Drastic improvement of soybean production in Madhya Pradesh, India

H. Okamoto¹,², K. Nishiwaki¹,³, S. K. Rao⁴, S. B. Nahatkar⁴, S. K. Sharma⁵

¹ Japan International Cooperation Agency; ² Present: Kamikawa Agricultural Experiment Station, HRO; ³ Present: National Agriculture and Food Research Organization; ⁴ Jawaharlal Nehru Agricultural University; ⁵ College of Agriculture Indore

Although India is the fifth-ranked soybean producer in the world, its soybean productivity is very low: 1.1 t/ha. Madhya Pradesh (MP) state accounts for 55% of national soybean production in India, but the productivity there is not higher than in other states. The farmers of MP, one of the poorest states in India, have therefore confronted poverty with low productivity. JICA conducted a project from 2011 to 2017: ‘The technical cooperation project in maximisation of soybean production in Madhya Pradesh’. The objective of this project is soybean productivity improvement in MP, in cooperation with agricultural universities and institutes in MP. Results show that we were able to accomplish the purpose of improving soybean productivity in MP drastically during this project. This report introduces some project results from a field demonstration conducted in 2016.

[Materials and Methods]

Field demonstrations were conducted in three districts (Indore, Dewas, Ujjain) from west MP, and five districts (Sagar, Tikamgarh, Rewa, Jabalpur, Hoshangabad) from east MP in 2016. From each district, 2–4 farmers’ fields were selected for the demonstration and evaluation some proposed techniques. Recommended package treatment (RP) plots and farmers’ practice (FP) plots were set up in almost all eastern districts. RP included techniques that local agricultural institutes regard as effective: techniques of seed treatment, fertiliser, insecticide, and selective herbicide. Some western districts and Rewa had plots to evaluate effects of a subsoiler. Indore and Dewas had plots with and without phosphorus fertiliser. Sowing was conducted during 24 June – 10 July. Then they were harvested during 2–7 October in all districts. Except for Rewa and Jabalpur, harvests were conducted at the appropriate stage. In Rewa and Jabalpur, the growth stages corresponded to R5-6 (from beginning seed to full seed).

We conducted field demonstrations in 2013 (Okamoto et al. 2014) just as we did this time. We used the results for comparison with the productivity found in this survey.

[Results and Discussion]

Except for Rewa and Jabalpur, seed weights as dry matter of RP plots reached 2.0–2.8 t/ha as dry matter in east MP. This productivity was almost as high as that prevailing in Japan. Seed yields in Rewa and Jabalpur in 2016 were 0.6–0.7 t/ha. However, they were surveyed again at an appropriate stage by local institute staff. The seed dry weights in Rewa and Jabalpur were then reported respectively as 1.9 and 1.6 t/ha. The seed productivities of east MP in 2013 were 0.3–0.8 t/ha: much lower than those in 2016.

In east MP, seed productivity of RP plots was higher than that of FP plots in almost all fields. However, even in FP plots, the productivity reached 1.2–1.6 t/ha, which was much higher than those in 2013. This result suggests that farmers’ management practices were improved by this project.

The seed weights of west MP were 2.2–2.3 t/ha, which were also much higher than those in 2013 (1.0–1.4 t/ha). The subsoiler plots showed the same or higher productivities than control plots in west MP and Rewa. This result indicated that the subsoiler execution was effective in some field conditions. However, phosphorus fertilisation did not increase soybean seed weights in all plots. A similar result was obtained from field demonstrations in 2013.

Results show that drastic improvement was achieved in MP state, India. Moreover, these practices and their results will be communicated and extended throughout MP state in the near future. Additional tasks of evaluating the importance of these techniques and improvement of soybean quality might be proposed for future studies and projects.