



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

## Farmer Led Action Research to Determine Suitable Wheat Variety

**1. Concern:** Variation in winter rainfall in the past decade in terms of time of precipitation, slight decline in number of rainfall days, and decline in total amount of precipitation.

### 2. Objective:

- To find out which wheat variety performs better in the present climate context.
- To find out performance of wheat on with and without irrigation basis.

**3. Varietal trials undertaken:** 9 units of Farmer Group led (Mother Trial Plot basis) action researches were undertaken in the period of November 2012 to April 2013. Varietal trials for Vijay, Gautam, and the resident local variety was undertaken in four lowland locations: Rajahar of Nawalparasi and Mainapokhar, Motipur, Belawa of Bardiya. Varietal trials were undertaken in five upland locations: Deurali and Rakachuli of Nawalparasi; Dhikurpokhari of Kaski; and Lekhgaun and Gadi of Surkhet.

**4. With and without additional irrigation trials undertaken:** These trials were undertaken on farmer led basis. These trials were undertaken in the period of November 2013 to April 2014. These trials were undertaken in nine lowland locations: Mainapokhar, Motipur, Beluwa, Kalika of Bardiya and Rajahar, Pithauli, Shivamandir, Dhobadi, Dumki-bas of Nawalparasi. Similarly, these trials were also undertaken in three upland locations: Hemja, Puranchour of Kaski, and Latikoili of Surkhet.

### 5. Findings:

- In the lowlands the introduced Gautam and Vijay wheat varieties gave higher grain yield and more straw as compared to the locally used variety. The grain yield realized was satisfactory for these varieties in most locations. That is it was about equal to or more than that of national average 2.4 ton per ha (see table given here). The introduced varieties were free of the rust and other diseases (as claimed by NARC).
- In the uplands, the introduced wheat varieties, namely WK1204, Gaura gave greater grain yields as compared to the introduced variety Dhaulagiri and locally used varieties. The grain yield realized in few of the upland trial locations was satisfactory and in other locations it was still low (see table given here). Caritas Nepal has advised the small farmers to improve land preparation, sowing, fertilizer methods in the uplands to improve yields of wheat in the future.

Table: Example of wheat varietal trial results in upland and lowland

Wheat Varietal Trial Result Lowland Location: Beluwa of Bardiya			Wheat Varietal Trial Result Upland Location: Gadi VDC of Surkhet.		
Wheat Variety	Grain yield (ton/ha)	Wt. of straw (ton/ha)	Wheat Variety	Grain yield (ton/ha)	Wt. of straw (ton/ha)
Vijay	4.2	4.9	Gaura	1.4	2.1
Gautam	4.5	5	Dhaulagiri	1.2	2.9
Local	3.9	4.1	WK1204	1.9	2.5
			Local	0.9	2.2

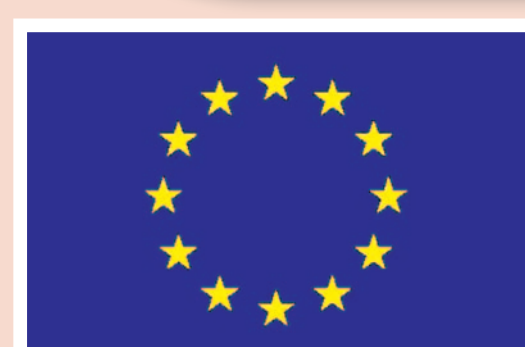
- In regards to the irrigated and non irrigated trials, the small farmers found that in locations with greater dryness there is significant increase in grain yield (greater than 10%) when 3 times irrigation is added. While in locations with relatively more soil moisture the increase in yield with irrigation was limited (9 % or less). These trials were done in November 2013 to April 2014 period, and there was at least three times rainfall in most locations during this period.
- The farmers have kept the seeds from the trial plots of 2012/13 and have used these seeds (and obtained additional best performing wheat variety seeds from Caritas Nepal) to plant in 2013/14. 426 small farmers planted the new wheat varieties in significant portion of their land (30% or more of their land) in 2013/14. The farmers' wheat yields have improved in 2013/14 due to introduced new varieties as well as better winter rainfall situation in the year as compared to the past year.



### 6. Way Forward - The farmers noted they will continue to pursue following practices to adapt to climate change:

- Keep seed stock of at least 2 proven rust resistant wheat varieties, and ensure wheat seed is replaced on timely manner in the future (by linking to relevant government and private sector institutions).
- Try to plant wheat early to catch remaining soil moisture from Monsoon. That is plant wheat soon after harvesting of Monsoon rice.
- Use adequate amounts of organic and chemical fertilizer (NPK) during land preparation and as top dressing.
- Pursue line sowing in some portion of their land (if not in the whole land). If broadcasting wheat, take care to broadcast seeds giving good spread. This is as against dense broadcasting as done in the past.
- Provide 2-3 times additional irrigation where possible and in other locations try to pursue dew harvesting methods if suitable. Undertake weeding as required.

**7. General Information:** wheat is farmed in 765,317 hectare of land in Nepal. The average yield is 2.4 ton per ha (CIMMYT). Wheat varieties promoted were disease resistant ones. Vijay is rust (UG99) resistant variety. Gautam is resistant to leaf and yellow rust and leaf blight and moderately resistant to loose smut. WK 1204 is resistant to yellow rust. These varieties have been produced by NARC.



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