



# AN END TO BENDING

## THE MECHANICAL SOYBEAN SEEDER

**S**oybean farmers in rural Thailand may never hear of the Bangkok-based Asian Institute of Technology (AIT), but it is an AIT-developed mechanical seeder that could vastly improve dry season planting on the country's soybean farms.

Soybean is grown during two seasons in Thailand: the rainy season and the dry season. In the rainy season, soybean is planted in the prepared fields and its growth and yield depends on the rains; the same rains, however, may cause considerable damage to the crop if they are heavy during the harvest period. Dry season soybean is planted in the stubble of the rice crop, in order to take advantage of residual soil moisture, and only in irrigated areas where farmers can maintain soil moisture at the desired level. The stubble provides a simple guide to sowing density (about 200 000 seed 'hills' per hectare) and allows the soybean roots to penetrate the soil by following the decomposing rice roots. It is also thought that the decomposing rice roots provide an additional source of nutrients.

Although the major portion of the total production of soybean comes from the rainy season soybean, dry season soybean is considered more desirable because of its higher yield and better quality. One of the factors limiting the production of dry season soybean is the manner in which it is planted. Unlike rainy season soybean, which is planted in furrows opened by tractor or animal-drawn implements, dry season soybean is planted by hand in a 3-person operation. The first person makes holes with a pointed wooden stick; a second bends or squats to drop 3-4 seeds into a hole, and a third covers the holes with earth, ashes, or pig manure. The work is tedious, time-consuming, and exhausting. Moreover, because of the simultaneous demand for labour for the rice harvest and for soybean seeding, far-

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mers sometimes resort to broadcast seeding the seed. Broadcast seeding is quicker, but produces less uniform seeding and lower germination rates — and subsequently, lower yields. For these reasons, soybean production in Thailand has actually declined, despite the fact that the area of land under soybean cultivation has substantially increased in recent years.

In order to reverse this trend, scientists at AIT developed a prototype seeder that combines hole-making and seeding into one operation. The device allows the labourer to work in an upright position, making planting a

considerably less tiresome, less time-consuming, and less labour-intensive operation. The seeder consists of a 1 1/2 metre steel tube, in which the seeds are stored, and an outer tube equipped with a wedge-shape tip and attached by a spring to a rolling metering device. When the seeder's tip is pushed into the ground, the spring is compressed, activating the metering device which releases 3-4 seeds into the hole.

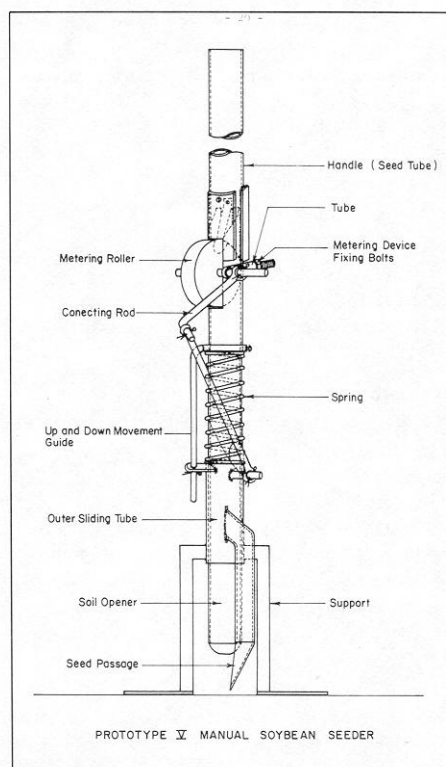
With a grant from IDRC, researchers have improved the seeder's design to eliminate such problems as seed breakage, seed jamming, and soil clogging. Through the substitution of lighter materials, the seeder's weight was reduced from 3.2 kg to approximately 1.5 kg. To suit different soil conditions, two versions of the seeder were designed: a blunt-tipped seeder for wet (or irrigated) soil and a sharper-tipped seeder for dry soil. A stand was added to keep the delivery tube from coming into contact with the soil and clogging up, a particularly important feature for dry season planting.

In tests conducted by AIT, the seeder cut sowing time by half from 46 person days to 22 person days per hectare. Since the seeder costs approximately US\$10.00 (including labour, materials, and mark-up), the farmer can expect to recuperate the cost, in terms of labour saved, in only 5 days, and with as little as one-fifth of a hectare under cultivation. Mass production is expected to reduce the cost of the seeder even further.

In Thailand's northern province of Chiang Mai, the idea has already caught on: a number of local manufacturers have gone ahead with small-scale production of mechanical seeders based on the AIT model. Under a new grant from IDRC, detailed blueprints of the seeder as well as training in the AIT manufacturing technique will be supplied to the manufacturers. Also, field demonstrations on different crops in different areas will be carried out to familiarize farmers with the seeder's operation.

By making planting a less onerous and more systematic operation, the soybean seeder is expected to increase crop productivity, making more of the world's richest source of plant protein available in the developing world. □

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PROTOTYPE V MANUAL SOYBEAN SEEDER