

BRIDGING RICE YIELD GAPS THROUGH MACHINE TRANSPLANTING (MTR)

The mechanised methods of rice establishment are gaining popularity due to serious labour problem. In Punjab and Haryana, the direct seeded rice (DSR) has gained popularity during



last two years of labour shortage associated with COVID 19 pandemic. The work of KVK-CSISA network show that there is also an opportunity in scaling machine transplanting of rice (MTR) for securing consistently higher paddy yield in the Eastern Gangetic Plains (EIGP). This

labour driven sudden shift will play out in the rice-based ecosystem. The change is underway and will accelerate as the scarce and costly labour poses new challenge to rice cultivation. That is the debate now.

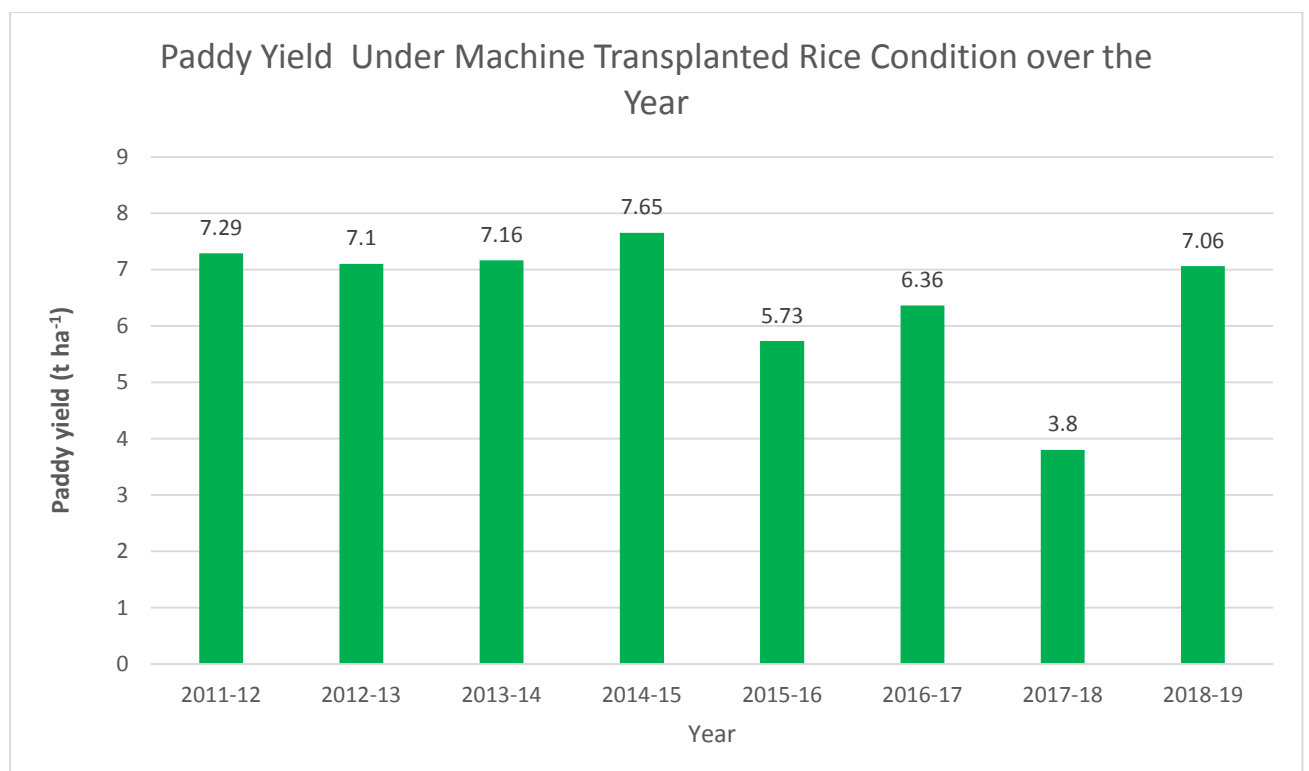


Figure 1. Paddy yield under best management practices including crop establishment by machine transplanting of rice in 8 years study period. Low paddy yield in 2015-16 was due to disease problem in variety BPT 5204 and in 2017-18, the low yield was due to change in variety from BPT 5204 to Basmati variety which has low yield potential.

The adoption patterns may change depending on how the sustained on long-term basis. To support our argument that same yield of rice and rice-wheat cropping system can be achieved if agronomic management is on par with Punjab and Haryana CSISA-KVK network has tried to harness the best from farmers participatory process (FPP) in situations where land and water resources are at the command of farmers. The use case presented here is of Mr Parmod Chaudhary- the farmers from village Lazar Mahadeva (situated at **27.142543-degree N and 83.351432-degree E**), district Mahrajganj, Eastern UP who practiced machine transplanted rice (MTR) and zero tillage in wheat (ZTW) under the supervision of CSISA-KVK scientists since 2010-11. Due to serious problem of labour after implementation of MNREGA he bought the advance version of South Korean Paddy transplanter in 2010. This machine can transplant 8-10 acres/day. Machine transplanting was done in rows at 28 cm apart during 3rd week of June every year. For MTR 12-18-day-old seedlings were transplanted with a 6-row self-riding type paddy transplanter (Dandong Self Propelled- Ride on transplanter). Nurseries for MTR were sown on dry beds with recommended package of practice. During last 8 years we have seen continuously more tillers per plant and more yield in MTR. Since last 8 years, the successful results of this trial show that MTR is the best bet to increase rice yield and MTR fb ZTW is the best bet to increase the system yield.

It allowed farmers to manage time and the intensification of cropping system with less cost. The paddy yield growth (Fig 1) and system productivity growth has been flagged as an essential part of better bet agronomy which can make the system more resilient and sustainable. The average ecosystem yield of 12.0 t/ha has been achieved at thus site. This technology has outperformed at this farm because of better quality South Korean model which worked efficiently compared to other models. Given the average yield of 6.9 t/ha at this farm and that of average **of 3.4 t/ha from 6 districts in EUP**, there is potential of getting sustained productivity growth of rice in these ecologies. Based on the experience and monitoring done by CSISA-KVK network the technology is so successful that Mr Parmod has continued to adopt this technology till date. He has another site of 70 acres in village Kathotia in Sidharthnagar district where he is practicing MTR since last 8 years with same yield potential. This plot was Laser Land Levelled first in the year 2010 and again in 2014.

The rice was fertilized with 150 kg N as urea and di-ammonium phosphate (DAP), 60 kg P_2O_5 as DAP, 60 kg K_2O as muriate of potash (MOP) and 25 kg $ZnSO_4$ per hectare. Medium duration rice variety BPT-5204 was used by the farmer in combination with other management practices like irrigation, weed and nutrient from kharif 2011 to



kharif 2019. Paddy yield ranged from 6 t/ha to 7.65 t/ha in six out of 8 years. Paddy yield of 5.73t/ha in the year 2015 was due to attack of sheath blight and WBPH. In 2017, variety the low yield was expected because of basmati rice (PUSA 1121) which has low yield potential compared to BPT 5204. This use case has two important messages. One, there is a need to look beyond existing model of top-down approach and work towards bottom-up approach of innovating jointly with farmers. This way the extension and research are happening at the same time. Two, the paddy yields in EIGP ecologies can be at the same level to that of Punjab and Haryana provided the focused attention is given on introducing best management practices as has been practiced in this use case.