

# Building Resilience to Climate Change Through Adaptive Small Scale Farming in Rainfed Areas of Bangladesh, India and Nepal (SAFBIN)

## Testing Climate Smart Rice Information on Farmer Led Action Research in Drought Tolerant Rice Varieties

**1. Concern:** Delay in arrival of Monsoon. Rainfall in Monsoon is less uniform and there are wet and dry periods within it. There is significant fluctuation in rainfall intensity as well (from one event to another or one month to another). This results in lack of enough soil moisture in certain growth phases of rice while excessive moisture in other periods.

### 2. Objective:

To find out the performance of drought tolerant rice varieties in rain fed locations.

### 3. Varietal trials in rice undertaken:

- Farmer Group led action research on Sukha dhan (1-3) varieties were undertaken in 36 locations. In Nepali Sukha means dry and these rice varieties are promoted as suitable for rainfed conditions with periods of dryness. For control resident rice varieties namely Radha-4, OR etc. were used.
- The 36 trial locations were in following districts: 18 in Bardiya, 14 in Nawalparasi, 3 in Kaski and 1 location in Surkhet. All these were rain fed rice farming locations. In each location there were 3 varietal trial plots (3 replication each of one variety). Each location had at least 2 introduced varieties and 1 locally used resident variety (control).

### 4. Findings:

- The introduced drought tolerant Sukha dhan (1-3) varieties showed stability and comparative or higher grain yield and greater straw amount as compared to resident rice varieties.
- There was moderate drought condition in Bardiya in the year and the Sukha dhan (1-3) varieties performed well in all the 18 locations in Bardiya. Similarly, the drought tolerant rice varieties provided better yields in Nawalparasi and Surkhet as well. The yield results of Bardiya is given here (see table).
- The farmers preferred the Sukha dhan (1-3) varieties depending on their characteristics. For example, Farmers liked the fat rice grain given by Sukha dhan 2 and noted this was good for their household consumption. Farmers liked the slender rice grain of Sukha dhan 3 and noted this was good both for self consumption and for sales. The farmers were glad that Sukha dhan (1-3) gave good amount of straw as well, more than that of some of the local varieties.
- Upon realizing good yield in 2012, 446 farmers in the 34 groups cultivated Sukha dhan (1-3) in 2013. These farmers were glad to plant the new varieties because of following reasons. They wanted to increase rice varietal diversity in their farms to adapt to fluctuating Monsoon conditions and reduce risk. That is they planted the new best performing Sukha dhan (1-3) varieties as well as maintaining plots of their long tested resident variety. They understood from year 2012 trials that Sukha dhan has capacity to provide good grain and straw yield in drier conditions. The Monsoon of 2013 was relatively a more wet one, and in this year as well Sukha dhan (1-3) realized comparative to better yields. Hence, farmers now know Sukha dhan is good for both relatively dry year as well as a wet year.

### 5. Way forward:

- 446 farmers in the 34 groups cultivated Sukha dhan (1-3) in 2013. They plan to keep the seeds of their selected Sukha dhan (1-3) variety and expand the farming area to half or more than half their land. However, they also want to continue farming of their resident long tested and trusted variety in some portion of their land. Caritas Nepal thinks this is a good strategy. In comparatively dry years Sukha dhan (1-3) will give the farmers good yield while in other years with better Monsoon the resident variety can also provide good yields.
- The farmers are now more consciously using good practices in rice farming and they plan to continue this. These practices are use of as much organic fertilizer as possible, judicious use of chemical fertilizer, proper nursery management, timely seedling transplantation, maintaining adequate spacing between seedlings during transplantation, and timely weeding.
- Caritas Nepal will promote Sukha dhan (1-3) varieties in the suitable locations to more farmer participants of SAFBIN projects as well as through its IPM Network to other farmers as well.

### 6. General information

Nepal is considered one of the origin center of rice (Nepal Agriculture Research Council). Rice is important to the people and the economy of Nepal. Agriculture employs about two thirds of the population of Nepal. Rice is planted in lowland in Nepal as well as highlands (up to 3050 meters) in Nepal. Rice is farmed in 1.44 million hectare of land. About 30% of this land is drought prone. The yield is about 2.56 tons per hectare on average. Rice contributes to half of the calorie requirements of the Nepalese people. Sukkha dhan (1-3) varieties are produced by Nepal Agriculture Research Council (NARC) with IRRI.



**Table: Combined Mean Performance of tested rice varieties in Bardia district in 2012**

Treatment No.	Varieties	Plant height	No. of Panicle per Plant	Grain Yied (ton/ha)	Straw Weight (ton/ha)
1.	Sukha dhan-1	110	9.03	3.4	7.66
2.	Sukha dhan-2	117.5	8.82	4	7.98
3.	Sukha dhan-3	111	10.74	4.1	7.71
4.	Radha-4	98.2	10.41	3.3	6.72
	GM	108.1	9.79	3.6	7.49
	F-test	Highly significant	Significant	Not Significant	Not Significant
	Lsd	6.83	1.154	0.7	1.292

The above given is combined mean performance of tested Sukha dhan and Radha 4 rice varieties in 18 locations in Bardiya. Annual rainfall within Bardiya varied significantly in 2012. For example, it was 694 in Taratal location with 31 rainfall days and 1340 in Mainapokhar location with 44 rainfall days. Average minimum and maximum temperature were 5.4 °C and 46°C respectively. The relative humidity (RH) was between 27% to 94%. Delayed onset and early termination of Monsoon rain is a regular feature in the district.



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