TRIBUTE

The Village that Seeded Swaminathan's Green Revolution

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In October 1963, about 100 kg of seeds of four Mexican semi-dwarf wheat varieties bred by Norman Borlaug – Sonora 63, Sonora 64, Mayo 64 and Lerma Rojo 64A – arrived at the Indian Agricultural Research Institute (IARI) in New Delhi. These were sown in November, at trial fields in IARI as well as Ludhiana (Punjab), Pantnagar and Kanpur (Uttar Pradesh), and Pusa (Bihar). Their yield performance, relative to the locally-cultivated "check" varieties such as NP 824, NP 876, C 273 and C 306, was found to be encouraging at the multi-location trials.

But Dr M. S. Swaminathan, then head of IARI's Division of Botany, wasn't satisfied. In June 1964, three months after the wheat from the four varieties grown at the trial fields was harvested, he proposed that these be sown in the fields of actual farmers during the ensuing 1964-65 *rabi* (winter-spring) season.

Swaminathan wanted the organisation of 1,000 "National Demonstrations" in the fields of resource-poor farmers. This was to introduce them to the new varieties – and also show that the higher yields had to do with their plant type, not the size of landholdings. The shorter height of their plants (2-2.5 feet versus 4.5-5 feet for traditional tall cultivars) and strong stems made the Mexican varieties less prone to lodging (bending) and more amenable to higher doses of fertilizer applications (Swaminathan 1964). Swaminathan's proposal received support from Union Minister of Food and Agriculture C. Subramaniam, who approved the programme in August 1964, overruling objections of officials sceptical about the necessity of such large-scale technology demonstration in farmers' fields.

The Choice of Village

One of the villages selected under the programme was Jaunti in northwest Delhi, bordering Haryana.[1] It was conveniently located, about 30 km from the IARI

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[1] The official spelling is Jaunti; some organisations spell it "Jounti."

campus. The farmers were largely Jats from the Chhikara exogamous clan or *gotra*; this community accounted for almost half of the village population and owned over 80 per cent of its agricultural land.

In November 1964, about 15 farmers from Jaunti sowed the seeds of the Sonora 64 and Lerma Rojo 64A wheat varieties on around 70 acres. These farmers – Bhoop Singh, Hukum Singh, Khazan Singh and Raghuvir Singh, among others – weren't exactly small farmers. They owned between 15 and 20 acres of land each, but tilled these themselves. They had no tractors, power threshers or electric or diesel engine-driven tubewells. The ploughing of their fields was done by bullocks, which also treaded the crops to separate the grain from straw and powered the *rahat* (Persian wheel) to lift water from the wells for irrigation.

In short, Jaunti's farmers were not big absentee landowning *zamindars*. They were medium self-cultivating *khudkasht* who more or less conformed to Swaminathan's selection criteria. The whole objective was to demonstrate the efficacy of the new varieties even in not-very-large landholdings. If these were planted in rich farmers' fields, the success in terms of higher yields would have been "attributed to affluence and not to technology." (Swaminathan 2013)

The choice of Jaunti seemed to have been greatly influenced by Dr Amir Singh, a seed-testing officer who went on to head IARI's Division of Seed Technology. A Jat from a related *gotra* of Chhillar, he belonged to Barahi, a village in Haryana's Jhajjar district, just over 10 km from Jaunti. As Raghuvir Singh, one of the farmers from Jaunti to have first planted the Mexican wheat seeds, put it: "Swaminathan*ji* brought Borlaug*saab* to India and Amir Singh got Swaminathan*ji* to our village."

Swaminathan was impressed by Jaunti's farmers. In most of the villages of Delhi that Swaminathan and his fellow IARI scientists visited in June-September 1964, the farmers were keen to know if there was any government subsidy available to them for trying out the new varieties:

> Our stock reply used to be that the government has no money and there was no need for subsidy anyway, as the higher yields from the seeds guaranteed increased incomes. Only Jaunti's farmers seemed to appreciate our point. Farmers are generally observant and understand non-verbal communication best. When they saw us landing up in the village even on Sundays, it probably occurred to them that we meant well! (Damodaran 2016)

The "Marvel"

In the 1964-65 season, Jaunti's farmers grew the Mexican wheat varieties in accordance with IARI's recommended package of practices under the supervision of Amir Singh and extension specialist M.D. Nandkeolyar. Students and other staff of the Division of Botany were also mobilised as field volunteers.

The Jaunti farmers were motivated to work towards achieving a minimum grain yield of 40 *mun* an acre or 4 tonnes per hectare (one *mun*=40 kg). This was way above the average 10-15 *mun* (1-1.5 tonnes/hectare) that they were getting from their existing tall varieties. The four tonnes/hectare target was met by many, with two of them – including Bhoop Singh – harvesting over 45 *mun* or 4.5 tonnes per hectare. "*Ye to chamatkar tha* (this was a marvel)," is how the farmer Hukum Singh described it.

In March-April 1965, a host of farmers, from within and outside Delhi, descended on Jaunti to see the miracle crop that was being harvested. Among them were Mahendrapal Singh and his sister Amteshwar Anand, children of Sardar Bahadur Sir Datar Singh, a former Vice Chairman of the Imperial (later Indian) Council of Agricultural Research. They farmed 1,500 acres in Punjab Khor, a village only 4 km from Jaunti. This land previously belonged to Pakistan's first Prime Minister Liaquat Ali Khan, who had swapped it for the hundreds of acres that Sir Datar owned in Montgomery district of West Punjab prior to the subcontinent's partition.

For Swaminathan, the sight of "big *zamindars* coming to the fields of ordinary farmers and deciding to grow the new varieties" (Damodaran 2016) was a vindication of his strategy of national demonstrations. It challenged the extant official wisdom that didn't appreciate "the tremendous extension value of demonstrating in poor farmers' fields" (M. S. Swaminathan in Rao 2014, p. 45) or the need for conscious seeing-is-believing efforts to take technology from lab to land.

A Seed Village

Recognising the clamour for the high-yielding seeds – including from politician-landowners wanting to sow these in their fields – Swaminathan launched his next project. This was to convert Jaunti into a "seed village." Its farmers were to grow Borlaug's varieties for producing grain that was of seed quality. IARI would supply them the foundation seeds that were the progeny of the genetically pure nucleus and breeder material developed and maintained by the Institute. The farmers of Jaunti would further multiply these, usually in a 1:25 or 1:30 ratio, into certified seeds. The certified seeds would then be used by other farmers for the production and sale of regular grain.

In November 1965, the Jawahar Jounti Seed Cooperative Society was formed. Over the next couple of years, the society had 54 farmer-members undertaking seed production in a total area of 850 acres. When regular wheat grain fetched the government's minimum support price of Rs 0.76 per kg in 1968, Jaunti's farmers sold its certified seeds at Rs 3 or more per kg. The buyer-farmers didn't mind paying that rate, as they would harvest at least 40 *mun* [1.6 tonnes] of grain for every one *mun* of seed sowed per acre. And since these were varieties, not hybrids, they could store part of that grain for reuse as seed in the next season.

On September 26, 1967, Swaminathan got Prime Minister Indira Gandhi to inaugurate a seed processing centre of the society at Jaunti. It had facilities for grading, fungicide treatment, bagging, and fumigation storage of the certified seeds produced by the farmers. By this time, Indian scientists had developed their own Kalyan Sona and Sonalika varieties through careful selection from advanced breeding material received from Mexico. The grain from these were amber-coloured and of better *chapati*-making quality than the red wheat from the original Mexican semi-dwarf varieties. Jaunti's farmers took up the multiplication of Kalyan Sona and Sonalika seeds as well.

The Seed Village served a strategic purpose. The Green Revolution's full-scale launch happened in the 1966-67 *rabi* season, with 18,200 tonnes of imported Sonora 64 and Lerma Rojo 64A seeds being planted on 240,000 hectares by Indian farmers. Swaminathan viewed the use of imported seeds only as a "purchase time" plan. He was also clear that the high-yielding varieties, grown in large contiguous areas, would naturally become susceptible to pathogens and pests. It would then require continuous development and release of new resistant varieties – not stopping at Kalyan Sona and Sonalika – to replace those prone to disease and insect attacks. That, in turn, called for "an efficient seed multiplication machinery" (Swaminathan 1968). Swaminathan envisaged the Seed Village as part of a system "capable of producing speedily and in adequate quantities seeds of the new varieties emerging from the breeders' assembly line" (Swaminathan 1968).

Jaunti's farmers rode a wave of prosperity from the late 1960s through the next decade, supplying seeds to growers across Punjab, Haryana and western Uttar Pradesh. The village's roads were widened and houses electrified. Khazan Singh and Raghuvir Singh bought their own Soviet-made DT-14 tractors in 1968. A year later, Bhoop Singh purchased a Massey Ferguson machine, using his newly-acquired stature and influence with the higher-ups in New Delhi to jump a 10-year waiting time for this tractor. Most farmers also had diesel-powered pumps for drawing water from tubewells, in place of the old *rahat*. Many regularly went to IARI to learn about new agricultural practices and breakthroughs. A few years before he died in 1980, Bhoop Singh received the coveted Krishi Pandit award, a prize conferred on progressive farmers.

Jaunti Today

For a village that "seeded" Swaminathan's and India's green revolution, Jaunti has, for the last two decades or more, been relegated to relative obscurity.

Of Jaunti's 775.19 hectares of land, 604.95 hectares or 78 per cent is still categorised as cultivated area. Agriculture is not, however, any longer a prime source of income for many, including the families of the pioneer entrepreneur-farmers. Om Prakash Chhikara, Bhoop Singh's grandson, who used to serve *chai-nashta* (light

refreshments) when Swaminathan, Borlaug, and other dignitaries came visiting, reckons that not more than 40 per cent of village residents are today actively engaged in agriculture. Chhikara is a retired schoolteacher from the Jawahar Navodaya Vidyalaya at Jhajjar. He and most others are just holding on to their land, while their sons and grandsons pursue alternative professions and businesses.

Chhikara further estimates that only about a third of the cropped area during *rabi* is under wheat now, down from more than 95 per cent till the late1990s. The main reason for the decline is water. In the heyday of the Green Revolution, farmers grew hybrid pearl-millet (*bajra*) and sorghum (*jowar*) in the post-monsoon season, apart from wheat in *rabi*. Double-cropping was possible thanks to the Jaunti Minor Canal built in the mid-sixties, supplemented by groundwater that could be tapped from 30-40 feet with shallow cavity tubewells.

That's no longer possible, with weeds and grass taking over the canal. Jaunti was at the tail-end of the canal, which itself has become dysfunctional because the Haryana government stopped the release of any water. The groundwater table, too, has fallen below 100 feet. Even the water from that, extracted using deep bore-well submersible pumps, is saline (*khara)*. Scarcity of water makes farmers hesitant to cultivate wheat, which requires 4-5 irrigations, as against 1 or 2 for mustard. Even those with tubewell irrigation facilities prefer planting carrots, bottle gourd (*lauki*), bitter gourd (*karela*), and other vegetables for sale in the Azadpur wholesale market, which is around 25 km away.

Exemplifying Jaunti's decline from the historical heights it scaled under Swaminathan's watch is the old seed processing centre. The Jawahar Jounti Seed Cooperative wound up in the early 1980s. The land and building now houses a government dispensary, with a fading board serving as a historical marker.

While Jaunti retains its old rural ambience, there is nothing much of agriculture to speak of, except in past memory. Although well-connected by road (the nearest Delhi Metro station at Ghevra is less than 10 km away), being one of the 47 Green Belt villages in the National Capital Territory restricts its real estate development only to low density residential plots. Jaunti's role in the Green Revolution and its association with Swaminathan cannot however be forgotten (Harigovind 2023). More than anything else, it is testimony to what science and knowledge transfer can do for national progress and the uplift of rural producers.

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