

RAJASTHAN – A SEEDY STORY.

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Much of Rajasthan is semi or hyper-arid and home to a large number of well-adapted local varieties of cash crop from which farmers have been saving seed for generations. Seed detective Adam Alexander travels across the state to discover if this tradition continues 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. Although by mid-afternoon it was in the mid 20's centigrade, at night there had been a succession of unexpected frosts. This had proved a challenge for many of the small, subsistence farmers I had been meeting on my journey through the state.

With the genetic diversity of edible crops being lost at an alarming rate globally and 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 who were continuing a traditional, low-input and sustainable model of cultivation as well as responding to an increasing demand for organically grown produce. This was why I found myself, a little shaken up but no less curious for that, 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 lowering water-table. However, what is now being sold 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 are genetically narrower than the real thing. 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, according to the plant scientists I met at the Agricultural Research Station in Bikaner, now consists mostly of introduced genetic material. Sellers in local markets and every farmer I spoke to about this chilli all said the same thing; the genuine Mathania was lost.

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 culture.

Locally developed varieties, with their well-adapted traits to thrive in their home ground, grown from 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. On my travels I found that once a farmer switches to a modern cultivar they stop saving their own seed. 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. 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. I look forward to eating Mathanias myself this summer and returning some seeds to Mrs Devi and plant material to the scientists in Bikaner to do some genetic testing.

This was just one of a number of inspiring encounters that I had with farmers throughout Rajasthan. I had been told by Dr. P. Shekhawat, Professor of agronomy in Bikaner – who had bred one of India's most widely grown cultivars of chick pea, 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 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 farmer that I found greatly encouraging. First, a family of three brothers with 30 acres of land they owned. Half was set aside for growing vegetables the rest for producing highly valued ghee from a small herd of buffalo and Indian cattle. Theirs was a zero external input system. Crops were grown from their own seed and soil improvement was from manure and compost. The subsidies they received helped them to earn sufficient 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 within the food chain. The sales and distribution system is badly in need of reform if farmers are to be economically sustainable. Although the brothers' output is entirely organic they don't see themselves as organic farmers and are not selling into this expanding and higher-margin sector. One of their neighbours, Shankar Shurma, somewhat younger and educated, has converted his 20 acres to 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 has developed a taste for non-traditional crops with high water demands including lettuce, brassicas, strawberries and courgette when the water table is falling, there are problems of increased salinity. Creating a greater consumer appetite for locally adapted crops that profit the farmer is essential.

Desi crops provide one answer. The pride and passion for native cuisine and Rajasthani food culture needs to be shared by this new cohort of urban consumer. In part this can be driven by food opinion-formers such as TV chefs and writers. With ever greater numbers of Indians discovering their own country for the first time, eco-tourism is already one form of diversification for many landowners. Further land-reform is essential too as well as better agricultural education.

Mrs Devi, with her Desi sheep and chillies, has a family story which is a metaphor for 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 Mrs Devi will not be the last generation and custodian of the Mathania chilli.