

MAY 2010



## ABOUT THE AUTHORS

**ANIKA ALI**

Task Manager for projects in Agribusiness and Climate Change Adaptation, has worked with IFC Advisory Services in Bangladesh since early 2005. She is part of the IFC team leading the work on the Pilot Program on Climate Resilience (PPCR) in Bangladesh, together with other donor operations and the government of Bangladesh.

**MRINAL SIRCAR**

Program Manager, IFC South Asia Advisory Services, currently manages sector work in Agribusiness and Textiles & Apparels. He is a member of the PPCR mission in Bangladesh.

**APPROVING MANAGER**

Ian Crosby, Head of IFC Advisory Services in Bangladesh, Nepal, North East India, and Bhutan.

# SmartLessons

*real experiences, real development*

## Adapting to Climate Change in Bangladesh: Stress Tolerant Seeds for Stress-Prone Regions

*In the event of global climate change, agriculture will be one of the worst-hit sectors in Bangladesh. Increasing global temperatures, rising sea levels, and melting polar ice caps result in land submergence, salinity intrusion, drought, and so on—all of which drastically impact agricultural productivity and therefore food security and the livelihoods of millions of people in the affected regions. Bangladesh, a low-lying deltaic country, is predicted by the international community of experts to be one of the first countries to be affected, and it has already been experiencing serious impacts of climate change. Agriculture in particular is one of the worst-hit sectors. This SmartLesson describes the experience of the Agribusiness advisory team in Bangladesh, based on a project focused on climate change adaptation and building resilience of the resource-poor farmers.*

### Background

Since Bangladesh is only 10 meters above sea level, it faces the risk of losing 17 percent of its land mass and the displacement of 20 million people as a result of a rise in sea level. Agriculture is the major economic driver in Bangladesh, accounting for 20 percent of gross domestic product (GDP) and 65 percent of the labor force. Of the total 9 million hectares of arable land, over 50 percent have already been affected by salinity intrusion, submergence, or drought. Crop yields have dropped to as low as 1.0 metric ton per hectare in affected areas (the average yield being 4.5 metric tons per hectare).

Between 1991 and 2000, 93 major disasters were recorded, resulting in nearly 200,000 deaths and causing \$5.9 billion in damage, with severe losses in agriculture. Cyclonic storms and tidal surges in the Bay of Bengal have become more frequent and intense. Changes in rainfall patterns are adversely affecting the crop cycles, bringing new challenges to sustainable agriculture. For example, rising salinity levels in the coastal regions have made the traditional seed varieties redundant, and a belated monsoon

brings forth a cascading negative effect on the subsequent production cycles. An increase in the rainfall intensity and the occurrence of flash floods and tidal floods all have made farmers even more vulnerable.

Added to this is the disproportionate growth of population (1.50 percent per year) and loss of arable land (1.75 percent per year). By 2025, an additional 19 million mouths are to be fed by a relatively poorly performing agriculture sector. Failing to take timely and appropriate adaptive measures and build the coping capacity may result in catastrophic



Drought affects approximately 1 million hectares of agricultural land.

consequences with regard to food security and livelihoods for a growing population vulnerable to the impacts of climate change.

## **The Project**

With the aim of addressing some of these constraints and challenges, IFC is working with leading seed companies to increase the production, distribution, and adoption of stress-tolerant seed varieties, and to promote these varieties to farmers who desperately need them but are not aware of their availability or the farming practices the new seeds require. These seed varieties can withstand prolonged periods of submergence, high levels of salinity, and drought conditions. The use of stress-tolerant seeds has demonstrated a drastic reduction in crop damage in affected regions. Yields have been found to be as high as 5–7 metric tons per hectare in many regions. In this context, development of stress-tolerant seeds, their promotion, and the establishment of an efficient distribution system will be one of the effective interventions toward climate change adaptation in the agriculture sector and thereby contribute to food security and to the building of farmers' economic resilience.

Notwithstanding that the climate change issues overshadow the global development climate these days, projects in the arena of climate change adaptation worldwide—particularly with a focus on mobilizing the private sector capacity and resources to meet the adaptation challenges—are few. Thus, there is limited scope of building on past initiatives. Each of the affected countries is setting its own objectives and identifying approaches to deal with its own specific constraints in adapting to climate change.

When the Agribusiness team of Bangladesh started evaluating the prospect of building adaptation projects around the use of stress-tolerant seed varieties, the importance and role of these varieties were not clear to many stakeholders. The release process of new seed varieties was slow. Policy was not favorable. The private sector had yet to see the business prospects. The public sector was slow and took a silo approach, relying mostly on the Bangladesh Agricultural Development Corporation (BADC), the public sector agency responsible for supply of agri-inputs to farmers.

Thus, the team undertook stepwise initiatives to induct the relevant stakeholders, mobilize key partners, design specific projects, and ultimately roll projects out into the field. This led to implementation of activities to strengthen the production, supply, and adoption of stress-tolerant varieties in the coastal belt of the country with four of the lead firms in the sector. During the first three months of the implementation activities, over 300 lead seed growers, dealers, and retailers were exposed to the varieties and their production process through field demonstrations. Training manuals on production of stress-tolerant varieties of rice have been developed to build capacity of the contract-grower farmers and the technical team of the lead firms, to ensure that they meet the potential demand.



Floods and submergence affect 2 million hectares of agricultural land.

## **Lessons Learned**

### **1) Work bottom-up to identify specific constraints.**

Climate change adaptation is truly a context-based need, even within a country. In Bangladesh, the southern coastal regions are suffering from the salinity intrusion and submergence issues, while the northern region is suffering from water shortage and drought issues. Thus, the specific locational needs, the current practices, and the capacity of the community to adapt have to be carefully considered in designing projects to suit the specific needs. For example, in Uganda, a development project distributed drought-tolerant seed varieties among farming communities and went back at the end of the crop season to check on the field performance of the varieties. The project team was shocked to see that there were no crops in the field. When asked why they had not planted the seeds that they were given, the local people responded that they were suffering from the effects of a huge famine, and they ended up eating the seeds instead of planting them.

Thus, in our own context we first conducted a detailed sector study and baseline surveys to identify the critical constraints being faced by the farmers, and then worked closely with government research and extension agencies to evaluate further results coming from the field and the resultant innovations that can address the constraints. This helped us understand the critical constraints being faced by the farmers, whether the stress-tolerant seed varieties would be beneficial to them, whether they would use them, what kind of pricing would make the product marketable, what the technical limitations of the farmers are with regard to using the varieties, what other input requirements there are (irrigation water, for example), what the production- and supply-related constraints are (from the perspective of the seed companies) to ensure a consistent supply of the varieties to the market, what the policy and regulatory issues are, and so on. The project design then took all of these aspects into account.

### **2) Effective stakeholder engagement: Understand how critical the public sector role is.**

Agricultural research and extension in Bangladesh are still spearheaded by the public sector agencies. In our specific

project context, the private sector entry into this business opportunity to meet the adaptation challenges was entirely dependent on access to breeder seeds of the stress-tolerant varieties from the Bangladesh Rice Research Institute for multiplication by the private seed companies. Further, collaboration with the Department of Agricultural Extension is critical for the private companies to leverage their extension networks in market development of new products.

In one workshop we were able to mobilize five directors general of relevant public sector agencies within the National Agricultural Research System, top management of all leading seed companies, the Secretary of the Ministry of Agriculture, and the Minister of Agriculture herself. That was an exceptional event, where the public and private sector representatives jointly worked out their respective roles and responsibilities in promoting stress-tolerant rice in Bangladesh. Following the workshop, we formed a core group, with public and private sector representation, that provides an effective platform for us to interact with all stakeholders.

### 3) Raise awareness at multiple levels.

For new initiatives it always helps to gain momentum around the focus area of the project. Several high-level workshops, seminars, and conferences highlighted the importance of stress-tolerant seed varieties in the context of Bangladesh. Diverse groups of stakeholders were introduced to the product and its importance. The initiatives provided multipronged benefits to the project. On one hand the private sector stakeholders started taking the issue seriously, and on the other hand it provided us access to all the key public institutions linked to the research, release, production, and supply of these varieties. These initiatives provided us, as champions of work in this field, smoother access to both groups, and helped us act as a catalyst in bringing them together into more collaborative initiatives. For example:

- *The private sector needed to see the business aspect in the area of stress-tolerant seeds, and to make the extra effort to research and develop their capacities to produce, distribute, and supply the seeds to the*

*farming community. We took this need into account for our promotional efforts that were focused on the private sector.*

- *To draw attention to the project, we engaged the big names in the private and public seed sector. Their strategic engagement helped kick-start initiatives and gain support for the projects.*
- *A diverse and high-profile group was formed to lobby for the initiative. It included the Director General of the Seed Wing, Ministry of Agriculture, the head of the International Rice Research Institute Bangladesh, the Chief Scientific Officer for Bangladesh Rice Research Institute, the President of the Bangladesh Seed Association, and seed experts. Their combined efforts led to the speedy release of two submergence-tolerant varieties that were in the pipeline.*

### 4) It is important to catalyze other climate change initiatives.

Compared with the compelling needs, we can directly address only certain constraints, but when interventions occur at *multiple* levels, we can begin to see strong positive impacts. For example, our efforts at enabling farmers to adopt stress-tolerant seed varieties might be impeded if the farming communities in the vulnerable regions do not have the basic level of protection, such as dikes and polders, to protect them from tidal surges. In many instances there are either no dikes available or the ones that do exist have not been maintained at all over the years, leading to collapse. Similarly, there are also issues related to social protection, public health, water sources, infrastructure, and so on. IFC is working closely with the Pilot Program on Climate Resilience under the Multi Donor Trust Fund in Bangladesh to assist in the identification of such issues, and then building projects around them and mobilizing relevant stakeholders, so that the cumulative results in the area of climate change adaptation are more impactful and pronounced.

### 5) Deal with the constraints of resources and institutional capacity.

Demands for work on the aspects of climate change have sprung up within a short span of time. The availability of skilled and experienced resources to assist on climate change projects and initiatives is limited. The few people who are available are being pulled in 10 different directions and are assisting in projects worldwide, often leading to diminishing quality of the service. Thus, it requires careful thought and investigation to identify resources to support the projects. Running the names of prospective resources through other donor-funded organizations helps gauge their level of engagement, intensity of assignments worldwide, and quality of service provided.



Farmer's field just after submergence.

## Conclusion

The current project is a baby step in a long journey. So far, only one company has completed the first cycle of demonstration of a salinity-tolerant rice variety. Initial results show a smile on the farmer's face, but we need to gather more data on output at the farmer level to measure the results. Since varieties are new, farmers have yet to adopt and adapt to new practices. We all are going through a learning phase to see what works and what doesn't. The government recently released two new submergence-tolerant varieties, which has created more opportunities for the private sector—and for us as well—to scale up for a greater outreach and positive impact. The productive relationship we have been able to build with



Farmer's field three months later, showing 90 percent crop revival from using stress-tolerant varieties.

the private sector seed companies is the real strength for us, going forward.

### DISCLAIMER

IFC SmartLessons is an awards program to share lessons learned in development-oriented advisory services and investment operations. The findings, interpretations, and conclusions expressed in this paper are those of the author(s) and do not necessarily reflect the views of IFC or its partner organizations, the Executive Directors of The World Bank or the governments they represent. IFC does not assume any responsibility for the completeness or accuracy of the information contained in this document. Please see the terms and conditions at [www.ifc.org/smartlessons](http://www.ifc.org/smartlessons) or contact the program at [smartlessons@ifc.org](mailto:smartlessons@ifc.org).