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Boosting Rice Production and Productivity for Ensuring Food Security in Uttarakhand Hills

J.P. Aditya

Rice is a major food crop in Uttarakhand hills which has great significance in food security of the region as well as plays integral role in almost all traditional rituals. The custom of "*Hudukiya Bol*" practiced during rice transplanting in hills also presents a unique example of communal harmony. In comparison to plains, hill region of Uttarakhand could not reap the benefits of green revolution and rice cultivation is still dominated by tall and lodging prone traditional cultivars like "*Thapacheeni, China4, Lal Dhan, Candolia, Thapuli, Chauria, Kusi Pai, Shiaun, Danshau, Jyoli, Rajma Dhan, Nan Dhan, Godi Dhan, Sau Dhan*" etc. During past decade the production and productivity trend of rice are sluggish and the level not seems sufficient to realize future requirement for ensuring the food security of rural masses. In recent times a number of high yielding rice varieties suitable for rainfed and irrigated ecology of hills are developed which are fairly tolerant for prevalent biotic and abiotic stresses. Wider adoption of these improved cultivars by farming communities can boost rice production and surely mitigate the problem of food and nutritional security in the region.

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developed which are fairly tolerant for prevalent biotic and abiotic stresses. Wider adoption of these improved cultivars by farming communities can boost rice production and surely mitigate the problem of food and nutritional security in the region.

Rice is grown in Himalayan region from centuries as major food crop and as cultural legacy with its integral role in almost all rituals of this region. The rice production scenario has undergone a dramatic increase in the productivity and profitability particularly, in plains as the result of green revolution but hardly any impact was experienced in hills where still food and nutritional security are the major concerns. Rice is the major source of food and livelihood security in Indian Himalayas. The total area under hill rice is about 1.8 to 2.0 million ha in India out of which 0.60 million ha area is situated in North-Western Himalayas, producing about 1.52 million tonnes with the productivity of 2,533 kg/ha. Hill

agro-ecosystem represents a harsh climatic conditions, fragility, marginality and inaccessibility and difficult eco-geographic conditions which affects crop productivity at micro as well as macro levels. Keeping this in view, major emphasis has been given to develop high yielding varieties with improved production and protection technologies suited for different altitudinal range in the hill region. Uttarakhand is a North-Western Himalayan state and rice is the major cereal crop of *Kharif* season accounting for more than 31 per cent of the total area under cereals. In Uttarakhand, rice acreage is about 280 thousand hectares with annual 593.8 thousand tones production. Rice alone contributes more than 32.08% of the total food grain production of the state. Low productivity (1333 kg/ha) levels of rice in Uttarakhand hills as compare to plains is primarily due to cultivation of local or indigenous varieties under

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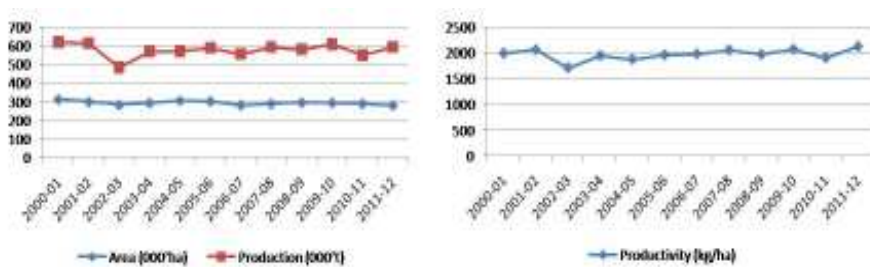


Fig. 1. Trend of rice area, production and productivity in Uttarakhand

prevailing rainfed farming systems, low input and varied eco geographical conditions which does not allow the production beyond a certain limit. Rice cultivation in Uttarakhand hills is dominated by traditional cultivars like “Thapacheeni, China4, Lal Dhan, Candolia, Thapuli, Chauria, Kusi Pai, Shiaun, Danshau, Jyoli, Rajma Dhan, Nan Dhan, Godi Dhan, Sau Dhan” etc. which are adapted to the prevalent rice ecosystem of the region, tall statured and lodging prone but preferred by farmers for their ability to provide straw along with grains. During past decade the trend of area (2.8-3.12 lakh ha), production (4.8-6.21 lakh t) and productivity (17-21 q/ha) is almost sluggish (Fig.1). Envisioning the future demand, enhancement in production and productivity levels of rice requires immediate attention for ensuring the food security of rural masses of the hill.

Traditional rice cultivation practices in Uttarakhand hills

In Uttarakhand, traditionally spring rice (Chaiti Dhan) cultivation is practiced which is confined only to its hill region. Chaiti Dhan is generally grown direct seeded during March end to early April taking advantage of the winter rains and harvested in the month of September under upland rainfed ecosystem. In hills, Chaiti Dhan cultivation generally follows two years crop rotation as “Chaiti Dhan (March end/April to September)-Wheat (October to May)-Finger millet/barnyard millet (June to



Fig.2. Custom of “Hudkiya Boll” during transplanting of rice in Uttarakhand hills

September)-Fallow (October to February end/March)”. This system allows harvesting of only three crops in two years with a cropping intensity of 150% but the development of short duration (110-120 days) varieties of Jethi Dhan (sown at onset of monsoon and harvested by end of September/October) has opened new avenues to increase the cropping intensity by 200% for rainfed upland condition without yield penalty and affecting successive rabi crop sowing.

Under irrigated ecosystem, a custom of “Hudkiya Boll” i.e.

traditional musical instrument (Hudkiya) and hard work (Boll) is very popular and associated with the transplanting of rice in Uttarakhand hills (Fig.2). In this practice with the harmony of Hudkiya beat and folk songs, rice transplanting is performed collectively on community basis by group of women in the villages.

Impact of improved rice varieties in Uttarakhand hills

In Uttarakhand, hills has an almost half yield level of rice as compare to plains due to lacking the inputs of green revolution viz., improved varieties, chemical fertilizers and irrigation which hampers the improvement of productivity levels to a great extent. Keeping these points in view, a focused approach of Front Line Demonstrations (FLDs) was undertaken to popularise superior and high yielding rice varieties having excellent characteristics like resistance to blast disease prevalent in hills for cultivation under different niche area of hills. For the said purpose improved rice varieties VL Dhan 85 and VL Dhan 65 were released for commercial cultivation in 2006 for the irrigated conditions of the mid hills of Uttarakhand. Under the standard agronomic practices, VL Dhan 85 and VL Dhan 65 can

Table1. Performance of improved rice varieties on farmer’s field in Uttarakhand hills

Year	No. of villages	No. of farmers	Area (ha)	Improved varieties	Yield (q/ha) at farmer’s field		% gain over local check
					Improved varieties	Local cultivar	
2009	7	70	11.75	VL Dhan 85	45.74	29.41	55.54
				VL Dhan 65	52.81	29.39	79.68
2010	18	102	10.12	VL Dhan 85	47.25	36.74	28.59
				VL Dhan 65	53.18	36.74	44.74
2011	20	135	9.82	VL Dhan 85	48.11	35.54	35.36
				VL Dhan 65	54.28	35.54	52.71
2012	10	97	8.00	VL Dhan 85	48.17	35.74	34.76
				VL Dhan 65	49.35	35.74	38.07

Table 2. Cost-returns through improved rice varieties on farmers field in Uttarakhand hills

Particulars	Improved varieties	Local cultivar
Total cost of cultivation per hectare	Rs.30,361/-	Rs.28,659/-
Gross Income per hectare		
a. Value of grain	Rs.51,400	Rs.38,500
b. Value of straw	Rs.7,125	Rs.7,500
Total (a +b)	Rs.58,525	Rs.46,000
Net profit per hectare	Rs.28,163	Rs.17,340
Benefit: Cost ratio (B:C)	0.93	0.61



Fig.3.View of improved rice varieties and threshing operation at farmer's field

produce up to 52 q/ha and 55q/ha within the maturity period of 120 days and 130-135 days respectively.

To ensure the productivity enhancement and consequently food security among rural masses in hills awareness is being created about the improved rice varieties. The wide adoption of improved varieties VL Dhan 85 and VL Dhan 65 has undoubtedly increased the production and productivity of rice in hills. Front line Demonstrations conducted in temperate mid altitude of Almora districts with agro-ecological situation most suitable for rice cultivation in hills. The FLDs on improved rice

varieties VL Dhan 65 and VL Dhan 85 were conducted in a total 39.69 ha acreage of Almora district. Improved rice varieties exhibited excellent performance in all the demonstrations and VL Dhan 85 and VL Dhan 65 average yield of 47.32 q/ha and 52.41q/ha respectively. Improved varieties of rice VL Dhan 85 and VL Dhan 65 showed its overwhelming superiority over local checks for grain yield productivity which varied from 28.59% to 55.54% and 38.07% to 79.68%, respectively than local cultivars traditionally grown in farmer's field under demonstration (Table 1).These improved varieties

were also found free from rice blast which is otherwise prevalent in hills and insect pest incidence. Further, as per estimates of cost and returns rice cultivation by using improved rice varieties was found more profitable as compare to traditional cultivars (Table 2). Overwhelming performance of improved rice varieties in farmer's field ensured that their wider adoption can surely help to boost rice production in hills make this region food secure in future for increasing population.

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Mountain Agro-ecosystems : Some.....

a system is a function of the soil ecosystem. A soil ecosystem reverberating with bounty of life forms (microflora, microfauna, mesofauna, macrofauna) within has bearing on the health of life forms in the troposphere, including that of plants and human beings.

Much more food is likely to be produced from such system than it would have been produced from merely the cropland isolated from forests/ rangelands, for all the

necessary agri-inputs are availed from within the system and a variety of foods are also made available from the uncultivated area. The system would be of great economic significance, for the farmers would earn not only from cropland but also from the produce of uncultivated lands. Demand on market for purchase of inputs would be reduced and, in long-term, eliminated. There would be no agriculture-borne pollution of the environment. Sound

health of the system, livestock and people would be ensured. The system would promote social-cultural cohesion amidst the community, for the uncultivated lands can then be used as the common property resources (CPRs). Ecological integrity of the farming system would be maintained and sustainability of the agriculture would be ascertained.

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