Best practices to avoid drought in Barind Region of Bangladesh

Jalal Uddin Md. Shoaib
Former Chief Scientific Officer
Soil Resource Development Institute (SRDI
Ministry of Agriculture
Government of Bangladesh

Abstract

The Barind Tract/region is located in between 24^0 23' to $25^0$15' North latitude and 88^0 2' to 88^0 57' E minute East longitude spread over 7,727 Sq Km area, 5.25% of total Bangladesh. It is covering about 41% of the North Western part of Bangladesh (all 16 districts of Rajshahi and Ragpur Division).It is a typical driest area in Bangladesh with comparatively high temperature prevails in Barind area except for the wet season beginning from mid June to October. Rainfall in the area varies from about 1500 mm to 2000 mm. Temperature ranges from 4 degree Celsius to 44 degree Celsius. The area is comparatively at higher elevation than the adjoining floodplains. The contours of the tract suggest that there are two terrace levels - one at 40m and the other between 19.8 and 22.9m above mean sea level. The total cultivable area of Barind is being about 5,83,000 ha (1.44 million acres), out of which 34% is loamy, 10% is Sandy, 49% is clayed and the rest of 7% is others. In eighties the area was predominantly single cropped (CI 117%) and the yield was poor and subject to be effected by seasonal drought, where supplementary irrigation, otherwise there was crop failure.

Barind Multipurpose Development Authority (BMDA) was in place on 15 th January 1992 under the Ministry of Agriculture (MoA) as a project of Bangladesh Agricultural Development Corporation (BADC) in 1985. Since then more than 30 projects of BMDA focused to avoid or halt seasonal drought either in Kharif or Rabi season in Barind. The outcomes were no crop failure due to drought, increased cropping intensity by providing irrigation by surface and DTW water. At present the area skipped seasonal drought in 0.316 million hectares. Potato, Boro and Transplanted Aman are practiced in more that 50% of the cultivable land, in addition safe drinking water and communication network to boast the economy of the community. Tapping river water (from the Ganges, Mahananda) storing in creeks or ponds, distribution to the farm land through subsurface irrigation pipe and solar powered low lift pump (LLP), Prepaid card system to purchase irrigation water (water metering), conversion of derelict water bodies or channels to excellent water reservoir, solar powered dug well, orchard plantation where both surface or DTW ineffective, plantation of trees and horticultural crops along road and channels etc contribute to avoid seasonal very severe to severe drought, which at the end addresses to achieve LDN by 2030.

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For more clarification please contact jalal_shoaib@yahoo.com, slmldproject@gmail.com.

This paper prepared on the basis of the experiences gathered during SLM best practices documentation in Barind region of Bangladesh by WOCAT team lead by the author.

Brief description of SLM best practices:

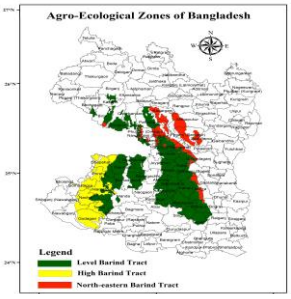

Photo-1: Barind region of Bangladesh

The Barind, where still irrigation support is yet to reach.

Area where irrigation support is yet to reach

The Barind where irrigation support reached

Area where irrigation support reached

How these changes happened:

A. Providing irrigation water:

1. ***Installation of subsurface (Burried0 pipe for irrigation water delivery:*** Barind Multipurpose Development Authority (BMDA) had installed Deep Tube Well (DTW) to support irrigation water supply where adequate aquifers were available since 1992. Initially irrigation water was delivered to the land either by earthen (Phot-8) or

brick mason (Photo-9) drain. To minimize loss due to evaporation and during delivery subsurface (buried) pipes were installed (Photo-10) with check bulb (Photo-11) in appropriate positions. The system is now working all around the Barind area (Photo- 12) connecting LLP (Photo-13) and even Dug well (Photo-14) command areas. Prepaid card system for the users was introduced with DTW (Photo-15) and LLP (Photo-16) supply points. The technology minimize water loss and land loss to a great magnitude.


Photo-8: Earthen drain
Photo: ATM Rafique


Photo-9: Pacca drain
Photo: ATM Rafique


Photo-10: Sub-surface pipes instaltion
Photo: ATM Rafique


Photo-11: Outlet
Photo: ShoaibJU


Photo-12: Extensive distribution line
Photo: ShoaibJU

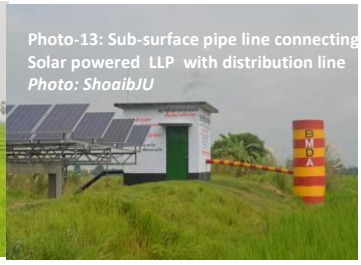
Photo-13: Sub-surface pipe line connecting Solar powered LLP with distribution line
Photo: ShoaibJU

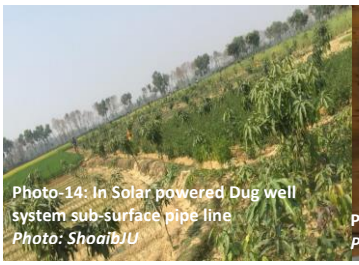
Photo-14: In Solar powered Dug well system sub-surface pipe line
Photo: ShoaibJU


Photo-15: Prep-paid card syste with DTW
Photo: ATM Rafique


Photo-16: Prep-paid card system with LLP
Photo: ATM Rafique

2. **Increasing surface water storage:** Ground water depletion was came on the board due GW abstraction for irrigation. BMDA took initiative to increase capacity surface water storage in derelict channels, ponds of Barind region. To increase surface water storage capacity the following technologies were adopted:
   a) ***Converting derelict water bodies to reservoir:*** It is in the Kushumkunda village of Porsha Upazila, Naogaon District at $24^0$56´ 57´´ North Latitude and 88^0 26´ 56´´ East Longitude. (Photo-17,18 & 19). The area of the reservoir is 8.1 ha and 80 families of an indigenous community are associated with this reservoir. 105 ha of land irrigated with this water. The reservoir has option to recharge from the catchment and LLP is used to deliver irrigation water for crops (Rice, Wheat, Maize etc.).

b) ***Excavating channels and installing check dams to outspread surface water:*** Excavation of abandoned channels (Photo-20) in different places of Barind were done to store rain water in rainy season (Photo-21) and installation of check dams (Photo-22) or rubber dams (photo-23) to store water to support irrigation as and when necessary. In channels deep wells filled with stones and sands to facilitate GW recharge (Photo-24) were installed. Trees of different species (Forest, fruit etc, Photo-25) were planted on most of these Channel banks.

c) ***Mainstreaming river water to facilitate surface water storage and irrigation:*** The Ganges (Padma) river water is lifting (Photo-26) to recharge 25 km long Sharmangla channel (Photo-27) at distance of 3.5 km from the source through subsurface (Buried) pipe and distributed by solar powered LLP (Photo-28) and subsurface pipe line. 14 check dams were installed in this channel to keep water reserve for long term (Photo-29). In other parts lifted river water reserves in ponds (Photo-30), where there are no channels available to reserve water. The command

area is about 1850 ha with 5,530 beneficiaries and 65,500 tree of different species were planted. The technologies adopted in other parts of the Barind. Like Godagari and Putia upazila of Rajshahi, Gomastafapur of Chapainoabganj, Damoirhat and Mohadevpur of Naogaon Districts where 9,400 ha land are irrigated, 18,000 farmers are benefited from these technologies. A typical sketch map of the plan may be depicted in Photo-31.

Photo-26: Padma water lifting point
Photo: ShoaibJU

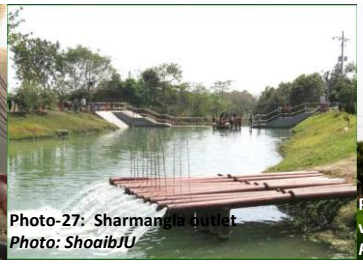

Photo-27: Sharmangla outlet
Photo: ShoaibJU

Photo-28: Solar powered LLP to lift irrigation water
Photo: ShoaibJU

Photo-29: Check dam to retain water
Photo: ATM Rafique

Photo-30: Water storing in ponds
Photo: ShoaibJU

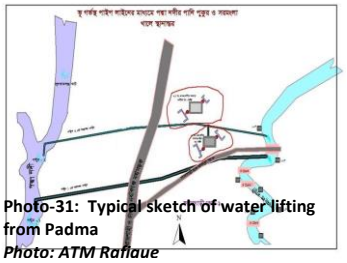

Photo-31: Typical sketch of water lifting from Padma
Photo: ATM Rafique

d) **Solar powered dug well for drinking water and small scale irrigation:** Utilization of dug well in Barind has long history specially where no GW aquifer available to set DTW/STW. There are 450 dug well (Photo-32) were installed and operated in Sapahar and Posrsha upazila of Naogaon (High Barind) to support domestic drinking water (Photo-33) requirement and in addition to support small scale irrigation. Mostly high value vegetables initiated as intercrop with mango trees (Photo-34). About 1.8 ha of land is cultivated and 8 families are directly benefited from this system.

Photo-32: Solar powered Dug well
Photo: ShoaibJU

Photo-33: Collecting drinking water from Dug well System
Photo: ShoaibJU

Photo-33: Cropping in Dug well System
Photo: ShoaibJU

B. Conclusion and recommendations:

The main focus of these technologies is to provide water either for irrigation or domestic use for safe drinking water to avoid seasonal drought in Barind region. Farmers of the area are growing crops throughout the year and outcomes are increased biodiversity and decreased drought impact, in addition increased cropping intensity, livelihood and net income of the people. These systems are supervised and maintained by Barind Multipurpose Development Authority (BMDA).

Capacity building of farmers on best water utilization in irrigation system, incorporating less water consuming high value crops in cropping pattern, balance use of fertilizer, usage of vermicomposts, clear modality of ownership of the plantation along roads and channels etc are the issues to be considered for better outcome. BMDA may initiate a strong research and development wing in their system. At this point mainstreaming of other institutions like Soil Resource Development Institute (SRDI), Department Agriculture Extension (DAE), Bangladesh Agricultural Research Institute (BARI), Bangladesh Rice Research Institute BRRI), Bangladesh Sugarcane Research Institute (BSRI), Mango Research, Bangladesh Rural Development Board (BRDB) and NGO, civil society etc could bear value in the process.