

## *Rajasthan – A seedy story*

**Adam Alexander**

**Much of Rajasthan is semi- or hyper-arid and home to a large number of well-adapted local varieties of cash crops that farmers have been saving seed from, for generations. Adam Alexander, who calls himself a ‘seed detective’, travels across the state to see how this tradition is faring and just how secure these commercially and culturally important varieties are.**

Being bounced about in the back of an ancient open jeep was a small price to pay for a heart-warming discovery I was shortly about to make. January may well be mid-winter in southern Rajasthan, but the temperature is normally redolent of a pleasant summer’s day at home in south Wales. This winter was different. There had been a succession of unexpected night frosts. This had proved a challenge for many of the small subsistence farmers I had been meeting on my journey through the state.

The genetic diversity of edible crops is being lost at an alarming rate globally. In my work growing and saving seeds of rare and endangered cash crops, I was keen to gain an understanding of the challenges and realities for an expanding cohort of horticulturalists that were continuing a traditional, low-input and sustainable model of cultivation and responding to an increasing demand for organically grown produce. This is how I found myself at the gate of a small compound about 40 kilometres north of Jodhpur, in gently undulating countryside near the town of Mathania, centre of a region famous throughout India for its prized chillies,

The Mathania chilli has been highly valued for its fine culinary qualities; floral and aromatic when first cut, they are large, slender fruit with more spice than bald heat. A staple of Rajasthan cuisine for generations, it is still an important crop for those few farmers who are able to grow them despite a dramatically diminishing aquifer. However, what is now being cultivated is but a pale imitation of the original fruit. On my travels, everyone I spoke to about this famous chilli grumbled about it having changed in the last twenty years or so. Farmers, due to problems with irrigation and low yields, have been switching from their own saved seed to modern cultivars, mostly F1 hybrids, which give greater yields, but perversely require more water, are more sensitive to low temperatures and genetically narrower than the native varietal. Chillies easily cross-pollinate so the introduction of new varieties into a farming system, where the average holding is about 20 acres, has meant that the Mathania now consists mostly of introduced genetic material, according to the plant scientists I met at the [Agricultural Research Station in Bikaner](#), which is at the forefront of improving crop varieties that can grow in semi- and hyper-arid environments. Sellers in local markets and every farmer I spoke to about this chilli, all said the same thing: what is being sold as a Mathania doesn’t have the same culinary traits as the open-pollinated plant.

If true, this was a story that had become familiar to me over many years of tracking down rare and endangered local varieties that are intrinsic to native food cultures.

Locally developed varieties, with their well-adapted traits, thrive in their home ground, grown from genetically distinct seeds that have been saved by generations of farming families, are replaced by modern cultivars that offer improved yields and better prices. It is entirely understandable that farmers who, for the most part, are barely able to scrape a living from the land, should want to improve their prospects with new varieties. I found that once a farmer switches to a modern cultivar, they stop growing and saving seed from their own local varieties since they no longer perceive the need to do so. After just two or three years, the genetic diversity and unique qualities of those local crops is lost for ever.

I was welcomed by the diminutive Mrs Devi into her Mathania home, a coral of round, white-painted cob rooms set in an immaculate earth courtyard. The wife of a share-cropper with about 20 acres of land, I was visiting her to find out more about what local varieties of crops – if any – were still being grown in the region. We ate chapatis made from her own landrace millet and a curry of yoghurt from the milk of her heavenly Rajasthani sheep, flavoured with seeds from nearby wild Khejri – the sacred desert tree [\*Prosopis cineraria\*](#), endemic to Rajasthan cultural life and a hugely important source of fodder, firewood, fencing, joinery timber and protein. I couldn't help noticing in a corner of the compound a small pile of chillies, harvested from a tiny plot where a dozen or so plants grew. My guide Pritam Singh, also a farmer, was beside himself. He needed just one sniff, one bite and with a smile that would have lightened up the darkest night, declared that this chilli tasted and smelled of his childhood. This was the real thing. I too, sniffed and ate – scrumptious! Mrs Devi kindly gave me a small handful of seeds from this year's crop. She had been growing her chillies for as long as she could remember, as had her mother before. There were no other chillies being grown for miles around. I believed I had stumbled across something all the experts had told me was extinct.

This was just one of a number of inspiring encounters that I had with farmers throughout Rajasthan. I had been told by Dr Shekhawat, Head of Plant Breeding and Genetics at Swami Keshwanand Rajasthan Agricultural University in Bikaner – who had bred one of India's most widely grown cultivars of chickpea – of his despair over the loss of genetic diversity of this key arable crop in Rajasthan. He could find no evidence of any of the 45 local landraces held in the gene bank in Jodhpur still under cultivation. That, of course, isn't to say that, like the Mathania chilli, they aren't still being grown. I found a landrace chickpea in the southern Kota region. Farmers would proudly show me their supplies of 'Desi' ('local') seeds. The distinctive red carrot of Rajasthan was being widely grown as was coriander for seed, a tomato called Abhilash that was fruiting well despite very cold nights when fleece was needed to protect the crops from frost. I found a local variety of turnip, Shaljum; the ubiquitous white radish, mouli; and a sensational native spinach, Palek, with oak-like leaves. I came across dry and wet-season gourds, lablab beans, peas, cumin and fenugreek being grown by families of farmers in wholly sustainable and low-input environments, all Desi landraces.

The pressure on farmers to apply costly urea, a synthetic chemical fertiliser, despite government subsidy, further makes the economics of agriculture challenging. These farmers, frequently share-croppers who must give as much as 50% of their income to

the land-owner, are only able to scrape a living relying on large subsidies for electricity to pump water, and equipment purchases. There were two examples of farmers that I found greatly encouraging. First, a family of three brothers who shared 30 acres of land that they owned. Half the land was set aside for growing vegetables, and the rest for producing highly valued ghee from a small herd of buffalo and Indian cattle. Theirs was a system with zero external inputs. Crops were grown from their own seed and soil improvement was from manure and compost. The subsidies they received helped them to earn sufficient money, to have recently built a brick home. However, their business model was entirely based on selling their crops through middle-men. Farmers make the least return in the Rajasthani food chain. The sales and distribution system is badly in need of reform, as in the UK and the rest of the developed world, inhibiting the economic viability and sustainability of farming. Although the brothers' use organic practices, they don't call themselves organic farmers and are not selling into this expanding, higher-margin sector. A conservative mindset, the costs of accreditation and lack of ambition are factors. One of their neighbours, Shankar Shurma, somewhat younger and educated, has converted his 20 acres to certified organic horticulture and grows a mix of Desi and modern cultivars. He sells through a local network into the urban centres of Jaipur and Delhi, some 6-hours' drive away. Business is good. The challenge, for Shankar, is to supply a market which, thanks to an increasingly affluent middle-class who have developed a taste for more western foods, has developed a taste for non-traditional crops. These invariably have higher water demands like lettuce, brassicas, strawberries and courgettes. However, when the water table is falling and there are problems of increased salinity, creating a greater consumer appetite for locally adapted crops that profit the farmer is essential. This, in great part, needs to be driven by opinion leaders who can highlight the importance, economically, culturally and environmentally of Desi crops.

Mrs Devi, with her Desi sheep and chillies, has a family story which represents the challenges facing food production in Rajasthan. Her children are the first generation to receive a full education. Her daughter is studying medicine, one of her sons is a career soldier and her eldest son is renting more land with his father to grow arable crops. Hopefully, placing sustainable and profitable farming at the centre of agricultural policy in India means Mrs Devi will not be the last generation and custodian of the Mathania chilli.