



Aga Khan Foundation-Afghanistan

Baghlan Regional office

Participatory Management of Irrigation System (PMIS)

Natural Resource Management (NRM)

System of Rice Intensification (SRI)

SRI Final Report for 2008

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This year 2008, the second year of SRI trials, we started our System of Rice Intensification (SRI) transplantation on our own AKF/PMIS farm on 20-21 May (31 Saur/1 Jawza) in Baghlan province. Although this farm is a government institution, AKF-A has five Jeribs (1 hectare) of land there as a result of an agreement between the Baghlan local government and Aga Khan Foundation's Baghlan regional office. AKF-A has strong relationships with the Afghan government, and AKF-A always involves the Afghan government in every program, especially for its Natural Resource Management (NRM) program, as seen from AKF having a farm at the government's research farm and involving government staff. On these five Jeribs of land, AKF has various experiments and demonstrations including SRI.

One Jerib of land was allocated for rice cultivation, divided into two parts: 1,000 m² of rice transplanted with conventional methods, and 1,000 m² of rice transplanted according to the System of Rice Intensification (SRI) for a proper comparison. The SRI team proposed last year that in 2008 we cultivate rice by both methods side by side in order to make a better comparison.

It should be mentioned that at the end of last year, the AKF team suggested making trials on more fertile land in 2008 as we had learned from our first year of SRI trials that the land used was not very fertile, being full of reeds and land where rice had never been cultivated before. Nevertheless, also in 2008 we could not find the kind of good land that was proposed to use. Our SRI land for 2008 was located at Puza-e-Eshan as part of the Puza-e-Eshan research farm. It was also land where rice has never been cultivated before, and the land was unlevelled. Its soil was sandy and full of reeds. Before it was levelled to prepare for cultivation, there are many reeds appearing on this land where we established our SRI demo-plots. However, although this is not very fertile land, we got a better yield compared to the first year's SRI trial because we started our SRI practice earlier in 2008 compared to 2007. The results were thus very encouraging.

Our first-year SRI trials were conducted in Baghlan and Takhar provinces in northeastern Afghanistan. The yields from SRI trials in 2007 were not very satisfactory to the farmers because we started the cropping season late, and there were also some other reasons as written in the final report on SRI activities last year. Because tillering and root growth were encouraging in 2007, some farmers were willing to continue trying out the methodology.

PMIS arranged a workshop at the end of 2007 involving farmers and Agriculture Department (AD) representatives to review the SRI results that year. The SRI team made some suggestions and propositions for 2008 to improve the SRI work in our target area. Here are some of the suggestions/propositions that emerged from the workshop:

- AKF/PMIS should find more fertile land for the 2nd year of SRI trials because the SRI land in the 1st year was full of reeds, unfertile, and rice never had been cultivated there before.
- AKF/PMIS must cultivate rice with both methods side by side, having at least one Jerib² (1,000m²) each under conventional methods and SRI methods for a better comparison.
- Select some volunteer farmers along the Jangharoq and Kelagai Canals to do SRI, receiving technical support from the SRI team. PMIS should provide incentives (e.g., watering can/water sprayer, marker and weeder) for each volunteer farmer. One reason why SRI yield was not better than conventional in the first year of SRI trials was because we guaranteed yield to the farmers, promising that if they did not get a yield as good as usual, PMIS would pay the difference. Unfortunately it was too late to find ideal plots for evaluating SRI practices, and also farmers did not pay a lot of attention to their rice crop because they had been assured by PMIS to



get a guaranteed yield as we had agreed with them.

- Exposure trips among SRI farmers were recommended, which should also include Agriculture Department representatives. In 2008, PMIS selected four SRI volunteer farmers along the Jangharoq canal in four different villages, and two SRI volunteer farmers in Kelagai area. According to farmers' suggestions, we provided support and incentives (watering cans/water sprayers, markers and weeders) for all six SRI volunteer farmers.

For this second year of SRI trials in 2008, local government staff were involved actively in SRI exposure trips to the fields of SRI farmers and to the Puza farm, and these officials from local government are supporting us to promote SRI in the region. Now local government officials know well the concepts of SRI and are happy about this.

Conventional rice cropping always starts earlier than SRI because its seedlings are older. First we soaked the seed for conventional practice and started the process early because conventional seedlings are transplanted at 35-40 days after seed broadcasting in the nursery. SRI seedlings are transplanted 8-13 days after seed broadcasting on the seedbed, so there is big difference in terms of seedling age to be transplanted. It is clear that in this regard, the SRI method saves time. Seeds for the conventional method were broadcasted on 28 April (9 Saur) and were transplanted on 3 June (14 Jawza), which means that its seedlings were transplanted at an age of 37 days, while SRI transplants were 8-13 days old, clearly a big difference.

With SRI methods, the surface of the plots needs to be marked with a square pattern before starting transplantation so that regular spacing is maintained. With markers, 25 cm squares are scored on the surface, so that each single seedling is 25 cm from the others. The young single seedlings are transplanted at each intersection of the lines, when seedlings are 8-13 days old.

SRI volunteer farmers from Jangharoq and Kelagai areas, Agriculture Department staff and research farm representatives observed the SRI marking with enthusiasm and took part in the marking when we invited them. Farmers who took part in the marking of SRI plots at Puza-e-Eshan saw for the first time this kind of marking of a rice plot before transplantation because conventional methods do not need any marking. So they were eager to learn System of Rice Intensification marking as soon as possible.

With space between each seedling at 25 cm, in 1 m² just sixteen single seedlings are transplanted with SRI, and 32,000 seedlings are transplanted on one Jerib (2,000 m²). When farmers use these young single seedlings, they should be very careful and transplant them carefully. If they transplant at incorrect places, during weeding they will lose the wrongly-transplanted seedlings as the weeder will remove all the incorrectly-transplanted seedlings.



Before starting marking, we explained the theory of marking and its benefits. Farmers and Agriculture Department staff paid attention to our explanations with enthusiasm. We precisely described the process of removing seedlings from an SRI seedbed. In addition, how to transplant young single seedlings was precisely told to them and how this seedling would produce more tillers. SRI young seedlings have the capacity to produce massive number of tillers, as we saw in 2007.



That first year, one single SRI plant had 120 tillers at 96 days after transplanting on the PMIS farm. Fortunately in 2008, there was a single SRI plant which had 133 tillers at 72 days after transplanting in the field of **Juma Gul**, a cooperating farmer from the Kelagai area in Dushi district in the Proje Canal region. This was seen during a farmer-exchange visit we organized on August 12, 2008, and it greatly impressed all of the visitors.

In the System of Rice Intensification, the reason why a single SRI plant can produce this massive tillering is that the roots are strong and healthy. Roots could go deeper and deeper in SRI practice, compared to conventional methods. Therefore the roots can get more nutrients, and this gives the plants capacity to produce more and healthier tillers. Root growth is excellent in System of Rice Intensification, and weeding is one of the major reasons that there is an excellent root growth. SRI practice aerates the soil, and this enables plant roots to go deeper and get more nutrients.

Results from 2008 Season:

We trained SRI farmers and organized exposure trips at different stages of SRI plant growth, and these visits involved also Agriculture Department staff/extension workers. This year, all of the



SRI plots matured in good time, and our farmers were even able to harvest early. We did crop-cut surveys jointly with the SRI farmers at their plots and on the PMIS/SRI farm. Our technician did the yield calculations with the farmers, and we compared their SRI yields and conventional yields at the same place and using the same varieties.



The above picture on the left is Jawan Shamali cutting conventional rice to compare with his SRI crop. His SRI yield was 14 T/ha and conventional yield was 7 T/ha. In the middle is Juma Gul, whose SRI yield was 11.56 T/Ha and conventional yield was 5.83 T/Ha. The photo on the right is Abdul Wakil weighing and comparing his SRI and conventional yields: SRI was 11.26 T/Ha and conventional was 6.13 T/Ha.

Fortunately, the SRI results were much more positive compared to last year, with SRI yields essentially *double* compared to conventional methods (see table at end of this report). Not only the farmers but also the government officials were happy with the results from the SRI methods, and they promised us more support in the future.

We involved all our SRI volunteer farmers in the process and carried out the calculations with all of them. When one of our SRI farmers, Jawan, measured the panicles on his SRI crop, for example, one was 32 cm long and had more grains than any of the conventional panicles, none of which was longer than 20 cm.

SRI cultivated as a single crop along the Jangharoq canal:

Jawan cultivated his SRI as a single crop, and his yield was **14 tons/ha** with the new practices. With conventional methods, he got a yield of **7 tons/ha**, so his production was doubled by using SRI practices, with the same variety and in the same place. Abdul Wakil also cultivated SRI as a single crop, and the yield on his SRI field was **11.26 tons/ha**, while his conventional yield was **6.13 tons/ha**. This difference of **5.13 tons/ha** indicated almost doubled yield for him. Wakil, who lives in Qazi village along the Jangharoq canal, is a very innovative farmer who graduated from Baghlan Agricultural High School and is now a schoolteacher.

SRI can be cultivated after wheat (double cropping) in Jangharoq:

Wakil also cultivated SRI rice in a double-crop system, with rice following wheat. However, the age of the SRI seedlings that he used (24 days) was considerably more than recommended for SRI transplanting (8-13 days). He used seedlings from the same nursery from which he had transplanted younger seedlings at an age of 13 days for his single-crop system. When he cultivated rice as a double crop in rotation with wheat, he was able to harvest the SRI crop earlier than with conventional methods. Wakil's double-crop SRI coming after wheat gave a yield of **9.55 tons/ha** while with conventional methods, his rice yield was **6.13 tons/ha**. The difference between conventional and SRI methods for rice was **3.42 tons/ha**, plus he had also a wheat crop.

Prospects

All the SRI volunteer farmers and their neighboring farmers were happy about the SRI results in both areas, and they would like to extend SRI next year. In 2007, we had just one SRI farmer cooperating, while this year, the number jumped to six SRI volunteer farmers. We look forward to what Jangharoq farmers will do with SRI in 2009.

Using conventional rice production methods, farmers are wasting a lot of water from the Jangharoq canal to maintain standing water on their plots cultivated with conventional methods. Once these farmers get interested in SRI and prefer SRI to conventional methods, water wastage will be reduced upstream and downstream farmers will benefit by having more water access.

In 2008, the yield increase from System of Rice Intensification methods was impressive, which was a surprise to Jangharoq and Kelagai farmers. Those farmers who live close to the SRI volunteer farmers' fields could observe the SRI practices closely and see the results. They intend to use SRI methods in the future, but would like PMIS to help them technically in this regard.

According to farmers' view, cultivating SRI rice as a single crop compensates for not growing wheat by giving about the same yield as double cropping, but with less work and expenditure required. The total output is actually more because the average yield of wheat is 2,800 kg/ha. With doubled rice yield, there is good reason to shift from conventional to SRI methods. It remains to be seen whether farmers will use SRI mostly as a single-crop or will integrate it into the wheat-rice rotational cropping system.

SRI volunteer farmers told us that they think if they cultivate SRI as a single crop very early, they can get even higher yield than they got this year. Farmers also told us that for extending SRI, they will still need some AKF technical support in the future. Those farmers who have more family labor find SRI practice very easy. Labor constraints are a concern for SRI adoption.

A majority of farmers who have been involved in SRI introduction, having exposure trips and explanations from Aga Khan Foundation, especially from PMIS/NRM staff, felt that they had learned enough about SRI concepts and purposes to continue. They appreciate water saving, time saving, increasing soil fertility, and resistance to pests and disease. Maybe also the taste of SRI rice is better than that produced by conventional methods. In SRI practice they do not use chemical fertilizers, and the yield of SRI for this year (2008) is extremely encouraging.

Fortunately, we received an invitation from SRI colleagues in India to participate in the 3rd National SRI Symposium held at Tamil Nadu Agriculture University in Coimbatore, 1-3 December 2008. Prof. Norman Uphoff of Cornell University helped us a lot in this regard, and Dr. Biksham Gujja from WWF generously funded the travel. The table on the next page shows comparison yields of SRI methods with conventional methods.

	SRI Methods (t/ha)	Conventional Methods (t/ha)
Research Farm	9.00	4.00
Farmer Plot 1	14.00	7.00
Farmer Plot 2	11.26	6.13
Farmer Plot 3	9.55	NA
Farmer Plot 4	11.56	5.83
Farmer Plot 5	5.88	NA
Farmer Plot 6	9.55	4.08
Average	10.13	5.41

Note: The above table shows comparison yields of SRI practice with conventional methods considering only single crops although this does not mean that SRI can be cultivated only as a single crop. Abdul Wakil cultivated SRI as single crop and as double crop at his own field. The result from Farmer Plot 2 is for SRI as a single crop, and Farmer Plot 3 is for SRI as a double crop in a wheat-rice rotational cropping system. A Baghlan Province landscape is shown below with farmers planting 11-day rice seedlings in the recommended SRI square-spacing pattern.

