later, one Shamsul Huq of RDRS stood beside him and paid on his behalf a cumulative savings amount of Tk. 140 at a time. Meantime, the family's economic crisis began to mount. It was very hard to get three meals a day. There was no option left for him other than begging or borrowing. However, after joining the group formed by RDRS, Khairul got training in vegetable production and poultry rearing and applied for a loan. While other applicants were given a loan of Tk. 4,000 to 5,000, it was only Tk. 2,000 for Khairul. However, with the money in hand, he leased one *bigha* land for one year with Tk. 1,000 to grow vegetables and decided to set aside the rest of the amount for petty trading and buying inputs.

Valuable vegetables

Khairul went for the production of

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cucumber on the leased-in land. The decision was based mainly on the demand for the product in the market that he could ascertain. Fortunately, he soon became a contract grower of BRAC to supply seeds. Thus, output and seeds from cucumber fetched him about Tk. 16,000. Excluding all costs, Khairul reaped home Tk. 8,000 as net income! Lucrative profits from cucumber lured him but for food security of the household, he also went for paddy cultivation. Then potato. He excelled in both. Seeing his promising and profitable performance, the landowner leased out another 75 decimals at Tk. 3,500 for one year. Khairul grew vegetables and began to sell in the roadside *arats*. In 1994, he sold vegetables worth Tk.32,000. With that money, he mortgaged in 2.5 *bigha* land at Tk. 20,000 and bought 50 decimal of paddy land.

Bridge as boon

In 1998, Bangabandhu bridge (Jamuna bridge) over the Jamuna was opened up for traffic. Khairul had read up to eighth grade but could read well the realities on the ground. He realised that the biggest bridge could help better business and trading, especially of perishable products. In his lifetime, he saw farmers growing vegetables but failed to fetch a fair price due to the lack of communication to market the crops. About half of the products used to perish in the absence of disposal. But those days appeared to have gone with quick contacts, facilitated by the Bridge, between his region and all other parts of Bangladesh. Imbibed with the new insights, Khairul began to devote more land to vegetable production. To be specific, he used his newly mortgaged-in 2.5 *bigha* land to grow raddish and other vegetables. A party from Dhaka came to see his farm and expressed the desire to buy products on a regular basis from him. A silverlining loomed large in Khairul's life. Neighbours began to visit his fields.

Turning the table

Khairul, for the first time in his life, decided to go to Dhaka to sell his outputs. He reckoned that the margin that goes to the middlemen could pour into his pockets provided he established direct connection with the buyers. There were, of course, risks involved since he knew nothing about Dhaka and the deals there. But as I mentioned, the person was desperate to go up the income scale and risks had to be taken to overtake others. One fine morning, Khairul got out of his home with 40 bags (70 *maunds*) of raddish, and rode on a truck that was carrying stones. With an address of a merchant at Kawran Bazar collected from his local *arat*, he reached the place and the person with his bags of raddish. They were sold at Tk. 240/*maund* to give Khairul Tk. 17,000. After deducting the costs of transport, seeds, labour/draft animals, fertiliser/water etc., reportedly, he got a net return of Tk. 6,000. A second time, also from the same land, he took to Dhaka 15 bags but price went down due to over supply. This time, at Tk. 130 per bag, he reaped home about Tk. 2,000.

The next trip, again for the first time, was to Chittagong in 2001. His bus from Thakurgaon started at 5 pm and reached Chittagong at 6 am next day and after selling the products he returned the same day because of the bridge that was once a dream. Khairul carried 6 cages (18 *maunds*) of *karala* to fetch home a net return of Tk. 13,000. Just a week later the same kind of journey took place with 6 cages (27 *maunds*) of *karala*.

Farm and fortune

And so the rewards continued. Khairul started producing *karala* bitter gourd to sell in Khulna and Dhaka markets. In 1999, sales from raddish and *karala* were hefty and he bought 2 *bigha* (1 acre) of land at Tk. 44,000. Meantime, he devoted

no less attention to the education of his children, meeting non-food needs of the family and saying prayers regularly. His children are getting a good education in schools and colleges/training institutes. *"But, I also use them in the early morning to harvest the daily crops that I take to the local 'arats' for sale. This is mainly to teach my family that fortunes come from farms. I also employ children of poor neighbours just to give them some cash money"*, Khairul described to me. *"Nowadays, the number of vegetable growers in this region has increased substantially, especially the poor farmers who used to keep land fallow. They are now vying to grow vegetables because of the opening up of markets due to the big bridge. In the past, farmers used to go to the roadside with vegetables and, more often than not, used to throw away the unsold surplus. Nowadays, nothing like that happens. Earlier, we produced vegetables and we perished but now it is the reverse: if we do not produce we perish"*. Khairul continued his conversation, as if, with a student who knows little about the role of Jamuna Bridge and the realities around the poor farmers.

Truthful trainer

Starting with zero amount of land in 1992, within the span of 11 years or so, Khairul now owns four acres of land plus he leased in another one acre to grow *karala*. I saw signs of happiness in him. However, he was looking at his wrist watch at 9.30 pm reminding me, perhaps, that a businessman like him has not much time left for a gossip with a university professor who draws upon a definite salary (irrespective of the output delivered!) at the end of each month. But Khairul will have to go home, take stock of things for tomorrow's markets, rise up at 5 am and then again go to bed at 12 midnight.

During the discourse, it was nice to hear that RDRS now knocks at the door of Khairul whose loan prayer was once rejected on the plea of poor creditworthiness. The reason they look for Khairul is to train other vegetable growers coming from different areas. Khairul teaches them with great earnestness, not textbook type economics, but economics originating from the practical experiences of his fields. *"It is not the size of the land but hard work, a small amount of capital, some knowledge on production and marketing and above all a good communication system that could improve the fate of people like me"*, Khairul told me. In other words, according to him, the poor only need a small amount of land, institutions to provide small cash, training in new cropping systems and a good communication network to market their products. Thus infrastructure, innovations and institutions seemingly constitute the core of any approach to poverty reduction especially of the resource-poor farmers.

Still with dreams!

At the fag end, as I was wishing him success, Khairul said: *"Sir, I have two dreams to come true. First, to buy a pick-up van so that I myself can carry the commodities and second, to write a book"*. *"Writing a book?"* I gave a surprise look at him. *"Yes sir, about my life. I have already named the book as 'Paruler Songshar' (Parul's family)"*. *"Why not 'Khairuler Songshar'?"* I wondered. *"Because throughout the journey so far, my wife Parul stood beside me to share the sorrows and silverlinings. In fact, she played the pivotal role in relieving us of the rigours"*, said Khairul, the veritable vegetable grower to live in my memory for years to come.

Suggested citation:

Bayes, A. 2007. The veritable vegetable grower. Reprinted from The Daily Star, August 12, 2003. In: Magor, N. P., Salahuddin, A., Haque, M., Biswas, T. K. and Bannerman, M., editors. PETRRA – an experiment in pro-poor agricultural research. Newspaper reprint no. 4.3. Dhaka (Bangladesh): Poverty Elimination Through Rice Research Assistance Project, International Rice Research Institute. 4 p.

Research for rich rice

Abdul Bayes

REPRINT

The Daily Star
July 30, 2003

When we talk about our self-sufficiency in rice, we generally refer to the coarse rice grown and mostly used for domestic consumption. There are other types of rice that Bangladesh farmers have historically been growing – not in countable quantities though. Fine, aromatic and glutinous (FAG) rice are the counterparts to the course rice grown in this part of the world. Glutinous rice is said to be produced and consumed mainly in Korea, Japan, and the Philippines. But in some parts of the greater Sylhet district of Bangladesh, one could come across such a variety of rice. I was told by some farmers from Habiganj and Maulvi Bazar that, in the past, glutinous rice used to be grown extensively in that region. They also enlightened me with the news that glutinous rice, compared to the traditional coarse varieties, requires smaller quantities for the same appetite and, at the same time, appears to provide more energy to the body.

Rich rice

On the other hand, some areas of the districts of Mymensingh, Rajshahi and Dinajpur have long been the hinterland of fine and aromatic rice like *kataribhog*, *chinigura* and *kalijira*. They are mostly consumed during festivals by almost all classes of people but on a regular basis by the richer section of the community. Fine and aromatic rice is also being supplied to posh hotels. Reportedly, Bangladesh imports roughly 50 thousand tons of fine and aromatic rice (worth about US$ 25 million) each year from neighbouring countries. According to experts, few of the fine and aromatic varieties grown in Bangladesh could comfortably compete with *bashmati* rice for which India and Pakistan have the monopoly to mould the international market. In fact, some enterprising exporters have already started vying for exporting FAG rice and, in the meantime, about 100 tons have so far been exported, we are told. It has been opined that given proper knowledge about varieties, know-how to grow, marketing channels and initial incentives, Bangladesh could easily capture 15%-20% of the world market for FAG rice in future. This would be no mean achievement given the fact that 100% of the value addition on this count would emerge domestically. On the other hand, the domestic demand would also go up *pari passu* the rise in per capita income. According to the famous Engle's law, income elasticity of demand for coarse rice would decline with a rise in income demanding more of these varieties of rice.

Finding FAG rice

Appreciably, two of the non-governmental organisations (NGOs) in Bangladesh have been trying to encourage farmers to grow FAG rice. Interestingly, these institutions supplied seeds and fertilisers on experimental basis to some of the resource-poor farmers of

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Habiganj, Maulvi Bazar and Rajshahi districts. The Poverty Elimination Through Rice Research Assistance (PETRRA) project of International Rice Research Institute (IRRI) and Department for International Development (DFID) tends to support the partners. However, my own interest of research lay in seeing to what extent and how marginal farmers would behave in the event that growing FAG rice mostly means catering to the market needs. Because, poor farmers could hardly afford to grow such expensive varieties (almost twice the price of coarse rice) only for home consumption. The issue of the niche between the marginal farms and the markets appeared as an interesting topic to me. I, therefore, made up my mind to visit a few of the spots where marginal farmers have been induced to go for FAG production. Regrettably though, the remarks presented below are not of a researcher related to rice but that of a traveler telling something on the heels of hectic parleys.

HEED and seed

Health, Education and Economic Development (HEED) is an NGO that has been working in greater Sylhet district for a long time. The heads of HEED told me about their project and invited me to visit some of the farmers experimenting with the new source of survival. HEED took up the challenge and provided the farmers with seeds free of cost. They collected seeds of 16 varieties of FAG rice from different parts of the country and supplied them to the farmers. In the demonstration plots, however, HEED paid for both seeds and fertilisers. The farmers are 'resource-poor farmers' with cultivable land upto 100 decimals, options to work in others' land and food provisions for 6-7 months from own farms. A total of 40 farmers have been selected to test the new technology.

During the discourse, the sample farmers that I met in greater Sylhet zone expressed their satisfaction over experiment with FAG rice. They cultivate *kataribhog*, *rataboro*, *parbatjira*, BRRI dhan34, *khasra* etc. devoting, on average, 10-40 decimals of land in last *aman* and *boro* season. For some of them, the opportunity cost of growing FAG rice was zero since fallow lands were used to grow crops and for others, it was very low since earlier crops were grown on lands which used to grow low yield *aus*. By and large, the farmers expressed their desire to double the land availability in the next season leaning mainly on the following lessons. First, there are various varieties of FAG rice that farmers have been told about and they are ready to accept them. Second, the yield rates of FAG and course rice are almost the same. In the event that coarse rice has a yield advantage, FAG rice holds the price advantage by a big margin (market price is two to two and half times alternative rice). Third, FAG rice could be an important source of cash needs of farmers where cash crops are difficult to grow.

Attempts by APEX

In greater Rajshahi district, another NGO called APEX has also been involved in inducing farmers to grow fine and aromatic rice. Following PETRRA-perspectives, it has selected some resource-poor farmers. The sample farmers tested BRRI dhan37 and BRRI dhan38 in their small parcels of land. The farmers informed us that growing fine and aromatic (FA) rice has benefited them. Some of them had already explored the demand in the local market. A private miller named Raj Automatic Rice Mill is reported to have decided to buy FA rice from the poor farmers at a price higher by Tk. 10 per maund. Besides, the sample farmers also informed me that more farmers expressed their desire to grow FA rice. BRRI dhan37 especially is being

considered better than *kataribhog* in terms of yield and fineness. Some poor farmers who grew FA rice informed me that they bought goat and calves by selling FA rice.

It appeared to me that in both Sylhet and Rajshahi zones, poor farmers welcomed FAG rice as a source of cash resources for buying cash-intensive inputs for *boro* crops. Again, the opportunity costs of cultivating FAG rice are reported to be lower than other varieties of rice and more importantly, the yield disadvantage is more than compensated for by the price advantage that FAG rice has. The observations are borne out by the fact that all of them targeted to increase the area under FAG rice in the ensuing seasons by a respectable margin.

FAG and the fog

However, wishes are not horses. Noticeably, there are a few fogs before the FAG rice. First, there is a knowledge gap among the rank and file. Policy makers, producers and purchasers tend to know little about the economics of FAG rice. Some call it rich but risky rice. Second, milling is a major problem. Traditional mills account for a sizeable portion of the system loss for FAG rice and hence special mills for FAG rice are needed. Second, marketing channels are at the nascent stage. The marketing networks that we come across are created to cater for the needs of coarse rice. Third, poor farmers can sell their coarse rice throughout the year and thus can take care of the cash needs whenever necessary. But FAG rice can be sold only during festivals. Again, FA rice is being bought in bulk by a few traders; so much so, that small sellers have no berth in the business. And finally, there is lack of publicity about the quality and price of FAG rice in the international market.

Policy for promotion

The government has to take into cognisance the importance of FAG rice in the economic uplift of poor farmers as well as in earning or saving foreign exchange. To this effect, the following policy options could be taken on board to increase the supply of FAG rice. First, various varieties of FAG rice should be made available to farmers through extension networks. Special attention needs to be given to areas where the opportunity costs of growing such rice is either zero or low. Mapping cropping patterns in different areas could easily do that. Second, at the initial stage, the government should invest in buying mills or help the private sector with credit to establish mills. Third, the government should subsidise farmers and traders – for a period of time to come – for exporting FAG in the international market. It may be mentioned here that in India, rice exports are subsidised. Fourth, to start with, contract growers should be identified and special preference should be given to poor farmers.

Concluding remarks

Quite contrary to the common notions, fine and aromatic rice has a growing market in the economy. Our presumption is that given proper incentives, Bangladesh could also capture a portion of the international market for *bashmati* rice or at least substitute imports of fine and aromatic rice through domestic production. That could save a portion of our hard earned foreign exchange. But to that effect, we would require, inter alia, technology, training, milling and marketing facilities and on occasions, cash incentives. However, we suggest that more research be carried out on rich rice before embarking on the growth of FAG rice. Perhaps, IRRI and our prestigious national organisation, BRRI could come forward in this regard.

Suggested citation:

Bayes, A. 2007. Research for rich rice. Reprinted from The Daily Star, July 30, 2003. In: Magor, N. P., Salahuddin, A., Haque, M., Biswas, T. K. and Bannerman, M., editors. PETRRA – an experiment in pro-poor agricultural research. Newspaper reprint no. 4.4. Dhaka (Bangladesh): Poverty Elimination Through Rice Research Assistance Project, International Rice Research Institute. 4 p.

What they need is new knowledge

Abdul Bayes

REPRINT

The Daily Star
July 22, 2003

Allow me to talk about two federations of farmers. One lies in Tushvandar union of Lalmonirhat district called Tushvandar Federation of Farmers (TFF) and the other, in Mohendranagar union under the same district and is named as Mohendranagar Federation of Farmers (MFF). Both the locations are 1 to 2 hours drive from Rangpur. Farmers' cooperatives or federations are not a new phenomena in this part of the world and hence should not inject any interest, whatsoever. The reason I wanted to visit was to see the client composition of the federations' committees. The members are drawn exclusively from households owning up to 100 decimals of land, called functionally landless and marginal households. It means, by and large, the federations that I am referring to are of the poor, by the poor and for the poor. In other words, these are not associations of the 'haves' but of the 'have-nots'. Quite in contrast to some of the federations and cooperatives that we come across; the federations seemingly have higher levels of homogeneity. I was told that roughly one-third of the members are drawn from functionally landless groups (owning up to 50 decimals), one-third from marginal farm groups (owning 50 to 100 decimals) and 40% member households have only homesteads. The federations average 350 members with women having due representations.

To become a member of the federation, the farmer groups have to be associated for at least five years with Rangpur Dinajpur Rural Service (RDRS). They should display some degree of social awareness, ability to absorb training inputs and eke out a substantial part of the livelihood from farming activities. And admittedly, RDRS acts from behind the scene as a 'friend, philosopher and guide' for the federations. An elected committee through direct franchise is running the federations. Women have reserved seats to be contested by women only but voted by both men and women. They can also, if they wish, contest in the open seats against their counter parts and some of them already established their supremacy on that count.

Both the federations came into being in 1992 and at the moment own, on average, 50 decimals of land. Meantime, semi-*pucca* office-cum-training sheds, *pucca* seed godowns, drying facilities, rice mill and dryers have been made available on the premises of the federations. However, much of the infrastructural facilities have been financed by RDRS, possibly, to be recouped in due time.

The federations have been fighting for the economic uplift of their members fraught with financial crisis. By the time I reached there to talk about their hopes and aspirations, the members had learnt that credit is not the panacea to move out of pervasive poverty. *"Credit does help at the initial stage to buy a few bullocks, poultry birds etc. but to keep going for ever, you need something else"*, some male and female members said

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with some confidence. I pretended to be ignorant of the subject and asked, *"What is that 'something else'"?* One female member explained: *"We never used the credit for agricultural production because we thought, given limited land and knowledge that we had before, agriculture would not be profitable for us. Vagaries of nature was another constraint. So, we banked on non-agricultural pursuits by utilising credit from RDRS. But, now we know that even 50 decimals of land can work like 100 decimals or so if we can apply knowledge about production practices. Second, we realised that we can produce our own food at no higher costs on our own land and buy non-food items through income generation in the non-farm sector. So, we told our husbands that we should directly help them in cultivation of crops so that they have two hands to reap harvests. Of course, still we need credit but, perhaps, not so much as we need knowledge".*

"But you have not attended schools, colleges or universities. How can you gain knowledge and apply them for your uplift?", I asked. *"Yes, it is true that we are not 'moha shikhak' (meaning university professor) like you, but the poor like us do not need to be 'moha biggani' (big scientists) to survive. We need to know what to grow, how to grow it and when to grow it in the fields. That's enough to put us on an even keel. Farms are our best friends and, perhaps, for ever. We never knew what farms could do for us. Now, with these three things i.e., what, how and when to do it, we do not need schools, colleges and universities to teach us. You see, recently, PETRRA-RDRS sponsored by IRRI-DFID, gave us some training on how to keep seeds and plant seedlings. We have been keeping seeds but not the way they told us. We found that seed health is as good as human health. You see, we had no idea about seedlings maintaining distances or using one or two instead of five or more to get more output. We sowed, as we liked. But now, we feel the difference. There are many varieties of paddy we never heard of although they are high yielding and produced by our institutions like BRRI. Thus whether, water or pest management, or crop diversification, we learnt from the schools at our homesteads and fields rather than from 'moha shikhaks'",* the participants told me. I was informed that these poor farmers get together in the field to exchange views about problems and prospects. They call it 'field schools'.

"What are the federations doing for you?" They talked of some services that are provided by the federations. For example, long before the food for education (FFE) scheme got under way, the federations pursued a moral persuasion programme to bring back children to schools. In fact, MFF made frantic efforts and succeeded to a large extent. It was in fact a chiming challenge in an area where children are considered as 'assets' for households in generating income in a regime of pervasive poverty. Second, the federations are reported to fight against assault on women and children and against dowry. They hold processions, raise concerted voice and approach administration against any menace, whatsoever. The family feuds of the poor families are settled through the federations. Likewise, the federations are also carrying out health, nutrition and sanitation programmes. The MFF has plans to perform during its tenure. Hanging on the wall, posters indicated plans of creating voters' consciousness, giving *khas* lands to members, fish culture, etc.

More importantly, some members of the federations have become sellers of seeds. The federations buy seeds from farmers when they need cash and store them for the future. That reduced their dependency on Bangladesh Agricultural Development Corporation (BADC). Yield of paddy almost doubled due to new knowledge and ideas imparted through informal channels. *"We are now more educated and united than before",* they claimed.

An important aspect here is the involvement of 13 students from the Bangladesh Agricultural University (BAU) who completed 13 Masters dissertations

working with the farmers of the federations. In fact, a trio of training took place here: poor farmers, trainers and students.

Srimoti Bulbuli Rani (45) of MFF claimed to me to have lifted her household above the poverty line. She is a member of the executive committee of MFF. Just a decade back, she lived in a thatched house, owned only homestead land and could hardly manage three meals a day for the family. Very enterprising as she is, her training on tailoring paid her good dividends. She now trains females and draws Tk. 6,000 a month. On the agricultural front, she rented in some land to grow crops. *"I did not know that I could broadcast seeds in muddy fields. I always thought that I needed to transplant them. Now, new knowledge gained through training brought good results for me. I am trying to grow hybrid rice on 25 decimals and am growing BRRI dhan28, BRRI dhan39",* Bulbuli Rani expressed. I went to Bulbuli Rani's house nearby. Unfortunately she was not at home but her husband waited to welcome me. I found two tin sheds and one shallow tubewell that the household owns. The children are going to schools and colleges. Meantime, she bought back a few parcels of land adjacent to the household, which were mortgaged earlier. *"Rani does most of the work. I only support her",* said Rani's husband who has been living in Rani's village as *ghor jamai.*

Jamila Begum (40) of MFF requires 2.5 kg of rice everyday to feed a family of five. She owns 75 decimals and rents in another 54 decimals on a 50:50 share cropping arrangement in the *aman* season. But in the *boro* season, provided the owner bears no costs, the share is 2:1. Jamila told me: "*buddhir obave ami gorib chhilam*" (I was poor due to the lack of intelligence). Noticeably, she did not mention about the lack of land! Imbibed by training, she has been cultivating mustard, potato and vegetables on her owned land. This time, tempted by the training on agriculture especially paddy cultivation, she decided to go for paddy production on rented in land. In 54 decimals she got 30 *maunds* compared to 20 *maunds* historically observed with old technology and techniques of production. Good seed, line sowing and economising on seedlings, irrigation and fertiliser application resulted in increased output.

Ismail Hossain (40) of TFF read up to class V but has to shoulder a family of six. The new ideas from the training on agriculture brought him back to agriculture that he ignored once. He established a nursery that provides half of the household income. Vegetable production, reportedly, provides 20% and increased food production (including sales of seeds), 20% of the income. His household no longer faces a food deficit.

Amjad Hossain came with his wife Latifa Begum. Three years ago, they lived in a thatched house. Now they live in tin shed. Both of them are involved in vegetable production, for home consumption in the past, but now for the markets. Two years ago, they harvested 50 *maunds* but now 80 *maunds* of paddy from the parcels of plots.

While I was meeting the moderate-poor, a group of ultra- or extreme-poor women assembled in the training hall of TFF. I was told that they were called in for training on food for work (FFW) programmes. The training pertains to some basics on social awareness. With permission from the organisers, I went to meet them. There were 30 women most of whom had no homestead land. They live on others' homestead land. Many of them lost their homestead land due to riverbank erosion. Half of them are either separated or divorced and most of them come from areas prone to river erosion. They cannot feed their families – at least two meals a day due to the lack of purchasing power.

The contrast appeared quite clear to me. The moderate-poor that I met are taken care of by the non-governmental organisations (NGOs) and other government organisations. Through various training and credit progarmmes, most of the moderate-poor were enabled to uplift themselves. To meet the Millennium Development Goals (MDGs), we need to take account of the ultra-poor that stand with no chance of graduation. I hope that innovative ideas, institutions and researchers will address the problems of the ultra-poor. I could glean from their faces, they are no less smart than the group I met just a few seconds before. What they need is some land and some knowledge. The vast tracts of *khas* lands could be allocated to them. In fact, the last Awami League government made modest attempts at that by giving this group land and a house. Give them some land and provide land-based training. That would, possibly, work to see them above the poverty line.

Suggested citation:

Bayes, A. 2007. What they need is new knowledge. Reprinted from The Daily Star, July 22, 2003. In: Magor, N. P., Salahuddin, A., Haque, M., Biswas, T. K. and Bannerman, M., editors. PETRRA – an experiment in pro-poor agricultural research. Newspaper reprint no. 4.5. Dhaka (Bangladesh): Poverty Elimination Through Rice Research Assistance Project, International Rice Research Institute. 4 p.

The ladies with the lamps

Abdul Bayes

REPRINT

The Daily Star
July 17, 2003

It was about eleven in the morning when I reached Shibpur village under Pirganj upazila of Thakurgaon district. My only aim was to meet some female farmers who were reported to be recently trained in agricultural production practices by the Poverty Elimination Through Rice Research Assistance (PETRRA) project under the aegis of International Rice Research Institute (IRRI) and the Department for International Development (DFID). The sponsors call it integrated crop management (ICM) training and, intentionally, imparted it to the resource-poor females so that they could add some value to the process of production of their households. *En passant*, in the context of Bangladesh, female farmers mostly go to mean those involved in post harvest activities at the household levels. I also had that notion in my mind and hence, mentally prepared myself to throw some questions on that score. However, while waiting in front of the house of poor Urubala, I sensed that all whispers were hovering around one Khuku Moni (35) who was yet to appear before us. I reckoned that she must have been the leader of the ladies in the group of ten formed by the Rangpur Dinajpur Rural Service (RDRS), a non-governmental organisation (NGO) and a longtime friend of the poor in that region. Mentionably, RDRS is a partner of the PETRRA project.

Females in fields

"Where is Khuku Moni?", I asked the resource-poor female farmers who had courteously come to see me. *"She is in the paddy field planting 'aman' crop as a wage labour",* I was told. Soon she arrived with a smiling face and informed me that, in addition to working in her own plots (with her husband), she also works on others' land as daily wage labourer. The wage rate is Tk. 40 plus a meal. Reportedly, she works for 4 to 5 months as an agricultural wage labourer starting from planting to harvesting. In fact, Khuku Moni has no other option but to work hard both inside and outside the house as she is forced to feed a family of seven. She can only sign her name and her household owns 50 decimals of land. The household also rents out some land to raise farm output. I was told, this applies to half of the group members that Khuku Moni seemingly leads to move up the economic ladder.

Powerful knowledge

Knowledge is power but, perhaps, all knowledge is not equally powerful as far as earning bread and butter is concerned. The female farmers that I was faced with were trained for a few days and then left to upgrade themselves. Every month, they gather to gain additional insights on farm practices through a participatory path. They discuss their problems, try to find solutions and in the event of a failure, seek suggestions from RDRS.

"What have you learnt about farming?", I

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posed to the resource-poor participants after explaining to them the purpose of my visit. *"We learnt a lot. First, traditionally for ages, we used to grow only two crops in 'aman' and 'boro' seasons. In between, the lands were kept fallow. Now, we grow three crops with mustard in the middle. Second, we now use one or two seedlings – compared to five or more before – to see that output is not affected at all. We had the wrong idea that more seedlings mean more output. That means, more lands are now being covered with the same amount of seedlings. It saves money. Third, we did not know that growing 'dhaincha' gives green fertiliser. We do it now and save huge costs on urea. Fourth, we cultivate 'mug dal' as an additional crop to help raise the fertility of the land. Fifth, there are 41 varieties of paddy in our country but we only heard of two or three and they are low yielding. BRRI dhan29, BRRI dhan39, BRRI dhan33 are high yielding but were beyond our imagination. Sixth, we used to waste a lot of irrigation water through seepage. Now, we know how to water the fields through canals to save water. Recently, we have been using pipes to save more water. Seventh, we used to grow vegetables just to meet household needs. But the training on ICM showed how to reap better harvests, especially high yielding potatoes. Vegetables are now grown for commercial purposes also. Last, but not the least, we have been trained in seed growing, preservation and seedbeds. All these experiences we gained through training from PETRRA-RDRS",* the female farmers narrated to me in the same breath.

Penny to the rich, pound to the poor

Khuku Moni came to quantify some of the benefits of the ICM training. The gains might sound a penny to the rich but appears as a pound to the poor like the 'ladies with the lamps' that I met in Shibpur village of Pirganj. Just two years back, Khuku Moni used to grow *boro* paddy by borrowing money from village *mohajans*. Since modern varieties of rice need fertiliser, water and involve other costs which amount to a sizeable margin, it was not possible for her poor household to meet the cash requirement from her own resources. Therefore, in the *boro* season, her household had to borrow, Tk. 2,500 or so to be paid in 90 days. The principal and the interest rate amount thereupon totaled Tk. 3,750! Gone are those days. She now cultivates an additional crop, Mustard, in between *aman* and *boro* instead of keeping the land fallow. Last season, she cropped mustard in 9 decimals of land and reaped 2.5 *maunds* of output valued at Tk. 1,800-2,000. *"Mustard is not a very water and fertiliser intensive crop. So, by growing and selling it, I have been feeding resources for the 'boro' crop. Now-a-days I do not need the money from 'mohajans' at an exorbitant rate of interest",* a proud Moni told me. Her 'comrades' only confirmed the contentions of their leader.

The poor and paddy

Urubala's son was also sitting there. He told me that his mother regularly conveyed the tone of the training to him. *"My mother cannot keep in mind everything all the time. So I come to her help through implementation of her wishes",* Urubala's son submitted. He informed me that in his 3 *bigha* plot (90 decimals), he got 45 *maunds* of paddy this year just because of systematic and cost saving farm practices. In the past, the same amount of land brought forth only 27 *maunds*. As I could understand, for every resource-poor person in the village, paddy output more than doubled per unit of land. In other words, their land endowments also doubled in one sense. In a regime of pervasive poverty, such a rise in rice output is really remarkable. Thanks to two 'Ts': technology and training.

Khuku Moni, Urubala, Kironbala, Josna, Shefali and others who gathered before me also depicted their developments on food security. *"I always faced a food deficit of six months or so. That meant either I had to borrow money to buy rice or borrow rice to pay at a later time. In any sense, it was not dignifying.*

Now I know, how to get good crops in a cost effective manner. Costs are saved and at the same time outputs are raised. I now have a little surplus to sell in the market. The sons and daughters are in schools. They are fed and clothed better than in the past", Khuku Moni continued to confirm her comfortable present conditions. Urubala's son joined in the joy with the news that his family can now meet a whole year's food need plus save Tk. 2,000-4,000 by selling the surplus.

The spillover effects of their training were also on the discourse. Some villagers already requested for BRRI dhan31, BRRI dhan30. Their relatives from far and wide have become fond of their farm practices. The most important spillover effect has been in terms of growing an additional crop, growing *dhaincha* or *mug dal* immediately after the harvest of wheat.

Rose smells the same

From Shibpur, I went to Uttar Shibpur that lies few kilometers from Shibpur. There I met seven female farmers. The utterances and the upshots were almost the same. Per acre yield increased by a big margin due to the development of ideas on cropping patterns, new varieties, seed management at household levels, water and fertiliser application etc. Asiran Begum (55) said: *"In the past, we needed 3 litres of diesel for watering one 'bigha' of land. Now, 2 litres. By adopting a canal and pipe system in irrigation, we have saved water and hence diesel cost by Tk. 22 per 'bigha'. This meagre amount matters most for us".* The participants reported that, over the years, they improved upon their housing, children's education and clothing, health etc. They are now able to eat more than before. Some of them also bought land or released the earlier mortgaged land.

Correlation and causation

"But that could be due to factors other than the training on crop management that you mentioned", I invoked. *"It is true that we got credit from RDRS to buy bullocks, poultry birds, set up grocery shops etc. But you see, we now get 20 maunds of paddy per 'bigha' compared to 13-14 maunds in the past. It is mainly due to our previously unknown new varieties. We now grow additional crops to raise income. That is the product of our newly gained knowledge. So, we reckon that income from growing crops increased and hence we would put ICM training at the top."* The spillover effect was brought on board: *"Ashe pasher manosh bole hamrao bichon nebo* (neighbours say we shall also take the seed)*".*

Costly credit!

During the discourse in both the villages, I wanted to know whether they would prefer a) Tk. 10,000 credit at 15% interest rate; or b) a ten-day training on such types of activities; or c) both. Surprisingly, out of the 17 female farmers from both the villages, 10 opted for (b), 2 for (a) and 5 for (c). The proponents of (b) held that their option was not repayable but, at the same time, riskless and rewarding. The other two options were repayable at a certain date, risky and in case of an odd situation, could even turn out to be unrewarding. The supporters of (c), on the other hand, argued that knowledge without implementation is useless and the only way to implement ideas of this kind is possible through credit to the poor. The difference between a rich and a poor farmer – so they argued – is the difference in terms of resource availability during the *boro* cultivation period. The former fawns upon its own sources while the latter, on costly credit.

Ladies lit lamps

As I drove back, I found females planting *aman* seedlings in muddy fields in the scorching heat. It was surprising to see that the resource-poor females along with their male counterparts were sweating under the sun for a sustainable livelihood

through upgrading their skills and expanding their frontier of knowledge. I take my hat off to the 'informal professors' that I met in those two villages. I am told that a lot of such ladies are being trained in several places in agricultural practices. Let ladies like them carry the lamps all over Bangladesh. To this effect, what they need is new knowledge, new ideas and new technology.

Epilogue

"What would you expect from your politicians?", I asked the female farmers. Some of them talked about training, some about education and some about housing and health etc. But sitting at the corner was sweet and shy Shanaz (19) who wanted stoppage of the *hartal*. I was taken aback by the answer and asked: *"Why? How come you are affected by 'hartals' living in a remote village of Pirganj?"*, Shanaz covered her smiling face with her *sari* amidst laughter from others. An old lady later explained to me that due to the last *hartal*, her newly married groom could not come from Chittagong.

'Necessity is the mother of invention', I uttered in my mind. It is true for Shanaz, for the females that I met and perhaps for all of us.

Suggested citation:

Bayes, A. 2007. The ladies with the lamps. Reprinted from The Daily Star, July 17, 2003. In: Magor, N. P., Salahuddin, A., Haque, M., Biswas, T. K. and Bannerman, M., editors. PETRRA – an experiment in pro-poor agricultural research. Newspaper reprint no. 4.6. Dhaka (Bangladesh): Poverty Elimination Through Rice Research Assistance Project, International Rice Research Institute. 4 p.

Tales of the tail-enders

Abdul Bayes

REPRINT

The Daily Star
July 08, 2003

In the context of rural Bangladesh, generally, females are expected to feed family first and themselves last. They are supposed to go to sleep late but rise early. The males mostly take household decisions, although females have largely to look after the activities. Working outside the homestead boundary is almost banned for them. By and large, females are, regrettably, tail-enders in the realm of rural realities in Bangladesh. Such treatment of females, and the traditions growing around them, trace back to time immemorial.

But things seem to have been changing, albeit at a slower pace, over the years. The last decade, especially witnessed the development of females on different fronts. Females in rural areas are now reported to be in the front line in many ways. Maybe that pervasive presence of poverty propelled a change of perceptions in the whole spectrum of societal superstitions. There are, in fact, many stories in circulation where females are reported to be in the frontline of education, business, services, social work etc. For my readers, however, I shall pick up a few resource-poor females who are basically farmers – looking after both pre-and post-harvest operations of their agriculture. They seem to struggle to survive and survive to struggle but never surrender. However, first, a few words on the resource-poor.

Definitional dilemma

There is perhaps, neither a dearth of data dealing with the poor and poverty, nor a dearth of definition on the poor. Economists have long been at loggerheads over detecting the attributes of the poor and their poverty levels. Consensus on this count is yet to come, but one concept is clear from all sides: the poor and poverty are multi-dimensional aspects, not to be left to the domain of income or any other single criterion of causation. Therefore, the definition of the resource-poor that we shall use in subsequent submissions could, possibly, produce a storm in a teacup. But let us see the justification behind the definition.

PETRRA's poor

The Poverty Elimination Through Rice Research Assistance (PETRRA) project of IRRI adopted the concept of 'resource-poor farmers' (RPFs) in their project paraphernalia. One could cast serious doubt as to whether poverty of a segment of population can be eliminated even after deploying all the arms in the armoury, not to speak of rice research alone. But one could equally agree with the view that poverty could be curtailed by a respectable margin only through rice research. Anyway, the resource-poor farmers of PETRRA-led projects are supposed to have several features. First, farming should be their main source of income and employment. Second, they cultivate a meagre amount of land – 100 decimals or so. This could be either own

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land, others' land or a combination of both. Third, they tend to generate additional income by working for 100 days per year or so on others' land. And finally, they have provisions for rice from their own farms for 6-7 months of the year.

Quite understandably, PETRRA's poor are not extreme-poor. With the endowments of land and labour, they would have at best fulfilled the 2,200-calorie needs of the household members and can be described as 'moderate-poor'. They are poor because of limited resources and not because of a lack of it which applies for the extreme-poor. However, such poor are always on the fringe of a fall and once fallen, could swell the ranks of the extreme-poor. PETRRA's purpose is to arrest the fall of today's moderate-poor or the rise of tomorrow's poor.

Arguably, that could occur if the RPFs could utilise their land optimally by devoting the full potential of male and female members of the households and by using the most cost-effective means of managing resources – at their disposal – for increased output. Since rice accounts for three-fourths of their calorie intake, a lion's share of employment and two-thirds of household budgets; then it would seem any attempt to raise the productivity of tiny rice lands would be tantamount to a titanic outcome. Unfortunately, in the past, the RPFs have hardly been addressed by the non-governmental organisations (NGOs), governmental interventions or even by researchers. All roads led to either the 'haves' (large, medium) or the 'have-nots' (landless or functionally landless) with little focus on those lying in between. Their proportion as farmers is reportedly rising. I reckon that they would even become the soldiers of the future self-sufficiency in rice in Bangladesh.

Ipso facto, targeting them is a timely concern. The objectives should be to provide them with information, knowledge and technology that they can easily sail in to survive, given their resource endowments. For example, we can provide them with a) foundation seeds to grow more seeds to exchange with other farmers; b) training with regard to rouging and preservation techniques of seeds in the wake of a 15%-20% loss of output from sick or bad seeds; c) training in the uses of balanced fertiliser in the face of their preoccupation with urea only and losing fertility of soil and hence output; and d) introducing the economics of growing FAG – fine, aromatic and glutinous – rice that has higher income elasticity of demand and better chances of export. Admittedly, the prices of these rice varieties are two to three times the rice they are growing at almost the same cost and with the same care.

Lady with the land

Very recently, I met 16 resource-poor females, engaged in and enlightened by the various projects of PETRRA-partners in the village of Krishnanagar. The training in farm seeds, modern varieties (MVs), input management, and others are led by Agricultural Advisory Society (AAS) in this village, both for males and females. The village is almost half way between Dhaka and Sreemangal, Sylhet. It has a population of 2,000 and households of 200 or so (imagine the density!). Half of the households are landless with only homestead land, and half also are pure tenants. So, the features of the village, possibly, justify the name 'Krishnanagar', a place under the dark.

I was curious to talk to Masuda Begum (45), Ayesha Begum (40) and Minara Akhter (30) as I was told that they are female farmers. In our rural areas, females mostly carry out post harvest operations but these three females have been at the forefront of the agricultural operations of

their households. Thus, they are engaged in seed-to-seed activities i.e., growing seeds to harvesting seeds. Reportedly, they roam around their rice plots to see that things move as per prescriptions. All of them know about soil conditions and types, crops to be grown in different plots, hiring labour and other inputs etc. During planting time, they are reported to sit in the aisle to see for themselves that proper distances are maintained between plants and rows – the teaching they received from training. During the last *boro* season, Masuda Begum and her husband harvested the whole crop of their 28 decimal plot. Masuda also carried the harvests home. *"Otherwise I would have to pay Tk. 700-800 for contracting out"*, she told me. Ayesha appeared more agile, active and energetic. Minara appeared relatively shy but sagacious. According to the villagers, the ladies who got training in agricultural operations, especially these three front liners, are doing extremely well. *"You need not have to have sons if you have daughters like them"*, a wealthy villager who praised their efforts towards uplift, told me. That does not, however, mean that their males have no role to play. *"They reportedly play a minor role"*, some of the females who were present during the dialogue said to me.

Of course, I could detect the degree of their developing dominance from a simple question: who is your household head? Masuda looked at her husband sitting nearby, smiled and said, *"Actually my husband. But I do the most work for the family and hence you can say both of us are household heads!"*, Ayesha and Minara expressed the same sentiment.

The females that I met there informed me that their economic conditions have been improving over the years. I presumed that the Dhaka-Sylhet highway passing by the village and the operations of some NGOs could have contributed to that on the non-farm side. The PETRRA-partners seemingly signaled an option from the agricultural side where they could manage their own food provisions from growing more rice from the same amount of land. All of them agreed that preservation of seeds, growing MVs, use of balanced fertiliser etc. are the technologies that would suit them. The only problem was that they were not aware of these and especially if available, these were for males only. The females in Krishnanagar village gave me the impression that females could be equally good farmers – if not better – than the males. According to them, the new techniques of seed preservation, growing MVs and resource management increased the yield of rice almost two times!

Poor and puzzle

On the last leg of our long discussions, I put before all of the 16 females a puzzle: *"Mention three (as per importance) things that you would expect your 'pro-poor' politicians to do for you"*. I observed that 10 of them mentioned seed first, saplings second and education (primary) third. Four of them noted saplings first, training second and seed third. And finally two of them mentioned, in order of priority, help for housing, goat/bullock, education.

Notice, first, that although called poor, none of them expected any relief or dole from their 'dear' political leaders. Second, none of them expected consumption items e.g., cash help, clothing, wheat or rice etc. Finally, all of them expected investment items from their leaders. Surely, seed, saplings and education, if properly provided, could go a long way in alleviating their poverty and generating future income. Among them, Ayesha said to me: *"Ekjone bish khaile ekjone morey, kintu ekjone beej khaile ghorer shobai moray"* (drinking poison kills one but eating up seeds as food, kills everyone in the house).

However, the puzzle that I threw to them bounced back to me. I wondered how these resource-poor females could be so rich in perceptions about the future stream of benefits and costs of seed, saplings and education. I presume the NGOs working there might have caused some influence and the electronic media, some impact. But the most important cause could be the Chaynovian hypothesis of subsistence pressures.

Driving back to Sreemangal, I was recollecting their responses. The road was patchy and bumpy. Economic development – said a famous economist – is a treacherous road. I hoped the females that I met would be able to overcome their barriers and have smooth sailing. There seems light at the end of the tunnel.

Suggested citation:

Bayes, A. 2007. Tales of the tail-enders. Reprinted from The Daily Star, July 8, 2003. In: Magor, N. P., Salahuddin, A., Haque, M., Biswas, T. K. and Bannerman, M., editors. PETRRA – an experiment in pro-poor agricultural research. Newspaper reprint no. 4.7. Dhaka (Bangladesh): Poverty Elimination Through Rice Research Assistance Project, International Rice Research Institute. 4 p.

As they sow, so they reap

Abdul Bayes

REPRINT

The Daily Star
July 01, 2003

The village is called Varaura – 2 km. west of Sreemangal. Mr. Abdul Hamid (78) of the village told me that the word 'Varaura' comes from *vara* meaning a vast container – made of bamboo canes – to store paddy. The height of a container could stretch up from the floor to the ceiling. The old but still active pure tenant told me that, in the past Varuara was very much a rice village. But growing urbanisation and development of road communication robbed Varuara of its rich rice heritage. In this Hindu dominated village, half of the households are reported to be pure tenants, one-third owner-tenants and the rest, owner-cultivators. The average size of owned land – as reported – is 80 decimals, and family size 6. Two to three years back, the resource-poor households could hardly afford 5 months' food from their own fields.

By and large, Varaura is a poor village but, I suppose, lies in a rich location. The Dhaka-Sylhet highway passes by the side of the village and Sreemangal is 5 minutes' walk from the village. Reportedly, land lies in the hands of the businessmen and *Londonis* (settlers in London). Some of the villagers lost land when they wanted to go to London but were cheated by the middlemen. The dominant form of tenancy in the village is share cropping with traditional fifty-fifty arrangements. But unlike elsewhere in Bangladesh, the landlord does not share the costs of inputs. In that sense, Varaura village is still backward.

Old is not gold!

While modern varieties (MVs) of rice began spreading fast in Bangladesh, Varaura village continued to cling to the cultivation of traditional crops. The per acre yield of these crops are very low, say, 7-8 *maunds* per *kare* (30 decimals). Such a yield reminded me of the 1960s when my own villagers used to bring home poor harvests from local varieties. However, recently the Agricultural Advisory Society (AAS), a non-governmental organisation (NGO) working for Poverty Elimination Through Rice Research Assistance (PETRRA) project – stepped into helping resource-poor farmers (RPFs). The purpose of PETRRA is to help moderately-poor farmers or future-poor farmers with cost effective technologies to raise rice output so that they can graduate from their present position. These targeted resource-poor farmers have land endowments not exceeding 100 decimals or so, they work for others' land and can meet rice needs of 6-7 months from own sources. It is assumed that if these resource-poor could be provided with suitable technologies and some knowledge about rice cropping practices, possibly, they would rise up and not join the ranks of the poor. However, as per PETRRA-path, AAS came forward to introduce MVs like BRRI dhan28 and BRRI dhan29 to Varaura villagers. It is

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estimated that the yield rate of these crops is three times the traditional ones.

But risk-averse as they were, the resource-poor farmers of the village refused to accept an unknown, unseen and unheard of package at the initial stage. AAS then selected a sample of resource-poor farmers and provided them with seeds and fertilisers free of cost. The risks thus were shared between AAS and the target resource-poor farmers. The selected farmers grew the MVs and demonstrated the developments in the fields where, like an industrial exhibition, farmers from far and wide came to visit 'paddy stalls' of the resource-poor farmers.

Not by seed alone

Seed is the source of growing rice but could turn sour if not handled properly and judiciously. Keeping this in mind, AAS also arranged training programmes for both male and female farmers. The former were trained in rouging the fields and the latter, on preservation of seeds at the homestead. According to a farmer, his wife now shares almost half the hard labour in sustaining good seeds. Farmers have been advised on how to grow seeds from the foundation seeds that they were provided with and also how to prepare productive seedbeds. Farmers told me that, the training is paying dividends in terms of increased yield per unit of land and seeing the size of the crops grown, the villagers of Varaura have been vying for MVs. As Janab Abdul Hamid said to me: *"BRRI dhan28 and BRRI dhan29 are good for the poor because 2 'kares' of land now take care of 5 'kares'"*. Mr. Hamid wanted to indicate that what used to be grown in 5 *kares* in the past are now being grown in 2 *kares* of land. For the poor with little endowments of land, this also meant that the endowments of their lands doubled over time!

By the time I visited the village, three-fourths of farmers had already adopted MVs. No more free lunch! (There is no free lunch after all). Farmers are now ready to pay for seeds and fertilisers and other input costs to reap a harvest that had never been dreamt of. Meantime, they also learnt about the balanced doses of fertilisers and some of the farmers I met, even taught me about the impact of different types of fertilisers on rice plants. An extra benefit for them, is that the water is free and flows from the hills through narrow canals locally known as *chara*. Food supply increased and *pari passu* food availability for households also went up. The food deficit has been reduced by 2-3 months, I was told by a sample of farmers.

Good and bad luck

During my visit to the village, I talked to three young and energetic resource-poor farmers. They are Nikesh (26), Mozam (20) and Fahim (25). The average size of their owned land is estimated at 85 decimals and they were shouldering the responsibilities of feeding their respective family of seven or so. Interestingly, at the very outset, these young farmers responded to the call of AAS and embraced the risks of growing MVs in their fields. But at times risk is also rewarding. In the 2001-'02 *boro* season, Nikesh produced 6 *maunds* of seeds and stored it in the house in suitable containers. It was bad luck for Bangladesh, that a serious seed crisis broke during 2002-'03 *boro* season. At that time BADC seeds of Tk. 16 per kg. were sold at Tk. 30 per kg. on the black market. Many other organisations, allegedly, sold their seeds also at Tk. 25-30 per kg. Seemingly there was no light at the end of the tunnel for the resource-poor farmers of Varaura. But the bane became a boon for Nikesh and his friend Fahim. Nikesh sold out 5.5 *maunds* of seeds at Tk. 600 per *maund* and reaped home a rich return. His friend Fahim also sold 3 *maunds*. The buyers were from their own village and

from far and wide. The crisis reminded the said villagers to be cautious as far as seed is concerned. Now they keep seeds with due care and do not sell them unless driven by dire distress. The farmers of Varaura and especially the resource-poor have learnt a lot about seed – growing and preservation. Of course, a sudden flood or heavy monsoon could create problems for them. But since the fluctuations in yields narrowed down substantially, any shock of that kind may cripple them for a while but, perhaps, not kill them – the sample farmers said to me. The technologies and the techniques of production became the saviour of the poor in Varaura village.

Promising poor

According to T. W. Schultz, the Nobel Laureate in economics: small farmers are very rational and efficient. They try to maximise the objective function subject to the endowments of resources, knowledge and technology. An expansion of the frontier of knowledge through training, extension and at times by the provision of subsidy could enhance their production possibility frontier. The earlier position of clinging to age-old cultivation by the Varaura farmers was perhaps the product of those factors. Meantime, new knowledge and technology have expanded their frontier. This valuable message seems to have been given by the villagers of Varaura.

As they sow, so they reap. Allow me to add: as they see, so they sow.

Suggested citation:

Bayes, A. 2007. As they sow, so they reap. Reprinted from The Daily Star, July 1, 2003. In: Magor, N. P., Salahuddin, A., Haque, M., Biswas T. K. and Bannerman, M., editors. PETRRA – an experiment in pro-poor agricultural research. Newspaper reprint no. 4.8. Dhaka (Bangladesh): Poverty Elimination Through Rice Research Assistance Project, International Rice Research Institute. 4 p.

Seed for survival

Abdul Bayes

REPRINT

The Daily Star
June 25, 2003

As you sow, so you reap – runs an adage from ancient times. Seed is the source of all crops, including rice. In Bangladesh, rice is the staple food accounting for more than three-fourths of the calorie intake of population lying at the lower end of the income scale. Rice cultivation occupies three-fourths of the cultivable land and is mainly an occupation of the poor. The development of seed is thus a determinant of the fate of the 'ill-fated' farmers. But seeds per se do not seem to support survival. They do however, impact upon improvements in livelihoods. What farmers need is good seed for a good yield. The relationship is like that of a healthy mother and a healthy child. Healthy seeds mean healthy harvests. The correlation is confirmed on an empirical plane. But sordidly, seeds always remained on the sideline in the realm of discussion on rice research. Scientists and farmers have long been harping on varietal developments and improvements without paying due attention to the preservation and promotion of good seeds. Perhaps, the necessity of growing more rice at that time knew no law!

Expensive evasions

Such an evasion of emphasis appeared expensive. However, the damage due to 'sick' seeds sown has never been quantified, nor could they be quantified in the presence of a paucity of data. We can however glean information from a report on seed health and its consequent costs. *"..BRRI estimate a national yield loss due to all diseases of 10%-15% of which it is further estimated that two-thirds are fungal, giving a yield loss of 6%-10%. The technical advice is that perhaps 20% of these losses is estimated to originate from seed borne inoculum, implying that 1.2% to 2% of the total rice crop is lost... . This is likely to be a conservative estimate; experimental use of clean seed in farmers' fields in the Philippines has given yield improvement of 5%-20%... .*

Assuming also conservatively, that the rice crop averages 18 metric tons per annum, these losses translate into 2,16,000 to 3,60,000 tons forgone availability annually due to diseases... .

At the current farmgate price (i.e., 1999), this equates to Tk. 1.3 to 2.2 billion (18 to 31 million pound sterling) per annum which indicates that the economic problem is on a scale worth tackling."

Pains of the poor

The loss of yield on account of seed quality falls heavily on the poor farmers. The marginal disutility of parting with a loss in production is different for different land size groups. The larger ones can possibly afford the loss since it would not stand in the way of their survival. But in the case of poor farmers – who hardly own one acre or so of land and have a big family to feed, such a loss could throw them down the poverty line. Therefore, the marginal benefit of regained yield through seed improvement could be large and lucrative for the small as opposed to the large.

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PETRRA and the poor

With the above-mentioned premises in mind, the Poverty Elimination Through Rice Research Assistance (PETRRA) project of IRRI initiated a project called seed health improvement project (SHIP). For the villages I visited research by the formal scientists of BRRI and other organisations on seeds are passed on to the informal scientists – the farmers, through Bangladesh Rural Advancement Committee (BRAC). The project is participatory in nature in the sense that farmers sit with scientists and exchange experiences. The resource-poor farmers, as PETRRA calls them, are selected on the basis of the following features: a) households owning not more than one acre of land; b) households' supply of rice from own fields does not exceed seven months requirement; and c) they spend 100 days or so in working on others' land etc. The selected sample farmers are then trained about roguing the lands (at least thrice each unit of land) and their spouses are trained in preservation of seed – on how to sort out seeds and preserve them in proper containers.

On board the 'SHIP'

I personally visited one site of SHIP that PETRRA sponsored in which BRAC and BRRI collaborated. The selected 3 villages are located at Sutang under Habiganj Sadar thana, about 60 km. west of Sreemangal. I sat with 17 resource-poor farmers and they accounted for half of the target farmers selected for SHIP. An interesting point to note is that only five of the participants that I met were males and the rest of the male farmers were represented by their counterpart females. Indeed, the males could earn Tk. 80 to 100 per day in this busy season of *aus* planting rather than listening to a university professor of no practical use to them. But courteous as they were, they sent their spouses who seemed to be no less knowledgeable than the males that I encountered.

All of the 17 persons present were from resource-poor households with the following attributes: a) average size of owned land was 68 decimals (only 3 of them had more than 1 acre with a maximum of 1.64 acre in the case one household); b) only 6% of them were pure tenants and the rest equally divided between owner and owner-cum-tenant cultivators; c) average household income per year was reported to be Tk. 21,118 and given a family size of 6.5, the per capita income estimated was about Tk. 3,249 per year; d) most of their houses are of straw roofs; and e) most of them had provisions for rice from their own farms for 6-7 months at the beginning of their involvement with SHIP.

Learning is light

The participants in the dialogue informed me that their forefathers had no idea about seed health in terms of promotion and preservation and so they had to pay a price for that inherited ignorance. *"What is that price?"*, I asked. *"Our present poverty"*, they replied. But through their involvement in the SHIP, they have learnt a) How to clean rice fields through roguing 3 times to weed out the competing crops. Each time roguing requires 2-3 hours; b) How to sort seeds manually one by one to ensure balanced seeds; and c) how to prepare and preserve them in suitable containers that ensure seed health.

Another village that I visited was Sirajnagar under Sreemangal thana. The project is managed by the Agricultural Advisory Society (AAS). Besides, seed preservation training, AAS also supplies foundation seeds to resource-poor farmers for growing their own seeds. The resource-poor that I met there also had

the same features as mentioned before and the impact of the training was more or less the same. But for the sake of this column, I shall concentrate on SHIP as experienced from my visit to Sutang and make reference to the other, if and when needed.

Rewarding lessons

Admittedly, the sample size was small and the effects of SHIP could not be captured quantitatively. But allow me to submit some impressional improvements that I could glean from the deliberations of the resource-poor farmers that I sat and chatted with.

First, came the knowledge. Messrs Feroz Ali (80) and Abdul Bari (70) submitted that for ages, they harvested 8-10 *maunds* per *kare* (30 decimals) of rice. Since they were born, they heard about the same figures from their forefathers. But for the last four years or so and without a break, they have been harvesting 15-20 *maunds* per *kare* of rice. It means an increase of output by 50% or so. But taking the average from all, I reckoned that the rise could be around 40%-50%. Thus, knowledge pertaining to seed health led to more output for the resource-poor farmers. The same sentiment was echoed by farmers at Sirajnagar.

Second, the income of sample households increased. For example, the average income of SHIP farmers was Tk. 19,000 per year compared to 22,000 now. *Pari passu*, the per capita income also rose over the years.

Third, the increased yield enhanced food entitlements for the households. As noted before, four years ago, the sample households had 6-7 months provisions for rice from their own farms. Now nine of the 17 farmers can feed their family for 12 months from their own production. Another five have food security for 10 months. By and large, as they reported, all improved in food security. To quote Hasina (40): *"I have 7 members to feed and 5 'kares' to cultivate. Four years ago, my own production from land could meet five months' need of rice. The rest would come from borrowing or help. Now both my husband and myself are working hard with SHIP and fetching good fortunes. Now we get 100 maunds of rice from the same amount of land compared to 50 maunds before."*

Fourth, one-third of the respondents reported that they were selling rice after meeting family needs. In Sirajnagar, half of the sample respondents reported to be selling rice after meeting family needs.

Fifth, they invested in sanitary latrines, repairing houses, buying land and bullocks, turning straw-houses into tin sheds etc. Four years ago, they could hardly dream of such developments.

And finally, before being with SHIP or the farm seed project of AAS, they could hardly afford to have three rice-meals a day with two curries. Now, they have regularly three rice-meals with two curries.

Admittedly, the above mentioned impact could originate from other sources also and a decomposition of the effects are also difficult within the short span of time and in the absence of in-depth household level income and expenditure data. But the participants revealed their strong assumption that increased yield and output resulting from the improvement of seed quality and seed growing, largely helped them to be on an even keel.

Teachers and teasers

The spillover effects of SHIP and the other project also need mentioning. When the project started in 2001, the participants under SHIP were teased by fellow villagers on the plea that the exercise was just sparing a pound for a penny. This meant that they were labouring hard for no hefty gain. *"What*

else can we do to change our lot? Let's try it and see what happens in the future", the sample farmers used to tell the skeptics. But now, proudly pointed out by the participants, the skeptics approach them to teach the methods of seed promotion, preparation and preservation. Sometimes they even ask for good seeds to be exchanged for rice for consumption. The exchange takes place provided the participants have surplus seed. It was also reported that neighbouring villagers and richer sections within the village also approach them for the same reasons. One female farmer from Sirajnagar informed me that her brother from a remote village saw her seeds and requested her to supply him.

Sustainable survival?

But what will happen when the SHIP leaves the port of the participants? Will they be dropped down? In response to my questions, all of them answered 'No'. Why? *"Because, we shall teach our children and grandchildren about this cost effective technology so that they do not inherit ignorance like us and fall into the poverty trap. Even if we die, our knowledge will keep us alive to following generations",* some replied.

Rice research and the resource-poor

Rice research has rarely helped the resource-poor directly and decisively. Undoubtedly they benefited, among others, from the introduction of modern varieties or the green revolution. But rice research needs to target the resource-poor in Bangladesh since a) they are actively engaged in rice production and increasingly they are becoming a dominant group among farmers; b) they could be the victims of the vagaries of nature to join the line of the extreme-poor; and c) they are poor because they lack knowledge about the proper management of their meagre endowments. Sometimes extension services could be more powerful and offer tools of sustainability rather than merely being providers of micro-credit. The PETRRA efforts seem to point to these observations.

Epilogue

At the end of our cordial conversations at Sutang, I posed a question: *"what do you mean by poor?"* The participants were silent for a few moments till Mrs. Razia of Noagaon broke the silence and said: *"A blind or a lame person without capacity to work is poor." "But why did you enlist yourself as poor in SHIP without being blind or lame?",* I asked Razia. *"It is because you call us so. I am not poor. I have hands to work and legs to walk. Why should I be poor?",* replied Razia.

Driving back to Sreemangal and seeing farmers planting *aus* in the muddy fields, I recollected Razia's reactions. Perhaps poor, not because they are poor but because they are called poor.

Suggested citation:

Bayes, A. 2007. Seeds for survival. Reprinted from The Daily Star, June 25, 2003. In: Magor, N. P., Salahuddin, A., Haque, M., Biswas, T. K. and Bannerman, M., editors. PETRRA – an experiment in pro-poor agricultural research. Newspaper reprint no. 4.9. Dhaka (Bangladesh): Poverty Elimination Through Rice Research Assistance Project, International Rice Research Institute. 4 p.

কৃষিতে বায়োটেকনোলজি এবং বাংলাদেশ প্রেক্ষিত

(Biotechnology in agriculture in the Bangladesh context)

আবদুল বায়েস

REPRINT

মুক্ত প্রাণের প্রতিধ্বনি
ভোরের কাগজ
October 3, 2003

সম্প্রতি সেন্টার ফর পলিসি ডায়ালগ বা সিপিডি ইরি ও পেট্রা প্রকল্পের যৌথ ব্যবস্থাপনায় ব্র্যাক সেন্টারে এক সেমিনারের আয়োজন করে। সেমিনারে মূল প্রতিপাদ্য বিষয় ছিল– জীবন-প্রযুক্তি বা বায়োটেকনোলজি এবং বাংলাদেশ। মূলত বিষয়টি নিয়ে বিতর্কের অন্ত নেই, যেমন নেই বিতর্কের বিস্তৃতি এবং এর ভৌগোলিক সীমানা নিয়ে। শুধু উন্নত বিশ্বে নয়, অনুন্নত কিংবা উন্নয়নশীল বিশ্বেও বিতর্কের ঢেউ লেগেছে। বলা প্রয়োজন, কৃষিতে যাঁরা জীবন-প্রযুক্তি ব্যবহারের বিপরীতে অবস্থান নিয়েছেন, তাঁদের প্রধান যুক্তি মানবস্বাস্থ্য ও পরিবেশগত ঝুঁকি সম্পর্কিত। এবং বিশেষ করে এ ধরনের যুক্তিতর্ক সেসব উন্নত বিশ্বেই বেশি করে উত্থাপিত হচ্ছে, যেসব উন্নত দেশে খাদ্য নিরাপত্তা (food safety) খাদ্য নিরাপত্তার (food security) চেয়ে অধিকতর গ্রহণযোগ্য বিষয় বলে বিবেচিত। যা-ই হোক, আগেই উলেখ করেছি, বিতর্ক অনুন্নত বিশ্বেও চলছে এবং মানবকল্যাণে এ ধরনের বিতর্ক অভিনন্দনযোগ্য। দরিদ্র দেশগুলোয় দরিদ্র জনগোষ্ঠীর খাদ্য ও পুষ্টি নিশ্চিতকরণে অণুজীববিদ্যা বা মলকিউলার বায়োলজি কোন পরিপ্রেক্ষিতে এবং কোন পথে যথাযোগ্য অবদান রাখতে পারে, তা ভেবে দেখার যথাযথ সময় দ্বারপ্রান্তে উপস্থিত বলে আমরা মনে করি।

দুই.

উলিখিত সেমিনারটিতে দুজন আন্তর্জাতিক খ্যাতিসম্পন্ন বিজ্ঞানী সূচনা-বক্তব্য প্রদান করেন। তাঁদের একজন বাংলাদেশের কৃতী সন্তান এবং ফিলিপাইনস্থ আন্তর্জাতিক ধান গবেষণা ইনস্টিটিউট (ইরি)-র সমাজবিজ্ঞান বিভাগের প্রধান ড. মাহাবুব হোসেন। তিনি বললেন জীবন-প্রযুক্তির আর্থসামাজিক দিক নিয়ে এবং অবহিত করলেন বাংলাদেশের জীবন-প্রযুক্তির প্রাসঙ্গিকতার কথা। অন্যজন ড. স্বপন কুমার দত্ত-ও ইরি'তে কর্মরত। ইতিমধ্যে তিনি চালের মধ্যে সঞ্চারক ভিটামিনের অনুপ্রবেশ ঘটিয়ে বিশ্বজুড়ে খ্যাতি অর্জন করেছেন। তিনি বললেন, অণুজীববিদ্যার ঐতিহাসিক প্রেক্ষাপট এবং কী করে সমাজ বিবর্তনের সঙ্গে এ বিষয় সম্পর্কিত আলোচনা-সমালোচনার পরিপ্রেক্ষিতও বদলে যাচ্ছে। এই দুজন বিজ্ঞানী তাঁদের সুললিত ও তথ্যসমৃদ্ধ বক্তব্যের মাধ্যমে উপস্থিত অর্থনীতিবিদ, সমাজবিজ্ঞানী, কৃষিবিজ্ঞানী ও নীতিনির্ধারকদের জন্য উপভোগ্য কিছু বিষয় উপস্থাপন করেন। উপস্থিত সুধীজনদের কেউ যেমন বক্তব্যের পক্ষে ছিলেন, তেমনি কেউ ছিলেন জীবন-বিজ্ঞানের বিরুদ্ধে। সব মিলিয়ে প্রাণবন্ত এক সেমিনার। প্রাসঙ্গিক তো বটেই।

তিন.

আমার হাতের কাছে ইংরেজি-বাংলা যে অভিধানটি আছে সেখানে ফুড সিকিউরিটি ও ফুড সেফটির বাংলা প্রতিশব্দ প্রায় এক রকম : খাদ্য নিরাপত্তা। এই দুয়ের পার্থক্যটুকু প্রণিধানযোগ্য করে তোলার জন্য এবং শুধু আজকের আলোচনার পরিপ্রেক্ষিতে আমি প্রথমটিকে বলব 'খাদ্য নিরাপত্তা' এবং দ্বিতীয়টি 'স্বাস্থ্যসম্মত খাদ্যের নিরাপত্তা'। অনুন্নত বা উন্নয়নশীল বিশ্বের মাথাব্যথার প্রধান উৎস খাদ্য নিরাপত্তা। স্বাস্থ্যসম্মত খাদ্য নিরাপত্তার বিষয়টি আসে দ্বিতীয় ভাগে। পান করার মতো পানির যেখানে অভাব সেখানে তৃষ্ণার্ত একজন ব্যক্তির কাছে নদী, খাল কিংবা পুকুরের পানির পার্থক্য নির্ণয় করা এবং ডায়রিয়ামুক্ত, ব্যাকটেরিয়ামুক্ত পানির প্রাপ্যতার ব্যাপার একটা জ্ঞানজাগতিক বা একাডেমিক বিষয়। অন্যদিকে যেখানে পানির

DFID Department for International Development
IRRI International Rice Research Institute
Bangladesh Rice Research Institute

উৎসের অভাব নেই সেখানে ব্যাকটেরিয়ামুক্ত পানি পানের জন্য মিছিল-মিটিং অবশ্যই বাস্তবসম্মত। তাই জীববিজ্ঞানজনিত বিতর্কটি উন্নত ও অনুন্নত বিশ্বে দুটি বিপরীতমুখী ধারার দাবিদার : একজনের চিন্তা 'খাদ্য নিরাপত্তা' এবং অন্যজনের 'স্বাস্থ্যসম্মত খাদ্য নিরাপত্তা'। বিষয়টি আরেকটু খতিয়ে দেখা যাক।

চার.

দক্ষিণ এশিয়া ও সাব-সাহারা আফ্রিকার ১.২ বিলিয়ন মানুষের দৈনিক আয় এক ডলারের নিচে। বাংলাদেশি টাকায় তা ৫৯ টাকার মতো। প্রায় ৮০০ মিলিয়ন মানুষের খাদ্য নিরাপত্তা নেই। অর্থাৎ এরা ফুড ইনসিকিউর। স্কুলে যাওয়ার বয়স হয়নি এমন ১৬০ মিলিয়ন শিশু প্রচণ্ডভাবে পুষ্টিহীনতায় ভোগে এবং প্রতিবছর এ কারণে পাঁচ বছরের কমবয়সী পাঁচ মিলিয়ন বা ৫০ লাখ শিশু মৃত্যুর কোলে ঢলে পড়ে। এর চেয়েও কয়েক গুণ বেশি মানুষ আয়রন ও ভিটামিনজনিত ঘাটতির মুখোমুখি। পরিণতিতে দেখা যায়, অনুন্নত বিশ্বের জনগোষ্ঠীর একটা বড় অংশ স্বাস্থ্যগত সমস্যায় পতিত এবং মানব-সম্ভাবনাত্মক সংকটের জালে আবর্তিত। এর বিপরীতে উন্নত বিশ্বে জনসংখ্যা মোটামুটি স্থিতিশীল এবং কোথাও কোথাও জনসংখ্যা বৃদ্ধির হার নিম্নমুখী। বেশি নয়, কম জনসংখ্যাই তাদের মাথাব্যথার অন্যতম কারণ হিসেবে আবির্ভূত। সুতরাং খাদ্য উৎপাদন বৃদ্ধি তেমন কোনো পণ বা বাজি নয়। ওইসব দেশের ভোক্তাদের আয় এমন পর্যায়ে পৌঁছেছে যে, ভোগবহুমুখীকরণ তাদের জন্য তেমন কোনো সমস্যাই নয়। সুতরাং সেইসব দেশের সরকার ও জনগণের চাহিদা স্বাস্থ্যসম্মত খাদ্য, যেনতেন প্রকারে উৎপাদিত খাদ্য নয়। উন্নয়শীল বিশ্বে, যেখানে জনসংখ্যা বৃদ্ধির হার খাদ্য উৎপাদন বৃদ্ধির হারকে ছাপিয়ে যায়, সেখানে ফুড ফার্স্ট, সেফটি সেকেন্ড।

পাঁচ.

এবার দৃষ্টি দেয়া যাক দক্ষিণ এশিয়ার অন্যতম দরিদ্র দেশ বলে বিবেচিত বাংলাদেশের দিকে। যে বিষয়টি নিয়ে বিতর্কের অবকাশ খুব কম তা হলো 'সবুজ বিপব' নামে পরিচিত উচ্চ ফলনশীল (উফশী) ধানবীজের ব্যবহার এবং ক্রমবর্ধিষ্ণুভাবে খাদ্য উৎপাদনে ঊর্ধ্বগতি। আন্তর্জাতিক ধান গবেষণা ইনস্টিটিউট ও দেশীয় ধান গবেষণা ইনস্টিটিউটের যৌথ প্রয়াসে চালের উৎপাদন দ্বিগুণ হয়েছে স্বাধীনতা-পরবর্তী সময়ে। প্রধান খাদ্য চালের ক্ষেত্রে এ চিত্তাকর্ষক প্রবৃদ্ধি না ঘটলে দারিদ্র্য, খাদ্য নিরাপত্তাহীনতা ও আনুষঙ্গিক সমস্যা নিয়ে বিশ্বের দরবারে বাংলাদেশকে ভাতের থালা নিয়ে হয়তো ঘুরতে হতো এতদিন। খাদ্য উৎপাদনে ঊর্ধ্বগতি, বিশেষত ১৯৯৬-২০০১ সময়কালে চালের দাম রেখেছে নিম্নমুখী, গরিবের আয় বাড়িয়েছে এবং সার্বিকভাবে মুদ্রাস্ফীতি নিয়ন্ত্রণের বাইরে যেতে দেয়নি। প্রতিবছর যে এক শতাংশ হারে দারিদ্র্য কমেছে বলে দাবি করা হচ্ছে, তার মূল নায়ক এই উফশী ধান। বর্তমানে চাষকৃত দুই-তৃতীয়াংশ জমি আধুনিক ধান চাষের আওতাধীন, ৫৫ শতাংশ জমিতে সেচের পানির লভ্যতা নিশ্চিত। এর ফলে ১৯৬৮ সালে যখন আধুনিক ধান প্রথম প্রবেশ করে, সে সময়ের চালের উৎপাদন হেক্টরপ্রতি ১.৭ টন থেকে ২০০১-০২ সালে ৩.৫ টনে দাঁড়িয়েছে। উৎপাদনশীলতা বৃদ্ধির হার জনসংখ্যা বৃদ্ধির হার প্রায় সমান এবং ধানের উৎপাদন দ্বিগুণ হয়েছে অতিরিক্ত জমি থেকে নয়, বরং অপেক্ষাকৃত কম পরিমাণ জমি থেকে। এ সবই পুরোনো কথা, তবে নতুন করে বলার প্রেক্ষাপট উপস্থিত, তাই বলছি।

ছয়.

সুতরাং আত্মতুষ্টির একটা সুযোগ তো অবশ্যই আছে। পরিতৃপ্তি এমন পর্যায়ে পতিত হয়েছে যে, বর্তমান নীতিনির্ধারকদের কেউ কেউ স্বয়ংসম্পূর্ণতাকে আড়াল করতে চাইছেন 'সাহায্যের' জন্য। আর একদল আছেন, যারা মনে করেন বাঙালিদের ভাতের প্রয়োজন মিটে গেছে। জনসংখ্যা হ্রাস পাচ্ছে, মাথাপিছু আয় বৃদ্ধি পাচ্ছে। বাঙালি ভাত কম খাবে, বেশি খাবে শাকসবজি, মাংস-দুধ-ডিম। কাজেই চালের ওপর গুরুত্ব কম দাও। কিন্তু তারা বোধহয় জানেন না যে, জনসংখ্যা বৃদ্ধির গতি ২.২ থেকে ১.৫ শতাংশে নেমে আসার পরও প্রতিবছর ২০ লাখ লোক যোগ হচ্ছে এবং এই অতিরিক্ত মুখে ভাত দিতে গেলে প্রতিবছর খাদ্য যোগান বাড়াতে হবে ০.৫৬ মিলিয়ন টন– শুধু একই মাত্রায় মাথাপিছু চালের ভোগ রাখতে হলে। তা ছাড়া খাদ্যে স্বয়ংসম্পূর্ণতার যত জয়গানই গাই না কেন, এ কথা তো অস্বীকার করতে পারব না যে, এখনো মাঝেমধ্যেই চাল আমদানির হিড়িক পড়ে যায় এবং পরিমাণ বেড়ে

যায়। আমদানি বৃদ্ধি পাওয়ার মূল কারণগুলোর অন্যতম হচ্ছে সেই 'আত্মতুষ্টি' এবং এর ফলে খাদ্য উৎপাদন বৃদ্ধিকল্পে গুরুত্ব কম দেওয়া। বস্তুত আরও চাষযোগ্য জমি খালাস করার জন্য একরপ্রতি উৎপাদন আরও বৃদ্ধি করতে হবে। মনে রাখা প্রয়োজন, বাংলাদেশের বাস্তবতা এখন তিনটি। এক. প্রতিবছর এক শতাংশ চাষযোগ্য জমির পরিমাণ কমে যাচ্ছে। এর কারণ বহুবিধ, তবে দ্রুত নগরায়ণ, রাস্তাঘাটের জন্য প্রয়োজনীয় জমি ইত্যাদি অন্যতম গুরুত্বপূর্ণ উপাদান। দুই. জনসংখ্যা বাড়ছে, পরিবার ভাঙছে এবং এর ফলে মাথাপিছু জমির লভ্যতা কমছে। এবং তিন. খাদ্য গ্রহণে মৌলিক পরিবর্তন এসেছে। চাল ব্যতীত শাকসবজি, ডাল, মাছ ইত্যাদির চাহিদা বৃদ্ধি পাচ্ছে এবং সেহেতু এগুলোর উৎপাদনে জমি প্রয়োজন।

কিন্তু গোল বেধেছে অন্য জায়গায়। একরপ্রতি উৎপাদন বৃদ্ধির অবকাশ খুব একটা আছে বলে মনে হয় না। আধুনিক ধানের উৎপাদনক্ষমতা নব্বইয়ের দশকজুড়ে প্রায় একই মাত্রায় অবস্থান করছে। শুধু বিগত কয়েক বছরে বোরো ধানের উৎপাদনশীলতা প্রান্তিক বেড়েছে মূলত যুতসই শস্য উৎপাদন ব্যবস্থাপনার কারণে। শুষ্ক মৌসুমে তিন-চতুর্থাংশ জমিতে আধুনিক ধান চাষ করা হচ্ছে এবং এমনকি বৃষ্টি মৌসুমেও প্রায় অর্ধেক জমিতে উফশী ধানের আবাদ লক্ষ করা যায়। সুতরাং অতিরিক্ত ধান উৎপাদনের সুযোগ কোথায়।

সাত.

তাই বাংলাদেশের জন্য প্রয়োজন বিরাজমান বা প্রচলিত বৈজ্ঞানিক সম্ভাবনা ও সুযোগগুলোর সর্বাধিক সদ্ব্যবহার করা। এবং সেটা সম্ভবত সম্ভবপর, যদি আধুনিক অণুজীববিদ্যাজনিত প্রযুক্তির দিকে দৃষ্টি দেওয়া যায়। প্রতিবেশী দেশ ভারত ও চীন ইতিমধ্যে এগিয়ে গেছে এ ক্ষেত্রে এবং আমাদের সেই পথে এগোনো যায় কি না সে বিষয়ে এখনই ভাবতে শুরু করতে হবে। বাংলাদেশে পাঁচ বছরের কমবয়সী শিশুদের ৬০ শতাংশ কম ওজন নিয়ে জন্ম নেয় এবং প্রায় অর্ধেকের স্বাভাবিক বৃদ্ধি ব্যাহত। আয়রন ঘাটতির কারণে ৭০ শতাংশ গর্ভধারিণী এনিমিয়া রোগে আক্রান্ত। গ্রামবাংলায় যেখানে তিন-চতুর্থাংশ লোকের বাস– অপুষ্টিহীনতার অন্যতম কারণ অজ্ঞতা অথবা অর্থ-সংকট। ভিটামিন-এ কিংবা আয়রনের ঘাটতি দূর করার মতো ট্যাবলেট ক্রয় করার পয়সাও দরিদ্রের হাতে নেই। কাজেই যদি প্রধান খাদ্যে চালের– যেখানে দরিদ্র খায় প্রতিবছর ১৪০-১৫০ কেজি– ভেতর কিছুটা আয়রন ও ভিটামিন ঢুকিয়ে দেওয়া যায়, তবে মন্দ কী। ভাতও খাবে সঙ্গে সঙ্গে ভিটামিন ও আয়রনের ঘাটতি পূরণ হবে। ইতিমধ্যে আন্তর্জাতিক ধান গবেষণা ইনস্টিটিউট থেকে বাংলাদেশের ধান ব্রি ধান২৯-এর মধ্যে সফলতার সঙ্গে 'অস্ত্রোপচারের' মাধ্যমে সেই অসাধ্য কর্মটি করা হয়েছে বলে আমরা জানতে পারি। তবে অবশ্য আমাদের দেখতে হবে এ ধরনের রূপান্তর প্রক্রিয়া জনস্বাস্থ্য ক্ষতিগ্রস্ত করবে কি না সে বিষয়টি। আরো লক্ষ রাখতে হবে স্বাস্থ্য, পরিবেশ ও অন্যান্য পার্শ্বপ্রতিক্রিয়া বিবেচনা করে এ ধরনের রূপান্তর করা যায় কি না সে বিষয়টিও।

এমন পার্শ্বপ্রতিক্রিয়ার দু-একটা উদাহরণ দেওয়া যায় এবং ড. মাহাবুব হোসেন ও অন্যরা সে বিষয়গুলোও তুলে ধরেছেন জ্ঞানগর্ভ আলোচনায়। ১৯৯৬ সালে ব্রাজিলে সয়াবিনে অন্য 'জিন' অনুপ্রবেশ ঘটানোর ফলে মানুষের মধ্যে ব্যাপক এলার্জির জন্ম দেয়। পৃথিবীর বিভিন্ন দেশে বিভিন্ন ধরনের পরিবেশগত সমস্যা ও নৈতিকতার বিষয়টি আলেচনার মূল বিন্দুতে স্থান পেতে থাকে। সবশেষে যে যুক্তিটি ধারালো অস্ত্র হিসেবে দেখা দেয় তা হলো এই যে, কৃষিতে জীববিজ্ঞানের ব্যবহার আয় ও সম্পদবৈষম্যকে বৃদ্ধি করতে সাহায্য করে। এ ক্ষেত্রে বড় চাষিরা জীববিজ্ঞানজনিত কৌশলগুলো প্রাথমিক স্তরেই আয়ত্ত করে ক্ষুদ্র চাষিদের সঙ্গে দূরত্ব বৃদ্ধি করেন। তা ছাড়া যে কোম্পানিগুলো জীববিজ্ঞান নিয়ে মাঠে নেমেছে তাদের সংখ্যা এতই কম যে, প্রতিযোগিতার অভাবে সেখানে একচেটিয়া ব্যবসা, মুনাফা ও সরকার থেকে একচেটিয়া সুবিধা আদায়ের দরজা খুলে যায়।

আট.

কিন্তু এ ধরনের বিরূপ প্রতিক্রিয়ার কথা ষাটের ও সত্তরের দশকে আধুনিক ধান চাষ প্রবর্তিত হওয়ার প্রাক্কালেও প্রচলিত ছিল। বলা হয়েছিল, আধুনিক ধান চাষ ধনীকে ধনী করবে আর গরিবকে করবে আরও গরিব। কিছু কিছু অভিযোগ যেমন সত্য প্রমাণিত হয়েছে, তেমনি কিছু মিথ্যা প্রমাণিত হয়েছে। তবে সার্বিকভাবে আধুনিক ধান চাষের উদ্ভাবন যে বাংলাদেশের জন্য কল্যাণ বয়ে এনেছে

সে বিষয়ে কারও সন্দেহ আছে বলে মনে হয় না। আধুনিক জীবন-বিজ্ঞানের বেলায়ও সে ঘটনা ঘটতে পারে। আমরা অবশ্যই প্রযুক্তি নেব, তবে ভালোভাবে পরীক্ষা করে নেব। ইমোশনস্ যেন ইকোনমিকসকে ছাপিয়ে না যায় সে দিকটি লক্ষ রাখতে হবে, যেমন করে লক্ষ রাখতে হবে ইকোনমিকস যেন আবার ইথিকস আর এনভায়রনমেন্টকে এড়িয়ে না চলে। ধনী দেশগুলোর বাস্তবতার নিরিখে আমরা যেন আমাদের পথ হারিয়ে না ফেলি। আজ থেকে ২০ বছর পরের দৃশ্যপট কল্পনা করলে, বাংলাদেশের উচিত হবে এখন থেকেই কৃষিতে বায়োটেকনোলজি নিয়ে গবেষণা করা। এবং আমাদের জাতীয় প্রতিষ্ঠানগুলো আন্তর্জাতিক প্রতিষ্ঠানগুলোর যৌথ প্রয়াসে একটা দিকনির্দেশ দিতে পারবে বলে আমাদের বিশ্বাস। যেকোনো প্রশ্নের উত্তর খোঁজা বুদ্ধিমানের কাজ, প্রশ্নটি ছুড়ে ফেলা কোনো বুদ্ধিমানের কাজ নয়। মাথা থাকলে মাথাব্যথা থাকতেই পারে। মাথাটা কেটে ফেলে না দিয়ে ওষুধ নিলে ভালো হয় না?

নয়.

শেষ কথা। ধান কিন্তু এখনো বাংলাদেশের প্রাণ। অকৃষিজাত কর্মকাণ্ড কিংবা অন্যান্য খাদ্যদ্রব্যের সরবরাহ বৃদ্ধি তখনই ঘটতে পারে, যখন ধান খালাস করবে শ্রম ও জমি। বাংলাদেশে ভারটিক্যাল বা ঊর্ধ্বমুখী সম্প্রসারণের কোনো বিকল্প আছে বলে মনে হয় না। বায়োটেকনোলজি হচ্ছে উৎপাদনের সেই ঊর্ধ্বমুখী হাতিয়ার। আশার কথা, নমুনাকৃত অধিকাংশ উত্তরদাতা, বিশেষত সুশীল সমাজ কৃষি প্রতিষ্ঠানে বায়োটেকনোলজি ব্যবহারের পক্ষে রায় দিয়েছেন। তবে শর্তহীন নয়। আমার সমর্থনও কিন্তু শর্তহীন নয়।

Suggested citation:

Bayes, A. 2007. Krishitey biotechnology abong Bangladesh prekhhit (Biotechnology in agriculture in the Bangladesh context). Reprinted from Bhorer Kagoj (Bangla daily), October 3, 2003. In: Magor, N. P., Salahuddin, A., Haque, M., Biswas T. K. and Bannerman, M., editors. PETRRA – an experiment in pro-poor agricultural research. Newspaper reprint no. 4.10. Dhaka (Bangladesh): Poverty Elimination Through Rice Research Assistance Project, International Rice Research Institute. 4 p.

ধান গবেষণা ও 'সম্পদ-দরিদ্র' একটি ভ্রমণবৃত্তান্ত

(Rice research and the 'resource-poor' – a travelogue)

আবদুল বায়েস

REPRINT

মুক্ত প্রাণের প্রতিধ্বনি
ভোরের কাগজ
September 12, 2003

আন্তর্জাতিক ধান গবেষণা ইনস্টিটিউট (ইরি) মনে করে, ধান গবেষণার মাধ্যমে সম্পদ-দরিদ্র জনগোষ্ঠীকে সহায়তা দিয়ে দারিদ্র্য দূরীকরণ সম্ভব। প্রসঙ্গত উলেখ করা যায়, দরিদ্র দু ধরনের হতে পারে। এক, যাদের 'সম্পদ' বলতে কিছুই নেই তারা দরিদ্র হতে পারেন। দুই, যাদের মোটা দাগের না হলেও মোটামুটি কিছু সম্পদ, বিশেষত চাষযোগ্য জমি আছে স্বল্প পরিমাণে, তারা, যদি দেয় সম্পদের সুষম ব্যবহার না করতে পারেন। তাই, চোখ থাকতেও যেমন অন্ধ থাকে মানুষ, তেমনি থাকে দরিদ্র, সম্পদের সন্নিবেশ সত্ত্বেও। ইরি'র মূল লক্ষ্য ধান গবেষণায় সহায়তা প্রদান করে সম্পদ-দরিদ্রের সাহায্যে প্রত্যক্ষভাবে এগিয়ে আসা। পরোক্ষভাবে অন্যরাও লাভবান হতে পারেন।

আর তা করতে গিয়ে ইরি পেট্রা উপ-প্রকল্পের অভিভাবকত্বে বেশ কিছু উপ-প্রকল্প হাতে নিয়েছে। এ উপ-প্রকল্পগুলোর সার্বিক দায়িত্বে রয়েছে পেট্রা, কিন্তু বাস্তবায়নে নিয়োজিত রয়েছে কিছু পার্টনার বা সহযোগী প্রতিষ্ঠান, যারা মাঠ পর্যায়ে দরিদ্রকে নিয়ে, দরিদ্রের দ্বারা এবং দরিদ্রের জন্য কাজ করে যাচ্ছেন। উলেখ করা প্রয়োজন, ২০০৩ সাল পর্যন্ত মোট ৪৫টি উপ-প্রকল্পের আওতায় ৫৫১টি গ্রামে মোট ১১ হাজার ৩৬ জন কৃষকের কাছে পেট্রা-প্রসূত প্রশিক্ষণ পৌঁছানো হয়েছে। এদের মধ্যে অংশগ্রহণকারী পুরুষ কৃষকের সংখ্যা ৬ হাজার ৬৬৭ (৬৭%) এবং মহিলা কৃষকের সংখ্যা ৪ হাজার ৩৭৯ (৪০%)।

সম্প্রতি এসব উপ-প্রকল্পের কয়েকটা ঘুরে দেখার সৌভাগ্য আমার হয়েছে এবং বর্তমান নিবন্ধটি সেই অভিজ্ঞতার আলোকেই উপস্থাপন করা হলো।

দুই. কেন নতুন ভাবনা?

প্রথমত, সবুজ বিপ্লবের সুফল সব অঞ্চলে সমভাবে বিস্তার লাভ করেনি। শুধু অনুকূল অঞ্চলেই সবুজ বিপ্লবের ব্যাপক প্রসার ঘটেছে। অথচ পরিবেশ-প্রতিকূল অঞ্চলে (যেমন খরাপ্রবণ, উপকূলীয় এবং বন্যাপ্রবণ) সবুজ বিপ্লবের তেমন ছোঁয়া লাগেনি। প্রাপ্ত গবেষণায় প্রতীয়মান হয় যে, পরিবেশ-প্রতিকূল অঞ্চলগুলোতে মোট জনসংখ্যার ৬৫% বাস করে (উপকূলীয় ১৩% এবং বন্যাপ্রবণ ৩৫%)। মোট নিজস্ব জমির ৭৩% এতদঞ্চলে অথচ মাত্র ২২-৫০% জমি সেচের আওতাধীন। তা ছাড়া মাথাপিছু চালের প্রাপ্তি সবচেয়ে কম, ২৫০ থেকে ২৯০ কেজি/বছর, যা কিনা গড়পড়তা ৩০৩ কেজির নিচে এবং এ লভ্যতার হার ১৯৮৭ সালের তুলনায় ২০% হ্রাস পেয়েছে ২০০০ সালে। এবং সর্বশেষ, চালের উৎপাদনশীলতা এবং চাল থেকে উৎসারিত উপার্জন এতদঞ্চলে সবচেয়ে কম এবং তির্যকভাবে নিম্নগামী। সুতরাং সবুজ বিপ্লবের 'আশীর্বাদ' বঞ্চিত এতদঞ্চলের চাষিদের জন্য লাগসই প্রযুক্তি উদ্ভাবন ও বিতরণ অত্যন্ত জরুরি বলে পেট্রা মনে করে। দ্বিতীয়ত, আজকের 'সম্পদ-দরিদ্র' চাষিরাই ভবিষ্যতের প্রকৃত দরিদ্র জনগোষ্ঠী হিসেবে আবির্ভূত হবেন বলে ধারণা করা হচ্ছে। আপাতদৃষ্টে দরিদ্র প্রতীয়মান না হলেও এদের অর্থনৈতিক অবস্থান খুবই নাজুক এবং যেকোনো প্রতিকূল পরিস্থিতিতে এরা 'সম্পদহীন দরিদ্রের' কাতারে শামিল হতে পারেন। তৃতীয়ত, 'সম্পদ-দরিদ্র' চাষি কৃষিকাঠামোতে প্রধান অংশ। সমীক্ষায় দেখা যায়, ১৯৮৭ সালের ৫৭% থেকে ২০০০ নাগাদ এদের অংশ দাঁড়ায় ৬৭%। চতুর্থত, অপূর্ণ ও অপ্রতিসম তথ্যপ্রবাহ অর্থনীতিতে বহুধা ভারসাম্য বিন্দুর জন্ম দেয়। এদের মধ্যে কোনো কোনো বিন্দু বা ভারসাম্য অবস্থান ভালো বা দক্ষ আবার কোনো কোনো অবস্থান খারাপ বা অদক্ষ। গণখাতের বা পাবলিক সেক্টরের প্রধান দায়িত্ব হয়েছে খারাপ

DFID Department for International Development
IRRI International Rice Research Institute
Bangladesh Rice Research Institute

ভারসাম্য অপসারণে কর্মকৌশলের মাধ্যমে হস্তক্ষেপ করা। এবং পঞ্চমত, যেহেতু চাল প্রধান খাদ্য এবং চাল উৎপাদন প্রক্রিয়াকে কেন্দ্র করে প্রধানত গ্রামীণ অঞ্চলের আয় ও কর্মসংস্থান আবর্তিত, সুতরাং চাল বা ধান গবেষণা দারিদ্র্য দূরীকরণে অনেকটা পথ অতিক্রম করতে পারে।

তিন. কারা 'সম্পদ-দরিদ্র'?

'সম্পদ-দরিদ্র' তারাই : ক. যাদের নিজস্ব জমির পরিমাণ ১০০ শতাংশের মতো; খ. যারা পূর্ণ সময়ের চাষি; গ. যাদের নিজস্ব উৎপাদন থেকে খাদ্যের যোগান দেওয়ার পরও ৪-৫ মাস খাদ্য ঘাটতি থাকে এবং ঘ. যারা অন্যের জমিতে 'জন বিক্রি' করে জীবিকা নির্বাহ করে।

চার. সম্পদ-দরিদ্রের দুর্দশা লাঘবে কৌশল

সম্পদ-দরিদ্রের দারিদ্র্য দূরীকরণে কৌশলগুলো আলোচনা করা যেতে পারে। প্রথমত, গৃহস্থালিতে ধানের বীজ উৎপাদন, সংরক্ষণ ও বিনিময় সংক্রান্ত প্রশিক্ষণের মাধ্যমে চাষিদের ঋতুভিত্তিক 'বীজ সংকট' থেকে রক্ষা করা। স্মর্তব্য, বাংলাদেশে মোট বীজ ব্যবহারের মাত্র ৫% আসে বাংলাদেশ কৃষি উন্নয়ন করপোরেশন (বিএডিসি) থেকে, ৬-৭% বীজের উৎস এনজিও ও ব্যক্তি খাত এবং বাকি ৮৫% বীজের উৎস চাষি নিজে। সুতরাং, চাষি যদি নিজে বীজের 'সুস্বাস্থ্য' নিশ্চিত করতে না পারে তবে ভালো ফসল আশা করা যায় না। শিশুর স্বাস্থ্য যেমন অনেকটা নির্ভর করে মায়ের স্বাস্থ্যের ওপর, তেমনি ফসলের স্বাস্থ্যের নিয়ামক হচ্ছে বীজের স্বাস্থ্য। দ্বিতীয়ত, প্রথাগত ধানের চেয়ে উচ্চ ফলনশীল ধানের উৎপাদনশীলতা অনেক বেশি এবং উচ্চ ফলনশীল ধানবীজ সংগ্রহ করে সীমিত জমিতে সার্বিক উৎপাদন উৎসাহিত করতে হবে। তৃতীয়ত, অজ্ঞতার কারণে সার, পানি ও পোকামাকড় দমনে অতিরিক্ত ব্যয় দরিদ্র চাষির জীবনে 'মড়ার ওপর খাঁড়ার ঘা' এবং সমন্বিত শস্য ব্যবস্থাপনা (আইসিএম) সংক্রান্ত প্রশিক্ষণ চাষিদের জন্য ব্যয়সাশ্রয়ী উৎপাদন কৌশল অবলম্বনে সহায়তা দিতে পারে।

মূলত এ তিনটি উপাদান সমেত সংগঠিত হয় Technology uptake বা প্রযুক্তিগত উন্নয়ন। তা ছাড়া উপকূলীয় অঞ্চলগুলোতে নদী থেকে বয়ে আসা খালগুলোতে বৃষ্টির পানি সংরক্ষণের মাধ্যমে শুষ্ক মৌসুমে বোরো ধান উৎপাদন ও লবণাক্ত পানির সঙ্গে সামঞ্জস্যপূর্ণ নতুন ধান উদ্ভাবন অন্যতম কৌশল। এবং সর্বশেষে, দরিদ্র চাষিদের সুগন্ধি চিকন চালের বীজ সরবরাহ করে উচ্চমূল্যের চাল উৎপাদন ও বাজারজাত করার মাধ্যমে অর্থনৈতিক সচ্ছলতা প্রদান করাও অন্যতম কৌশল বলে মনে করে পেট্রা।

ষাটের দশকে উচ্চ ফলনশীল (উফশী) ধান প্রবর্তনকালে মূল লক্ষ্য ছিল দ্রুতগতিতে কম সময়ে অধিক ধান উৎপাদন। জনসংখ্যার দ্রুত বৃদ্ধি এবং চাষযোগ্য জমির স্বল্পতার মুখোমুখি সময়ে পরিবেশগত পরিস্থিতি, নারীর অধিকার, অংশীদারিমূলক উৎপাদন কৌশল ইত্যাদি গুরুত্ব পায়নি। মোটামুটিভাবে ওই সময়ের প্রযুক্তি খাদ্য উৎপাদন বৃদ্ধিতে প্রয়োজনীয় ভূমিকা রাখলেও এর বিরূপ পার্শ্বপ্রতিক্রিয়া পরবর্তীকালে কৌশল পরিবর্তনের ডাক দেয়। সেই ডাকে সাড়া দিয়েই সম্ভবত পেট্রা বর্তমানে নবধারামূলক কৌশল গ্রহণে ব্রতী হয়। বর্তমান কৌশলগুলোতে বৈশিষ্ট্য নিম্নরূপ :

ক. উপ-প্রকল্পগুলো কৃষকদের চাহিদামাফিক পরিকল্পিত, যাতে কৃষকরা তাদের মধ্যে আলাপ-আলোচনার মাধ্যমে স্থানীয় পরিবেশের সঙ্গে সঙ্গতিপূর্ণ ও সংবেদনশীল উৎপাদন কৌশল নির্ধারণ করেন;

খ. এগুলো অংশীদারিমূলক– সেখানে বিজ্ঞানী, কৃষক ও মাঠকর্মীদের যৌথ প্রয়াসে ধানের জাত, উৎপাদন কৌশল ও ব্যয়সাশ্রয়ী পন্থা উদ্ভাবন করা হয়;

গ. লিঙ্গ-সংবেদনশীল এই অর্থে যে নারীদের কৃষি কর্মকাণ্ডের মূল স্রোতে নিয়ে আসে এবং

ঘ. দরিদ্রমুখী, অর্থাৎ শুধু সার্বিক হারে ধান উৎপাদন নয়, কী করে বিশেষত দরিদ্র চাষিদের জন্য সঠিক ধান উৎপাদন কৌশল শেখানো যায় সেটাই মূল লক্ষ্য।

আশা করা যায় :

ক. প্রকৃত প্রশিক্ষণ ও উপকরণ সরবরাহ অব্যাহত থাকলে প্রতিবছর বাংলাদেশ সম্পদ-দরিদ্র চাষিরা ৫ লাখ টন অতিরিক্ত খাদ্য উৎপাদন করতে পারবেন। অতিরিক্ত এ উৎপাদন মোট আমদানির প্রায় অর্ধেক;

খ. জমির উৎপাদনশক্তি বৃদ্ধির হার হবে ৩৫%;

গ. আর্থিক রিটার্ন বৃদ্ধি পাবে ২৫% হারে;

ঘ. ১৯১৫ সাল নাগাদ গ্রাম ও শহরে দারিদ্র্যের অনুপাত হ্রাস পাবে ৫০%।

পাঁচ. অর্থনৈতিক প্রভাব

পেট্রা ও এর পার্টনার সংগঠনের কর্মকাণ্ডে অংশগ্রহণের ফলে অংশগ্রহণকারী চাষিদের খানা বা পরিবার পর্যায়ে অর্থনৈতিক সুপ্রভাব পড়ে। যেমন, চাষিরা জানিয়েছেন, নতুন জাতের ধান ও এর পরিচর্যার ফলে বিঘাপ্রতি উৎপাদন বেড়েছে ১৮ থেকে ২৫ মণ। আর পূর্বে যেমন বেশির ভাগ ক্ষেত্রে দেশি জাতের ধান চাষ করতেন, এখন বেশি করে আধুনিক ধান চাষ করছেন। গড়পড়তা খানার আয় দু বছর আগের ১২,০০০ টাকা থেকে সমীক্ষাকালে (২০০৩) ১৭,০০০ টাকায় দাঁড়িয়েছে। বিভিন্ন প্রশিক্ষণের ফলে ব্যয়সাশ্রয়ী পদ্ধতি চাষিদের অনেক খরচ বাঁচিয়েছে। যেমন, প্রতি বিঘায় ১ হাজার ৪৬০ টাকা খরচ হতো বীজ, সার ও ওষুধ ক্রয়ে। এখন খরচ হচ্ছে ৭৮০ টাকা। তার কারণ প্রশিক্ষণের আগে তারা ব্যবহার করতেন ১০ কেজি/বিঘা, এখানে ৫ কেজি/বিঘা। তেমনি অতিরিক্ত ব্যবহার করতেন সার, সেচ ও ওষুধ। এই আয় বৃদ্ধি ও ব্যয় হ্রাসের প্রভাব পড়ে জমিবহির্ভূত সম্পদ সন্নিবেশনে। তাদের মধ্যে ৭৫% জানিয়েছেন, গত দু বছরে গৃহস্থালিতে সম্পদ যোগ করেছেন, যেমন পাম্প মেশিন, টিউবওয়েল, ইলেকট্রনিক সামগ্রী, ঘরের টিন, গরু, হাঁস-মুরগি ইত্যাদি। এখন খাদ্যঘাটতি মাত্র ১-২ মাসের। ভোগবিন্যাসে পরিবর্তন এসেছে। *"আগের থেকে অহন ভালো খাই"* বলে জানিয়েছেন। সবচেয়ে গুরুত্বপূর্ণ উৎপাদনের অস্থিরতা ও ওঠানামা অনেকাংশে হ্রাস পেয়েছে বলে জানিয়েছেন। কোনো কোনো জায়গার (যেমন কালীগঞ্জ) চাষিরা জানিয়েছেন, পেট্রা উপ-প্রকল্পের প্রশিক্ষণের পর তারা 'জন বিক্রি' কমিয়ে দিয়েছেন, কারণ নিজের জমিতে মনোযোগ দিয়ে চাষ করলে যে প্রাপ্তি তা 'জন বিক্রির' চেয়ে কম নয়। অন্যান্য অঞ্চলে জমি বর্গা নেয়ার প্রবণতা বেড়েছে এবং পরিবর্তন ঘটেছে বর্গা শর্তের।

ছয়. অ-অর্থনৈতিক প্রভাব

ক. অংশগ্রহণকারী চাষিদের মধ্যে জ্ঞানের প্রসার ঘটেছে। মাঠ স্কুল, নতুন জাতের ধান, উৎপাদন পদ্ধতি, মাটি ও লবণাক্ততা পরীক্ষা ইত্যাদি বিষয়ে গত দু বছরে তারা বেশ জ্ঞান অর্জন করেছেন (বিশেষত মহিলারা)।

খ. অংশগ্রহণকারী চাষিদের মধ্যে 'আস্থার' ভাব ফুটে উঠেছে। কম জমি, কম উৎপাদন, কম আয়জনিত দারিদ্র্যের দুষ্টচক্র থেকে বেরিয়ে এসেছেন বলে জানালেন। এখন তারা জানেন, কম জমিতেও বেশি ফসল হয়। খরচ যতটুকু করতেন তাও কমানো যায়।

গ. আগে মহিলারা পরোক্ষভাবে কৃষিকাজে, বিশেষত চাল উৎপাদনে সহায়তা করতেন। এখন সরাসরি বীজ তোলা, সংরক্ষণ, স্বামীকে অব্যাহতভাবে প্রশিক্ষণপ্রাপ্ত জ্ঞান সম্পর্কে অবহিতকরণ ইত্যাদি কাজে পূর্ণকালীন নিয়োজিত থাকেন।

ঘ. দৃষ্টিভঙ্গি বদলেছে। *"সরকারের কাছে আপনাদের প্রথম ও প্রধান দাবি কী?"*– এ প্রশ্নের উত্তরে ৭৫% বলেছেন সময়মতো উন্নত বীজ সরবরাহের কথা। বলেছেন দু বছর আগে হলে চাইতেন শাড়ি কিংবা ঘরের জন্য টিন। *"পেট্রা কতকাল বীজ, সার ও কীটনাশকে ভর্তুকি দেবে?"* – এ প্রশ্নের উত্তরে অধিকাংশ বলেছেন তারা সাহায্য চান না, সহযোগিতা চান। রাস্তা-ঘাট, স্কুল-কলেজ এখন প্রাণের দাবি– দু বছর আগে তা ছিল না।

ঙ. প্রতিবেশিত্ব প্রভাব : নেইবারহুড ইফেক্টস বা প্রতিবেশিত্ব প্রভাব সম্পর্কে গবেষকরা বলেছেন, সিদ্ধান্ত গ্রহণে ব্যক্তির ওপর প্রতিবেশীর প্রভাব প্রকট। বাংলাদেশে উন্নত ধানের জাত পরিগ্রহণে প্রতিবেশিত্বের প্রভাব উলেখযোগ্য। ফিলিপাইনে কৃষকদের মাঝে বাজারজাতকরণ প্রক্রিয়ায় প্রতিবেশিত্বের প্রভাব রয়েছে। বর্তমান পেট্রা উপ-প্রকল্পেও প্রতিবেশিত্ব প্রভাব বেশ প্রকট বলে মনে হয়। পেট্রা উপ-প্রকল্পের অংশগ্রহণকারী চাষিরা জানিয়েছেন, তাদের দেখাদেখি প্রতিবেশীরাও উন্নত চাষাবাদের কলাকৌশল জেনে নিয়ে চাষাবাদ করেছেন। দূরদূরান্ত থেকে বীজ সংগ্রহের জন্য কেউ কেউ আসছেন। উপ-প্রকল্পে অংশগ্রহণ করেননি, এমন চাষির সঙ্গে আলাপ করে জানা যায়, তারাও উপকৃত হচ্ছেন।

সাত. সামষ্টিক প্রভাব

পেট্রা উপ-প্রকল্পগুলো বাস্তবায়ন শেষে আশা করা যায় :

ক. খাদ্য উৎপাদন বৃদ্ধি পাবে;

খ. দারিদ্র্যের আপতন হ্রাস পাবে এবং উন্নত চাল ও শাকসবজি রপ্তানি করে বৈদেশিক মুদ্রা অর্জন/সাশ্রয় সম্ভবপর হবে।

আট.

আগে উলেখ করেছি, বর্তমান নিবন্ধটি রচিত হয়েছে লেখকের বিভিন্ন পেট্রা উপ-প্রকল্প পরিদর্শনকালে সংশিষ্ট চাষিদের সঙ্গে আলাপ আলোচনার মাধ্যমে। এ দেশের সম্পদ-দরিদ্র জনগণ যে মন ও মানসিকতার দিক থেকে কত উন্নত, তা নিচের কয়েকটি বক্তব্য থেকেই বোঝা যায়।

১. *"একজন বিষ খাইলে একজনে মরে, একজন বীজ খাইলে ঘরের সবাই মরে।"* (আয়েশা বেগম, কৃষ্ণনগর, হবিগঞ্জ)

২. *"সাহায্য চাই না, সহযোগিতা চাই।"* (দুলাল বৈরাগী, কিসমত ফুলতলা গ্রাম)

৩. *"শিক্ষা নিলে ভিক্ষা লাগে না।"* (জননী সংস্কার মহিলা চাষি, ঠাকুরগাঁও)

৪. *"এখন স্বাস্থ্য ভালো হবে, কারণ ওষুধ কম ছিটাইতে হয়।"* (হাজেরা বেগম, উত্তরণ, দেউনিপাড়া)

৫. *"দারিদ্র্য সে যে অন্ধ এবং অক্ষম। আমরা গরিব না, বলতে পারেন ঘাটতি চাষি। গরিব কইলে দুঃখ পাই।"* (নিকেশ, ভারভিরা গ্রাম)

৬. *"গরিবের পয়সা নাই, কিন্তু স্বাদ আহ্লাদও নাই?"* (মৌলভীবাজারের কৃষকগণ) ইত্যাদি ইত্যাদি।

Suggested citation:

Bayes, A. 2007. Dhan gobeshona o 'sampad-daridro' ekti brhomon britanto (Rice research and the 'resource-poor' – a travelogue). Reprinted from Bhorer Kagoj (Bangla daily), September 12, 2003. In: Magor, N. P., Salahuddin, A., Haque, M., Biswas T. K. and Bannerman, M., editors. PETRRA – an experiment in pro-poor agricultural research. Newspaper reprint no. 4.11. Dhaka (Bangladesh): Poverty Elimination Through Rice Research Assistance Project, International Rice Research Institute. 4 p.

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PETRRA was a DFID-funded project, managed by the International Rice Research Institute (IRRI) in close collaboration with the Bangladesh Rice Research Institute (BRRI)