

Rebirthing the landscape

Mark Everard visits Rajasthan and sees at first hand Rajendra Singh's prize-winning schemes for water conservation

The slanting evening sun brought into sharp contrast a striped hyena's fresh pugmark in the newly turned earth of Rajasthan's desert edge. The saying 'build it and they will come' seemed apposite as, with construction completed just a month before in anticipation of the forthcoming monsoon, the new johad had already attracted interest from wildlife in the adjacent Sariska National Park. Nearby, more established johadi and open wells were regularly visited by leopard and other species, even the occasional tiger, in search of a drink in the desert fringe.

So what is a johad (plural 'johadi')? Basically, it is an earthen bund intercepting monsoon rainfall, enabling water to percolate to ground and recharge aquifers. Johadi are actually extremely heterogeneous, some designed to hold standing water for livestock throughout the dry ten months and others also used for water-gathering or washing and bathing.

Two days later, I renewed my acquaintance with Rudhmelmehna, the headman of Harmeerpur village straddling the Arvari River. We talked as Rudhmelmehna showed me around his wonderful garden. In the understory of trees – teak for timber and others for fruit including papaya, lychee and banana – the garden was rich in orange, apricot and almond bushes as well as a diversity of salad and vegetable crops and vivid hibiscus flowers. The garden also retained a cooler, shaded microclimate much appreciated not only by me but by varieties of butterflies and birds.

Perhaps the most remarkable thing about Rudhmelmehna's garden, and the rich surrounding village farmlands growing wheat, chana (chick peas), mustard, bindi, onions and many more crops vital for subsistence but also for trade, is that this land was desert – no trees and not even any grass – just thirty years previously.

Johadi have played, and contribute to play, a central role in this remarkable story of rejuvenation of a tightly linked socio-environmental system. This is a tale that should serve as a global exemplar of how it is possible to reverse long-running ecological degradation and its disastrous consequences for social and economic wellbeing.

Across Alwar District on the desert fringe of North Rajasthan, the NGO Tarun Bharat Sangh (TBS) has worked tirelessly at community level since 1985 to support people in taking control of water management, and thereby their own dependent prospects. Key to this has been the reinstatement of long-abandoned johadi and the design and construction of literally hundreds more to regenerate aquifers. Prior to this, groundwater levels had retreated to more than 100 metres below ground in places due to increasingly powerful mechanical pumps, with corresponding declines in levels in wells upon which less affluent villagers and farmers depended for year-round water availability in a landscape lacking in perennial surface waters.

Johadi are augmented by many anicuts: low-level check dams across shallow valleys that hold back water, inundate and nourish soils during the brief and increasingly unpredictable monsoon period, and recharge adjacent aquifers. This diversity of water harvesting systems has brought water back

not merely to the soils and wells, but also rejuvenated the wider ecosystem and farming economy. It has also resulted in seven river systems – the Arvari, Sarsa, Baghani, Jhardwali and Palasari as well as upper reaches of the larger Sabi and Ruparel systems – now holding water perennially, supporting a diversity of wetland flora and fauna, and restoring many benefits formerly lost to local people. Parched, overgrazed and eroded landscapes have seen soil, water, vegetation and communities recover, monsoon rainfall once again percolating to raise water levels and also to sweeten deeper groundwater once causing localised fluoride-related problems.

The effect has been truly transformative, reversing a long-running cycle of aridification, desertification and village abandonment. Today, Harmeerpur, Gopalpuri, Beekampura, Kalid and hundreds more villages where communities have taken control of the most fundamental environmental resources securing their futures are experiencing full schools, active community participation in village governance, and access to more diverse and healthy food for their own needs and to trade for valuable income. Hand pumps installed close to people's homes now tap into a raised water table typically close to the surface or declining to perhaps ten or fifteen feet below ground according to season. This in turn has benefitted women massively, freed from the drudgery of their traditional role as gatherers of often poor-quality water from remote sources that formerly might have occupied seven hours of each day. Women are thus now empowered to play significant roles in village governance, education and Ayurvedic medicine.

At the core of these successes has been collective mobilisation and governance at community scale. Villagers deliberate and agree on water needs, on how Johadi, anicuts and some other water harvesting techniques may best help them rejuvenate the ecosystems supporting these needs, about the relative contributions that people should make both financially and in terms of labour, how water should be fairly and sustainably allocated, and what practices are to be prohibited (such as the growing of water-intensive crops like rice, the cutting of trees and overgrazing). Stewardship of this closely linked environmental and social system extends well beyond the river valleys, focusing also on promotion of the recovery of trees on surrounding hilly lands which are now greener after years as barren rocky crags and so now storing and recycling water and supporting grazing at agreed densities.

Another intriguing feature is that johadi are designed through a rich amalgam of traditional and local knowledge, not by top-down imposition or assumption of uniform 'solutions'. Local people know the literal lie of the land and the disparate needs that johadi can serve within it, and so collaborate to optimise location, size, construction methods and materials, and management regimes. They are supporting with access to some funding and also by relevant technical know-how from TBS, including for example how to align johadi with fractures in the underlying rock strata visible from inspection of local open wells in order to optimise aquifer recharge. TBS also insists that the funding it channels from external sources is matched by local people, typically 30-70%, further grounding the johadi in local ownership.

Another remarkable facet of this rejuvenation is that it is, at least technically, illegal. The centralisation to national and state levels of the ownership and management of water under late colonial era and post-independence has poorly served rural people in marginal regions, such as the Thar Desert and its margins. Deriving uniform regulatory regimes enabling diverse, locally effective solutions consistent with geographical, cultural and traditional stewardship contexts is always going

to be difficult in as huge and heterogeneous a state as Rajasthan, India's largest state at 342,239 km² (40% larger than the combined area of the United Kingdom) encompassing major rivers and cities, mountains, wetlands, deserts and the Gangetic Plain. However, the disempowerment of communities through former centralisation, and the ensuing abandonment of traditional local governance and physical rainwater harvesting infrastructure, has led to the linked degradation of soil and water resources with often severe and systemic adverse consequences for ecosystems and people. The same is observed widely in semi-arid environments across India, Africa, China and beyond, including for example America's 'Dust Bowl' experience of the 1930s precipitating the largest migration in the nation's history.

Driving this landscape rejuvenation through constant encouragement, education and routing of predominantly international funding has been Tarun Bharat Sangh. During my March 2015 stay with TBS, visiting and analysing key sites in the area and meeting with dedicated people significantly including TBS's founder and chief driving force Rajendra Singh, news came through that Rajendra had been awarded the prestigious Stockholm Water Prize: the "Nobel Prize for water". This is a grand honour indeed, and it was wonderful to be there to celebrate over meals of chapatti, dahl and other vegetable dishes all grown within the grounds of the TBS ashram at Beekampura on land that had formerly been barren desert but now was a cool oasis of trees, shrubs, butterflies and birds, fertile soils and visiting wildlife.

Due to the tight focus of TBS on working at community scale, including the linkage of communities across catchments to optimise benefits arising from collective action and governance, there are many more potentially significant benefits from landscape regeneration that remain uncaptured. I hope over time to help raise the profile of contributions to carbon sequestration in regenerated soils, and to climate mitigation and adaptation, flood regulation and the support of river and groundwater flows. These benefits extend far further afield down sub-catchments and into incrementally larger receiving catchments such as the Banas, Sawa and Banganga, and downstream to the Chambal and eventually the Yamuna and the lower Ganga basin. I have also been in discussion with colleagues in Rajasthan State Pollution Control Board in Jaipur, and will contribute to work with them to explore how the regulatory regime and its implementation can better support decentralised management which has a clear track record of sustainable success in these harsh conditions.

This inspiring story from the villages and catchments of Alwar District is one of the rebirth of a formerly damaged and degrading ecosystem, enabling the rejuvenation of nature and its capacities to support the recovery of community and economic opportunities. In this regard, it is truly inspirational. However, there is also another scale at which I am interested in the TBS-driven rejuvenation of catchments and communities. For we live on a planet with severely damaged ecosystems, its booming human population placing ever greater pressures on nature's dwindling supportive capacities. This, for me, is why the common understanding of sustainable development no longer encompasses a bold enough vision, as we make stumbling headway seeking to lighten and ultimately neutralise the tread of our demands on natural resources and processes. The stark reality is that those processes and the ecosystems that generate them are far from in a steady state. Rather, as evidenced by authoritative studies such as the UN's 2005 global Millennium Ecosystem Assessment and the UK's 2011 National Ecosystem Assessment, the baseline of nature is in steep decline, and with it human prospects to live secure and fulfilled lives. Looking forwards, seeking

neutrality against a declining baseline is no formula for a sustainable accommodation. Instead, we have to shift our vision to the rehabilitation of ecosystems, the fundamental natural infrastructure upon which humanity's prospects depend.

'Build it and they will come'. At least if we build the right things, in the right places, where there is a seed corn of nature (which brings new importance to the value of reserves such as Sariska), and where we have the dedication cleverly to conjoin the recovery of nature with appropriate modification of livelihoods and governance systems. This tale of rejuvenation from the desert edge of Rajasthan gives hope, and also provides an exemplar from which we can derive lessons of vital importance for the future wellbeing of all of humanity. It is relevant to how we manage farmland in other environments and continents, how we harvest from the sea, and how we design cities. It applies even to those of us buffered by historic trading advantages and overly comfortable assumptions, but who are in reality very far from immune from the consequences of continuing global ecosystem degradation.

The TBS-driven example in the desert fringe does not stand alone. There are also inspiring ecosystem-based socio-economic rejuvenation tales in areas of China's Loess Plateau and in the Ethiopian Highlands, as well as those achieved through wetland rehabilitation for linked socio-ecological reanimation of the Anne Valley in County Waterford, Ireland. But what has become starkly clear is the need to raise our vision to a world of rejuvenated ecosystems and the net reversal of declines in their quality, extent and capacities to sustain continuing human security, wellbeing and opportunity. Holding a declining line is entirely insufficient.

There is no greater investment in the future than upon the foundations of natural infrastructure; we have positive examples of how this may be achieved, from which to draw key principles, and upon which to base a renewed ambition and relationship with both nature and each other.

Mark Everard is Associate Professor of Ecosystem Services at UWE Bristol. His many books include <i>The Hydropolitics of Dams: Engineering or Ecosystems?</i>
