

Third season-long Training of Trainers (TOT) Course on Rice IPM

The project organized the third season-long TOT on Rice IPM from June to October 2012. 25 officers from plant protection and extension directorates of three eastern provinces of Afghanistan, such as Nengarhar, Laghman and Kunar attended the training. The TOT was conducted at the Agriculture Research Farm in Dehdadi, 10 kilometers west of Mazar city in Balkh province, where the previous two TOTs were conducted.



The training started on 18 June 2012, 18 days after rice crop was transplanted by the second batch of participants before completing their TOT. The TOT was conducted in parallel with Farmer Field School (FFS) in their posting place as the cropping season coincided with the TOT. So the design was slightly different from first and second TOT. The participants each time spent 7-10 days in the training center followed by two weeks at their duty station for conducting FFS. The training was completed in middle of September 2012.

In Afghanistan, the conventional method of random transplanting very old seedlings is the main problem of poor yields of rice, which is around 3 tons per hectare and much lower than the neighboring countries, such as Pakistan and Iran. Because of random transplanting, weeding becomes a more difficult job, thus most farmers leave the field unweeded. The poor growth of plants combined with weed problems then becomes more vulnerable to pest and disease infestation.

To address the problems above, SRI was introduced in the TOT and FFS. For details about SRI, please refer to the link. In the TOT, rice was grown in around an acre of land using the System of Rice Intensification (SRI) method, involving a number of field trials on various aspects of SRI. In SRI trials, comparisons were made between single seedling and double seedlings per hill with half, quarter and zero doses of chemical fertilizers, generally used by farmers. In both the cases, seedling age was 13 days. The spacing was 25X25cm. Weeding was done three times with rotary weeder. Water was maintained only at moist condition with

intermittent irrigation. Before planting rice, clover was grown in the field as green manure and mixed into the soil at the age of 35 days. All the trials were equally distributed to five small groups of participants.

The trials allowed the participants to learn the concept of maximizing rice yields with better management of the rice paddy, while reducing the use of external inputs, especially chemical fertilizers to sustain the growth of rice production.



TOT participants in classroom session after field observation

The classroom session provided the participants with the methodologies of non-formal education to create an environment for learning through hands-on exercise, field observation, group work, individual and group assignment, presentation, displays, debate and discussions. This was supported by technical sessions on subject specific matters by the national and international trainers and resource persons on regular basis.



Hands-on field practice, enhance technically confidence. For field management decision are made through regular monitoring. Weeding while cleaning the weeds aerates the soil.



The results of the study

The results of the studies were very impressive. Rice yield with SRI with half-dose of farmer's use fertilizers was **9.16** tons per hectare, which is **three times** the average yield of farmers in the area. There was no difference in yields between using single seedling and double seedlings per hill. The yields with quarter dose of farmer's use fertilizers were 7.74 tons/ha with single seedling and 7.13 with double seedlings per hill, providing this time single seedling with an advantage of 8.5% yield increase over double seedlings per hill. The yield with no fertilizers at all was 6.61 tons/ha which is two times the farmer's average yields in the area. *All these yields were recorded based on the total harvest of individual plots, not just based crop cut where there are higher chances of error.*

The yields of SRI in the same field in the previous year with similar amount of chemical fertilizers was 6 tons/ha. The yield this year is more than 50% higher than in the last year. This confirms a positive trend in yield increase with SRI, unlike the conventional methods where there is a tendency to decline in yields.

Field studies data in the TOT field

Seedlings per hill	Variety	Transplanting Date	Harvesting	Plot Size (M ²)	DAP (Kg/Ha)	Urea Kg/Ha)	No of Average Till/hill	Yields/ ha
1	Kunduz 1	01/06/12	30/09/12	426.6	140	187	37	9.17
2	Kunduz 1	01/06/12	30/09/12	426.6	140	187	37	9.17
1	Kunduz 1	01/06/12	30/09/12	426.6	70	140	32	7.64
2	Kunduz 1	01/06/12	30/09/12	426.6	70	140	27	7.13
2	Kunduz 1	01/06/12	30/09/12	426.6	0	0	27	6.61

One reason of this yield increase can be attributed to the use of green manure. As mentioned previously, 35 days old clover grown in the field as green manure was mixed in to the soil this year. In last year, however, there was no green manure used. Green manure highly improves the soil quality and health, increasing the availability of soil nutrients for a longer duration of time.

SRI gives more profit because the cost is less. SRI needs less seeds (5-7kg/ha), less chemicals and less water. Facilitators and farmers visiting the fields were highly impressed with the overall yields and profit margin with SRI.



Vigorous growth and higher yields

The facilitators participated in the TOT conducted 20 FFS in Nengarhar, Laghman and Kunar, provinces. In all these FFS, rice is nearly harvesting stage. Rice yields in these FFS fields are expected to be 50-100% higher than farmer's average yields in the area. Yield increase in the next year is expected to be much higher because in most of the FFS planting time was late, and the seedlings age was much higher than the recommended age for SRI which was 25-40 days old, planted in 3-4 seedlings per hill. However, farmers are already happy with this yield increase. In the coming season, they are all planning to apply the SRI method on their own fields.

The potentials for self-sufficiency and further exporting rice

According to 2012 Agriculture prospect report, the total production of rice in Afghanistan in 2011 was 450 thousand metric tons as against the requirement for 520 thousand metric ton, with a net deficit of 70 thousand tons per year. Based on the potentials for yield increase as demonstrated in the above cases, SRI bears a huge potential for Afghanistan to become an exporter of rice, while fulfilling the complete domestic requirements if introduced in all rice-growing areas in the country.

The net return from rice is much higher than from other cereals, especially wheat because rice price is always higher (at least two times) than other cereals. However, water is an important constraint. Now that SRI has been introduced, it will reduce the water use by 50-70%, providing opportunities for even expanding the rice area. Instead of maintaining the rice field continuously flooded with at least 2-4 inches of water, which is the common practice in conventional methods of growing rice, keeping the field only moist is sufficient for SRI. This reduces the water use by 50-70%, depending on the soil condition in the area.