INDIA'S BURNING RICE BOWL

Stubble burning is a serious problem in the intensive-agricultural state of Punjab. Although new technology could stop the need to burn stubble, there are barriers to its adoption

BY REBECCA THYER

For up to 25 days each year, a vast cloud of smoke engulfs the Indian state of Punjab as farmers burn the stubble of freshly harvested rice.

Punjab, which straddles India's border with Pakistan, is often referred to as the country's 'bread basket' because it produces two-thirds of the country's food grains.

The size of the crop area also makes stubble burning a serious problem—more than 17 million tonnes of rice stubble is burnt each year. Widely practised in the mechanised rice–wheat systems of south Asia because it is fast, cheap and allows for a quick turnaround in crops, stubble burning has serious side-effects. It is detrimental to soil, human and animal health, other crops and remnant vegetation, and generates heavy atmospheric pollution.

In Punjab, more than 90% of the rice is harvested using combine harvesters, leaving loads of up to nine tonnes a hectare of rice stubble in the fields. This has to be dealt with before the next crop, usually wheat, can be planted.

Seeding machinery that can sow directly into rice stubble has been developed, but its uptake has been constrained. Many farmers lack the capital or economic impetus to invest, while other social or institutional issues have hindered its adoption.

Called the Happy Seeder, the machine was developed through a previous ACIAR project. It cuts and collects stubble in front of the sowing tynes, depositing it behind the seeder as mulch. The technology offers farmers a way to drill wheat directly into rice stubble without burning, thus eliminating smoke pollution and arresting nutrient and organic carbon loss.

One of the researchers behind the Happy Seeder is Dr Harminder Singh Sidhu, a research engineer with Punjab Agricultural University's Department of Farm Power and Machinery. With Australia's Charles Sturt University and machinery manufacturer Dasmesh Mechanical Works, the university has continually worked to improve the seeder.

Dr Sidhu says its adoption could also mitigate greenhouse gas emissions.

"It could be the answer to our burning problem, saving our environment and improving our soil health," he says.

However, critical to realising these benefits is the extent and rate of adoption. ACIAR commissioned a scoping study to assess the range and scale of policy-related issues relevant to Happy Seeder take-up, with a view to developing a project to overcome limitations identified.

PARTNER COUNTRY: India
PROJECT: PLIA/2006/180: Happy Seeder policy linkage scoping study
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The project, led by policy economist Phillip Pagan from the NSW Department of Primary Industries, considered a range of issues, from government and economic policies and reforms to specific agronomic constraints, and their impact on adoption. For example, some policy settings, such as those related to electricity and groundwater, mean that farmers may not financially benefit from adopting the Happy Seeder.

"Both electricity and groundwater are significant, but free inputs," Dr Pagan said. "Once supplies are connected to farms, at considerable capital expense, their use is unregulated, with no ongoing access or unit pricing."

These free inputs mean that many of the economic benefits of Happy Seeder adoption are less apparent: "The costs of following conventional farming practices are not borne by those farmers."

However, Dr Pagan expected that policy reform in this area would change farmers' circumstances and, as costs were felt more directly, the relative profitability of water-intensive rice production in comparison to other crops would decline.

Dr Pagan expected this would change the Happy Seeder's primary purpose—sowing wheat into rice stubble—and it would be adapted to other crop rotations. "It increases the potential for the Happy Seeder to be flexible in its ability to sow alternative crops into other types of heavy stubble loads."

Other constraints identified included design, agronomy, alternative technologies, low policy-maker awareness of these technologies' limitations, and government and private impediments to its manufacture, such as patenting issues, training and extension, and credit availability. Dr Pagan said that there should be a focus on alternative potential policy instruments and intellectual property protection options to help address these constraints. ■

ACIAR is sad to advise readers that Dr Phillip Pagan passed away on 1 September 2007. The results of Dr Pagan's study will be published in a forthcoming report and have provided a basis for further ACIAR projects, which he stood to lead. Our thoughts are with his family.