

Tour Report of Raj Gupta for Nepal Visit July 30-August 2, 2003

Day I - July 30, 2003

Reached Kathmandu from Delhi by 1430 and visited Khumaltar and met Dr. Maski and then together with Dr. Shanti Bhattarai, we straight went to Kotunjaya in Bhaktapur district. There from last one year, after Raj Shrestha's departure to USA, we had been using this site more exclusively for LCC and other RCT work (zero-till wheat and some bed planting works). Farmers traditionally do lot of bed planting on terrace agriculture on terrace sloppy lands. We work with a Women Farmer group there and Mr. KC Uddhava, is the only male farmer in the group who is the Secretary of the RCT group of the farmers.

At Kotunjaya they showed me some farmer trials on the raised beds where last season wheat was grown. Another farmer has adopted a small area on the terrace to plant rice on narrow beds. Some signs of impending big changes that could be easily discernible are as under:

- NARC scientists have given a power tiller to the villagers on loan to experiment with it. Although it has not been easy to take the power tiller from terrace to terrace but they managed to move the machine between terraces using two large wooden planks as a track.
- Farmers group here have bought an initial version of the locally made power thresher and they claim to have saved NR 10K in wheat threshing season. They seemed to have realized the importance of mechanization. This is clearly indicative of the fact that Scott's mechanization efforts are beginning to work in Nepal.
- Farmers now like to split the application on N using LCC in rice. Broadcasted N apparently is of little use for the crop as the top dressed N moves out of terraced land with runoff. We need to promote single deep placement in rice as a better option and it will work if we move in the direction of direct dry seeded rice. A single deep N dose while it obviates the need for split applications, save labour, reduce N losses and improve nutrient-water interactions. It may also make LCC use redundant.
- Some direct seeded rice trials are also there but in most of these fields a very high seed rate has been used.
- Root slips of the different grasses have been distributed amongst farmers and these are being multiplied. Grasses are will be planted on the riser face of the terrace to provide for fodder and also to stabilise the risers against caving in during monsoon season- a common problem. The activity was planned last wheat season.
- It was observed that lot of rainwater from the forest area is received in the area but it is simply diverted to natural drains called "kools". In Almorah hills of UP under similar conditions, VPKAS (ICAR) has designed experiments to divert the runoff of forest area to flow over cropped terraced lands and also store a part of it in small ditches. Results of these experiments suggest that it helps reduce fertiliser N needs by 25-30%. Storage of rainwater in ditches on the terraces helps meet water shortages in intervening rain-free periods. We need to give it a try in a different manner. Farmers apprehend that until riser walls are stabilised with fodder grasses, terraces may cave in. We need to check this apprehension. I discussed this issue with Mr. Sushil Bhattarai, who earlier served as chief conservator of forest in Nepal. He agreed with the idea that we should make beds along contour and use furrows for growing rice and raised beds for horse beans, and soybean etc.. This way we can store rain water/ forest runoff, save on nutrients and have more water for rice and soil profiles better charged with moisture. A soil profile charged with water is a better guarantee for drought proofing during the

wheat season. Intercropping will improve the land equivalent ratio and thus the farm-gate incomes. We will check on this next season.

- Small beds made along contours is likely serve better. Right now, farmers make beds along the slope and along the contours. This definitely needs to be changed.

Day II - July 31, 2003

The Buddha flight scheduled to fly to Bharawah at 7am did not fly until 12.30hrs. It was raining most of the time and we had little time left after a visit to farmers' fields and visit of the experiment station with shoes in hands at times. Every one advised us against reaching Bharatpur before 9PM, Sorry Scott for this, but it is becoming clearer to every one there that there is a need to use cheaper sources of energy and more steel for speedy results. I was told that the first version of the ZT drill / bed planter "Made in Nepal" may be available for experimentation by next year with help from private sector.

In the research station we saw lot of direct seeded rice. Last year during the kharif due to weeds they had kept many fields fallow. They used the 4 wheel tractor for seeding the DSR. Several methods were used for establishing the rice crop and weed management.

Trials in progress at Bhairwaha, Birgunj and Kotunjaya sites can be broadly categorised into two groups, A) direct dry seeding with ZT drill/ seeder drill operated with two wheel tractor and B) Wet seeded rice and transplanted rice under puddled conditions.

A. Direct dry seeded rice has been established by several ways indicated below.

1. ZT direct dry seeded rice with Pretilachlor and butachlore or Almix
2. ZT seeded rice / transplanted rice on old and new raised beds/ flats
3. Direct dry Seeded Rice (broadcasted) mixed with power tiller
4. Direct dry seeding of rice on flats / raised beds using a bed planter or Chinese seeder.

B. Planting into puddled soils

1. Broadcasting of pre-germinated seeds on puddled soils
2. Seeding or pre-germinated seeds with drum-seeder on puddled soils

Some of my observations on these trails are as under:

- DSR followed by ZT wheat is best when crop residues were kept on the surface.
- Chiselling the soils had no effect on rice growth.
- In DSR rice, there is an urgent need to reduce seed rate. Although scientists have reduced the seed rate from 80kgs/ha to 40-60 kg/ha in Bharwaha but it needs to be reduced to around 20 kgs/ha for medium course varieties and to less than 15 kgs for other scented fine grained cultivars. At higher seed rate, crop was already suffering from N deficiency and from excessive plant competition. Farmers also indicated that DSR rice due to higher plant density, suffer from BPH and lodging too .
- Curiously enough, rice plants had tip yellowing; some suggested that it is symptom for Mg deficiency, we need to check this by applying MgSO₄ in a small area.
- A collection of *Sesbania* is being multiplied by cutting method. *Sesbania rostrata* has come out to be better and many stem slips had sprouted and these cuttings are putting up good growth. Nodulation on step was apparent and seemingly effective. Due to waterlogging of the selected field, apparently other *Sesbania* cultivars could not come up well.
- Scientists and farmers alike confirmed that germination of irrigated rice was adversely affected where ever seed depth was more an inch or too much water was applied / fields remained submerged for long due to frequent rains. These observations corroborate with Indian experiences and suggest that DSR be sown before rains with a pre-sowing irrigation or after first rains. It provides seedlings

some time to emerge and withstand early submergence (Young seedlings suffer heavy mortality if they remain submerged for few days after emergence.

- In Bharwah J. Tripathi has tried “bidhani” (ploughing in direct seeded rice followed by a light planking. This practice has helped control weed significantly. In eastern UP farmers do not plough but do planking (“Laeve”). This presses weeds in surface soil layer and let rice stand again but not the weeds. I think that in DSR rice with herbicide use, if weeds are likely to pose problem going for “Laeving’ will be good option for weed management. We will try this where situations with warrant this.
- J. Tripathi mentioned clearly that his training with Ken Sayre has left on him a permanent mark and he is now little scared of machines, more confident, and this in turn has helped his farmers to have greater confidence in him. Thanks to Ken for his help and training scientists from this region.

Travelled to Bharatpur to stay overnight there and reach Birganj early morning

Day III - August 1, 2003

From Bharatpur we travelled to Birganj. Previous night, it rained it heavily only to help disrupt the vehicular traffic. In Birganj we were received by Er. Ganesh Sah. I was extremely pleased to see Ganesh Sah’s efforts on DSR flats / beds using CHT / ZT and bed planters and drum seeder and his reach for the farmers. My summary of his efforts is as under:

- Growth of DSR after ZT wheat with mulch was much better and very little weeds.
- Seed rate of 22-25/ ha is better in DSR rice than a higher seed rate.
- Of all Boro rices (6 cultivars from Nepal, India and Bangladesh were tested and according to Mr. Ganesh Sah and Mr .AP Dahait and Mr. Yadav (both farmers), BRRI 36 performed better under Nepal Terai conditions.
- Pretilachlor has been used for control of weeds in DSR rice by Ganesh Sah in all his on-station and on-farm trials. *On the basis of what I saw, the weeds in DSR are not a problem and farmers are getting convinced about it.*
- In Belwa, near Birganj, due to an earthen dam, water is readily available and farmers grow summer rice followed by Aman/monsoon rice. Continuous rains/drizzles that continue for 2-3 days lead to seed germination right into panicle. This is a problem of modern rice cultivars having no dormancy. *There is an urgent need to breed for some amount of dormancy in rice and wheat.*
- Farmers take rice –rice wheat systems in Birganj, Belwa. The issue is do we have a rice cultivar that ratoons well. A high yielding cultivar that gives even 4.5 tons grains as a ratoon crop will be of immense use - to bring down the cost of cultivation of second rice significantly. Discussions with farmers revealed that a decade ago farmers were growing two rice cultivars (Bhalori and Kehra) in combinations. This varietal mix had different dates of maturity and heights (tall vs. dwarf). Both the rice cultivars were sown at the same time in Transplanted /DSR mode but farmers used to harvest them one by one by end of Oct/ by early November. These cultivars have become extinct now and farmers are trying for the seed of some of these cultivars once again. Tripathi agreed to check in for these rice locals in the NARC germplasm collection. Thus such a blend of cultivars helped them over come need for a good rationing cultivar.

Overall it was a very useful visit during planting time and there were several things as mentioned previously which will need our attention to be able to grow rice more like wheat or other upland crops. I take this opportunity to thank profusely Dr Shanti Bhattarai, J. Tripathi, Regmi and Er. Ganesh Sah and compliment them for taking pains to move in the direction of resolving puzzles related with issues of weed management in DSR. It seems that Ganesh

Sah's efforts have dwarfed the stature of Bharawaha . It is challenge for the team of scientists stationed in Bharawaha..

Last, but not the least, I could realize the fact that NARC scientists have turning more enthusiastic and becoming fired-up and willing to accept challenges. They are now talking of publications and their rights. It's a big change and possibly brought about by introduction of promotion policy. Many of our partners working with us in Khumaltar, Parwanupur and Bharwaha were assessed and have been promoted. This has brought back life into the national research system due to strenuous efforts of the research managers and planners.

Raj Gupta ..