

Eliminating Poverty in Bihar

Paradoxes, Bottlenecks and Solutions

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A close examination of Bihar's recent growth experience reveals several paradoxes. These are paradoxes only with reference to certain orthodox positions widely held in development economics. Resolving these paradoxes helps formulate a more incisive understanding of what bottlenecks lie in the way of eliminating poverty in Bihar and opens the way for working out solutions to the problem.

This paper briefly outlines the grim challenges that still remain on the path to eliminating poverty in Bihar, through an account of the paradoxes that mark the state's development experience. It proposes possible solutions that could help accelerate movement towards eliminating poverty in Bihar.

Paradoxes of Bihar's Recent Development Experience

Bihar's recent development experience is a fascinating case study that forces us to question many of the standard presumptions of mainstream economic theory.

Paradox One—High Growth without Impact on Poverty: In recent years, Bihar has recorded impressive rates of growth. Bihar's gross state domestic product (GSDP) increased at 9% per annum between 2004–05 and 2009–10. However, the incredible fact is that, contrary to received wisdom, this had little impact on poverty in the state. The headcount ratio has remained virtually unchanged over the same period. Indeed, Bihar is one of the poorest regions on this planet. Bihar has the highest concentration of rural poverty in the world, with more than 600 poor people per sqkm. Bihar ranks 21st out of 23 Indian states in the Human Development Index (HDI) and 15th out of 17 states in Global Hunger Index (GHI). Over 81% of Bihar is poor as per the multidimensional poverty index (MPI), the highest among all Indian states (Alkire and Santos 2010) and 56% of children under five are malnourished (compared to the national average of 42%) (UNDP 2012).

The explanation for this apparent paradox lies in what economists call the growth elasticity of poverty (GEP). The GEP captures the impact of growth on poverty reduction. The normal assumption of an automatic relationship between the two is too simplistic. GEP is the percentage reduction in poverty rates associated with a percentage change in per capita income.

Resolving Paradox One—Agricultural Growth Is Critical:

It is well established now that the nature of the growth process, especially the sectors in which it is embodied, has an important bearing on the value of the GEP. There is also clear evidence that the GEP of agricultural growth is very high. The Organisation for Economic Co-operation and Development has just completed a study of 25 developing countries over a 25-year period. The study includes some of the poorest and some of the richest developing countries in the world,

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representing virtually all geographic regions. The countries also represent greatly diverse systems of governance and economic management. The study finds that while economic growth is an important contributor to poverty reduction, the sectoral mix of growth is crucial, with growth in agricultural incomes being especially important. Per worker growth in agricultural GDP was the single most important factor in reducing poverty in the most successful countries (Cervantes-Godoy and Dewbre 2010).

Thus, a state like Bihar needs to focus on its huge agriculture sector if it wants to make dent on poverty. Poverty elimination in Bihar, where 81% of the workforce depends on agriculture and 90% of the population lives in rural areas, is impossible without development of agriculture. And agriculture has not grown even as the overall Bihar economy has grown rapidly in recent years.

As Kishore et al (2014) have argued, average rice yield and cropping intensity in many parts of Bihar today is not much higher than what it was in 1876. Bhalla and Singh (2012) place the compound annual growth rate (CAGR) in the value of agricultural output in Bihar at a mere 1.24% from 1962–65 to 2005–08 as against 2.08% for all India.¹ This is the second slowest (after Assam) of all Indian states over this period. The total population and the population of agricultural workers in Bihar grew almost three times as fast during this period. In effect, per capita (and per worker) value of output of agriculture has been shrinking over the last four decades in Bihar.

Paradox Two—Agriculture Not Growing Despite Massive Increase in Irrigation and Chemical Inputs: Another orthodox view equates agricultural development with certain elements of the Green Revolution such as extension of irrigation, mechanisation and use of high-yielding varieties (HYV) seeds, chemical fertilisers and pesticides. If that was the case, agriculture in Bihar should have been booming because nearly two-thirds of land has been brought under irrigation (nearly double the national average), and use of chemical fertilisers and hybrid seeds is widespread. Fertiliser consumption in Bihar is 166 kg per ha, which is higher than the national average of 153 kg per ha (Bhalla and Singh 2012). Both net and gross irrigated areas in Bihar have increased by more than 60% between 1971 and 2008. The density of tractors has increased from 4 to 17 per thousand hectares of net sown area (NSA), and the use of high-yielding varieties is much more common now. In the late 1980s and early 1990s, agricultural growth rate did reach almost 3% per year. But this was short-lived and agriculture is stagnant once again. Both NSA and gross cropped area (GCA) peaked in the mid-1970s and have declined since then by about 5%–10%. The same is true of cropping intensity, which has not risen above 140% since then. The real GSDP in agriculture in the state has not had two consecutive years of growth since 1993–94 (Kishore et al 2014).²

It is not as if the Government of Bihar (GoB) is not aware of the crucial role of agriculture in poverty elimination in the state. The state's plan expenditure on agriculture has undergone a massive increase from Rs 25 crore in 2004–05 to Rs 844

crore in 2011–12. Easily accessible subsidies on farm implements and quality seeds are being provided to farmers. Barefoot agricultural extension workers are helping gram panchayats to bring innovations to farmers' doorsteps. An agriculture cabinet facilitates coordination across 17 departments connected with the subject (Kishore et al 2014).

Resolving Paradox Two—What More Needs to be Done:

But why have all these measures not injected the corresponding dynamism into Bihar agriculture? What more needs to be done? What are the other key bottlenecks in dynamising agriculture? What are the ways of overcoming these bottlenecks? We suggest that there is a whole gamut of changes that is required and that these changes need to be implemented as a package if we want to make a real dent on poverty in Bihar. We like to allude to the Green Revolution and the dynamism it injected at least into some sectors of Indian agriculture. And the key to the success of the Green Revolution was that a whole package was implemented, which is not limited to improved seeds, groundwater irrigation, chemical fertilisers and pesticides but also includes massive public investment, availability of credit as also price and procurement support. Of course, the specifics of the package Bihar now requires will be very different from the Green Revolution, drawing the right lessons from its many failures. But it is clear that much more is required if we want to make the big breakthrough in agriculture in Bihar, without which poverty cannot be eliminated.

Eliminating Poverty in Bihar: Bottlenecks and Solutions

Our overall understanding of the Bihar agriculture conundrum is that public investments are lagging way behind private initiative and unless vital elements of rural infrastructure are put in place through massive public investments, the situation is unlikely to change. There is also need to build upon the initial momentum recently achieved in key sectors of the rural economy. Addressing inequalities and improving the functioning of anti-poverty programmes is critical. We present below 15 thrust areas that would be crucial if we are to hope for the elimination of poverty from Bihar:

(1) Separation of Power Feeders: Groundwater is the key driver of the increase in irrigation in Bihar, as in the rest of India. But unlike most of India, in the alluvial aquifers of Bihar, water is available at remarkably shallow depths. Nearly three-fourths of the farmers get water within 10 m. This is a huge potential crying out to be utilised. There is sufficient evidence to show that higher the level of abstraction in the pre-monsoon season, higher is the net recharge in post-monsoon season; for every one metre of additional drawdown in the pre-monsoon season, post-monsoon recovery goes up by 0.85 metres. Hence, intensive groundwater use has positive externalities, as envisaged in the "Ganges Water Machine" hypothesis (Revelle and Lakshminarayana 1975; Mukherjee et al 2012).

The main reason why this does not happen is the lack of power. Fifty percent of farmers live in villages where there is no access to power. For the other half, the quality of power is

abominable: supply is extremely poor and unreliable. In the irrigation data, all these farmers are shown as irrigators. What the statistics do not reveal is the quality of irrigation. The result is stagnant intensity of irrigation, as well as cropping.

What is worse, in the absence of reliable electricity, farmers (97%) resort to diesel pumpsets (owned or rented) to draw groundwater, which makes irrigation both very costly and extremely environmentally unfriendly. The price of diesel increased 670% from 1990 to 2006. With deregulation, these prices could rise even more rapidly. Kishore et al (2014) clearly demonstrate the high, statistically significant negative correlation between diesel prices and cropping intensity.

In our view, the way forward for Bihar is to adopt the path-breaking solution pioneered by the Jyotigram scheme in Gujarat. What Gujarat achieved has inspired other states like Andhra Pradesh, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Punjab and Rajasthan to follow suit. The physical segregation of power feeders enables the provision of 24×7 electricity to rural habitations and non-farm users and high quality three-phase predictable supply to agriculture, which is rationed in terms of total time, at a flat tariff. This provides requisite power to schools, hospitals and the non-farm economy, while allowing rationed supply of power to agriculture, which can be at off-peak hours. The Government of Gujarat invested \$1,250 million during 2003–06 to separate 8,00,000 tube wells from other rural connections and imposed an eight-hour per day power ration but of high quality and full voltage. The net result has been: (a) halving of the power subsidy and (b) improved power supply in the rural economy. Combined with other measures such as the High Voltage Distribution System (HVDS), specially designed transformers and energy-efficient pumpsets, this could be a better way of delivering power subsidies that cuts energy losses (Planning Commission 2012).

(2) Harnessing the Potential of Solar Power: Another possible solution to the problem of low rural electrification is to increase the use of solar power. Since Bihar is characterised by alluvial aquifers and shallow water tables, there is more potential for solar pumps here than in most other parts of India. A shallow tube well, which until now was pumped for barely 400–500 hours per year, can be pumped for 1,500–2,000 hours per year (Shah 2014). The Ganges Water Machine can be used to pump more shallow groundwater for rabi and summer irrigation, thereby creating storages in the alluvial aquifers to receive more recharge. In addition to increasing the irrigated area and reducing poverty, this could also somewhat mitigate the problem of recurrent floods.³

There have been a large number of issues related to solar power generation and distribution in India. Recently, the Government of Karnataka has come up with a new scheme called Surya Raitha, which combines capital cost subsidy with guaranteed buy-back of surplus solar power from the producers. This allows farmers to grow solar energy as a “cash crop” (Shah et al 2014). A similar scheme encouraging decentralised harvest of solar power with capital subsidy and buy-back

arrangements could be attempted in the relatively water-abundant Bihar as well.

(3) Raising Yields of Rice and Wheat: Rice and wheat are the main crops in Bihar covering 72% of GCA in 2007–08. But their yields in Bihar are among the lowest in the country. The share of rice and wheat in total value added from agriculture is only around 30% (GoI 2013). In parts of Bihar where waterlogging and floods are not a problem, yields of rice can be increased by advancing transplantation of kharif paddy by a month. If we can reduce the cost of irrigation by making power more regularly available in good quality (even if rationed), then farmers will be able to exercise this option recommended by agricultural scientists for a long time now. With assured irrigation and price incentives, rabi wheat production can be stepped up.

(4) Crop Diversification, Agro-processing and Value Addition: Nearly 10% of India’s fruits and vegetables are produced in Bihar, which ranks third and sixth in vegetable and fruit production respectively, among Indian states. Fruits and vegetables contribute 21% of the Bihar’s gross value of output from agriculture and allied activities (GoI 2013). But the cropped area and production of fruits have been stagnant in the first decade of the 21st century and productivity has actually shown a slight decline. For vegetables, though, both area and production have grown rapidly. But productivity has grown only slowly.

There is a great diversity of vegetables grown in the state, with potato being the most significant vegetable, followed by onion, tomato, cabbage, cauliflower, pointed gourd and okra. Mango is the main fruit of Bihar followed by banana and lychee, which fetches a high premium not only within India but also in West Asia, Europe and North America.

The answer to the stagnant productivity syndrome of the very high potential fruit and vegetable segment of Bihar agriculture is modern infrastructure at all levels of the supply chain. The potential of banana plantations raised through high-yielding and early-maturing tissue-cultured plants must be fully exploited. There is need to also build cold-storage capacity. Of what exists in the state, nearly 40% is said to be defunct (World Bank 2007). An estimated 10%–40% of the state’s horticulture produce is lost every year. And only 2%–3% of Bihar’s fruits and vegetables go through any kind of processing.

There is also huge potential for further diversification and increased productivity in maize, a crop that has shown great promise in Bihar. Productivity of maize in Bihar is higher than the national average. Maize can replace both rainfed kharif rice and irrigated rabi wheat. Potentially there is huge demand for maize—for poultry and livestock feed, as also for human consumption. With a new starch and feed industry coming up in Bihar, there is great scope for integrating the value chain for maize. Andhra Pradesh, Tamil Nadu and West Bengal have huge unmet demand for maize.

(5) Renewed Thrust to the Livestock Sector: The livestock sector is perhaps the most dynamic sector of the Bihar economy and is more significant in Bihar than in the country as a whole.

Bihar produces about 54 lakh tonnes of milk annually. Over the last decade, milk production has grown at nearly 7% pa, nearly double the national average.

Much of the success owes to the work of the Bihar State Co-operative Milk Producers' Federation (COMPFED), which has recorded an annual average growth rate of 14% from 2000–01 to 2009–10 (COMPFED 2010). The quantity of liquid milk marketed crossed nine lakh litres per day in 2011. Bihar milk is today reaching distant markets in Delhi and Kolkata through partnerships with both Mother Dairy and Amul.

Sustained growth of COMPFED would be a key factor contributing to poverty elimination in Bihar.

(6) Easing the Credit Crunch: Bihar has the lowest density of banking among all states in India, with only one bank branch for every 13 villages. There is one bank branch every 35 sqkm suggesting an inter-branch distance of at least 6 km on average in rural Bihar. Population per bank branch in Bihar is approximately 23,000 in comparison to the national average of 15,000. The credit–deposit ratio is an abysmal 32%, compared to the national average of 73% (Government of India 2008). Farmers are forced to borrow at usurious rates of interest from moneylenders, who are also traders. Thus, farmers get caught in a pincer-like movement created by an interlocking of credit, product, input, labour, land lease and land markets, culminating in alienation of their land itself (Shah et al 2007). Without addressing the credit crunch, it is impossible to make farming viable in Bihar and to make a real dent on poverty.

Technological advances have made many innovations possible in banking today. We do not require “brick-and-mortar” solutions. The business correspondent model can work as well, where the bank reaches the doorstep of the customer. However, banks do not always find such solutions attractive. Viability of the business correspondent model remains a big concern. The way to resolve the twin challenges of viability for banks and accessibility to credit for the poor is to build the self-help group (SHG)-bank linkage model in Bihar.

The SHG-bank linkage model has worked in many previously under-banked areas of the country, where remote rural banks were on the verge of shutting down. It is the linkage of these banks with vibrant SHGs led by women that has enabled both access to credit for these people previously regarded as “un-bankable,” while also restoring the profitability of these banks (Shah et al 2007). Well designed and soundly functioning SHGs of women help overcome many elements of market failure in the credit market by providing unimaginable credit intelligence to banks, as also recording near 100% rates of repayment based on sound lending decisions, taken by the women themselves.

The Bihar Rural Livelihoods Promotion Society provides a great platform for the expansion of the SHG-bank linkage model in the state, which must be provided every possible assistance through the National Rural Livelihoods Mission. The Bihar government has announced an ambitious target of forming 10 lakh SHGs in the next five years. If this target is reached, a total of 1.25 crore households and six crore people would be linked

with the SHGs which would form a formidable 55%–60% of the state population. Several key livelihood initiatives could then be implemented through this wide base of SHG membership.

(7) Market Reform and Farmer Producer Organisations: In line with orthodox policy opinion in India today, the GOB did away with the Agricultural Produce Marketing (APMC) Act in 2006. The state of agricultural markets in Bihar today captures the third paradox of the development experience of Bihar in the 21st century. One would have imagined that the abolition of the APMC would do wonders for Bihar agriculture. But the real experience on the ground has been to the contrary. Since APMC abolition, no law has governed the functioning of agricultural markets in Bihar. It was thought that the private sector would step in to fill the breach. But this has not happened.

This is because in Bihar, primary produce marketing, both before and after the repeal of the APMC Act, has continued to be dominated by village-level exchange between farmers and local buyers (traders, aggregators, wholesalers and retailers) in bilateral trading arrangements outside mandis. Both state-regulated and private wholesale markets in the state have tended to feature secondary transactions (between buyers, traders and commission agents), but have not facilitated the participation of farmers, especially the majority of small and marginal cultivators (Krishnamurthy 2015). Poor marketing infrastructure and highly dispersed and fragmented landholdings seem to act as a deterrent to private players from procuring directly from farmers. Even when they enter, they are likely to procure from large traders operating in these markets. The state government's Rs 1,272 crore plan to develop infrastructure for agriculture marketing has remained a non-starter (Government of Bihar 2008a). Little has changed for the small and marginal farmers, who are forced to sell their produce in unregulated markets. Farmers of Bihar suffer great neglect by the Food Corporation of India, whose procurement operations cover less than 10% of total kharif production of Bihar. The situation is even worse in wheat, resulting in widespread distress sales of rice and wheat much below minimum support prices by farmers.

The last few years have seen a vigorous attempt by the state government to change this situation, with impressive procurement targets. 6,000 new collection centres were opened to facilitate procurement, and farmers were promised immediate payment for their paddy through account payee cheques. The state cabinet approved a budget of Rs 800 crore to pay farmers.

But the overall task remains a deeply challenging one as most farmers have a very small marketable surplus, which raises the transaction costs for both the procurement agency and the farmer. The answer to these problems is to develop strong Farmer Producer Organisations (FPOs), which would help overcome the difficulties faced by isolated small and marginal farmers who suffer at the hands of the interlocked markets syndrome and are forced to sell their produce at a pittance to the very same moneylender-traders to whom they are in debt. Thus, developing a vast network of SHGs and then aggregating them into FPOs would be the way to both overcome the credit

crunch and also allow economies of scale for farmers to be able to gain from participation in commodity markets. Such powerful institutions of the poor will also open up possibilities of climbing up the value chain, especially in fruits and vegetables, an option that otherwise does not appear to be feasible for small and marginal farmers at the moment.

(8) Expanding the Network and Quality of Roads: Marketing will remain a pipe dream for Bihar's farmers without an extensive network of high-quality roads. Bihar has among the lowest road density, in terms of road length per sqkm and road length per capita. The Planning Commission has estimated that a mere 30% of inhabited areas in Bihar are connected with motorable roads, which is the lowest in the country (Planning Commission 2007).

The GoB has, over the last decade, started giving great emphasis to improving the road network, both in terms of coverage and quality. The expenditure of the road construction department has increased 18-fold during 2004–09, resulting in a sixfold increase in road length. Quality considerations have come to the fore and bridge construction has been given an unprecedented thrust. This momentum needs to be maintained in the years to come as the state has a great deal of catching up to do.

(9) Flood Management Needs a Paradigm Shift: One of the most important bottlenecks afflicting agricultural growth in Bihar is the chronic problem of floods, with nearly three-quarters of its area and 30 of its 38 districts being flood-prone. From 1990 to 2006, floods have caused damage of more than Rs 9,000 crore (at 2006 prices) and killed around 3,000 people and 12,000 cattle (Kishore et al 2014).

In addressing the problem of floods, the central focus over the years has been on engineering/structural solutions. Apart from the massive investments in large dams, India has already constructed over 35,000 km of embankments. But these are rapidly reaching their limits. Recent studies show, for example, that

For the Ganges system, out of 250 BCM of potentially utilisable water, about 37 BCM are presently captured, and a total of at most 50 BCM would be captured if all possible dams under consideration were to be built. These would add little in the way of irrigation or flood prevention benefits. Tributaries at risk are already fully embanked, and floods have occurred not because water has flown over the embankments, but because embankments have been repeatedly breached as a result of poor maintenance (for example, Kosi in Bihar) or inappropriate dam management (for example, Hirakud in Orissa) (Ackerman 2011).

In 2008, a breach in an upstream embankment of the Kosi led to nearly thousand deaths and the displacement of around 3.35 million people (Government of Bihar 2008b). In north Bihar, despite the continued construction of embankments, the flood-prone area has increased 200% since independence, at times because embankments end up obstructing natural drainages and impede the natural building up of river deltas and floodplains.

In acknowledgement of the limits to further possibilities of building large storages and embankments, some state

governments (such as Bihar) have decided to broaden their strategy of tackling floods by placing greater emphasis on rehabilitation of traditional, natural drainage systems, leveraging the funds available under Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) (Samaj Pragati Sahayog and Megh-Pyne Abhiyan 2012). Since this involves a process of complex social mobilisation and social engineering, civil society organisations will need to work in close partnership with the state government in this endeavour. The Twelfth Plan strongly endorses such a paradigm shift in flood management away from building more and more embankments and towards a “room for the river”²⁴ kind of approach.

Indeed, an attempt needs to be made to, as far as practicable, convert adversity into opportunity. Part of the waterlogged area could be used for construction of small multi-purpose farm ponds. The mud of the ponds would be raised on the side as embankments on which crops like banana, papaya, mango, pigeon pea and cashew nut can be grown. The pond water will be used to irrigate the non-waterlogged, upland area. Experiments have shown that in waterlogged areas, cultivation of water chestnut (*Trapabi spinosa*) can be quite profitable. Research and field level trials have identified extra-tall varieties of paddy that can grow fast and can tolerate waterlogging. Waterlogging is often aggravated by the mismanagement of rainwater in the upper catchment. In situ rainwater conservation in the upper catchment and intensification of the use of groundwater through shallow tube wells are possible interventions to mitigate the problem. Through integrated management of land, water and nutrients, agricultural productivity of these uplands could be stabilised and enhanced, which would, in turn, have a positive impact on the waterlogged lowlands.

In addition, far greater priority needs to be given to non-structural measures such as the efficient management of floodplains, floodplain zoning, disaster preparedness and response planning, flood forecasting and warning, along with disaster relief, flood fighting including public health measures and flood insurance. Many reservoirs were initially constructed without any flood cushion but with development and population growth, habitations have come up very close to the downstream of these reservoirs and the operation of such reservoirs needs to be done carefully. The existing flood forecasting network of the Central Water Commission (cwc) is not sufficient to cover the entire country adequately. The Twelfth Plan proposes a concrete plan for extension of cwc's flood forecasting network in consultation with the state governments and India Meteorological Department to cover A, B-1, B-2 and C-class cities located near rivers under the network of automatic data collection, transmission and flood information dissemination. At present, the cwc provides inflow forecast to 28 reservoirs in the country. In the Twelfth Plan this needs to be extended to an additional 160 reservoirs, which will cover 80%–90% of the total live storage capacity.

Moreover, a majority of the flood warning systems are not timely, primarily due to poor transmission. Delays cause enormous damage to property and lives every year. Models used

for flood forecasting and its influence zones are not rigorous enough due to a lack of integration of hydrology and the weather forecasting systems. The lead time for flood forecasting can be improved through the use of hydraulic and hydrologic models which are linked to the weather forecasting system, the real time data acquisition system, and the reservoir operation system. It is possible to improve the current forecasting methods by using satellite-based information for better estimates of rainfall and snowmelt (Shah 2013a).

While concluding our discussion in this section, we would like to clearly state that a much-advocated solution to Bihar's floods is a complete non-starter. In this view, the solution to Bihar's floods lies in constructing large multipurpose dams in Nepal to better regulate river waters. Such views completely ignore the fact that in the Himalayas we confront one of the most fragile ecosystems in the world. The Himalayas are comparatively young mountains with high rates of erosion. Their upper catchments have little vegetation to bind soil. Deforestation has aggravated the problem. Rivers descending from the Himalayas, therefore, tend to have high sediment loads. A 1986 study found that 40% of hydro-dams built in Tibet in the 1940s had become unusable due to siltation of reservoirs (Pomeranz 2009). Studies by engineering geologists with the Geological Survey of India record many cases of power turbines becoming dysfunctional following massive siltation in run-of-the-river schemes. Climate change is making predictability of river flows extremely uncertain. This will rise exponentially as more and more dams are built in the region. Diverting rivers will also create large dry regions with adverse impact on local livelihoods (fisheries and agriculture). Rapid rise of the Himalayas (from 500 to 8,000 metres) gives rise to an unmatched range of ecosystems, a biodiversity that is as enormous as it is fragile. According to Valdiya (1999), as also Goswami and Das (2002), the neo-tectonism of the Brahmaputra Valley and its surrounding highlands in the eastern Himalayas means that modifying topography by excavation or creating water and sediment loads in river impoundments can be dangerous. Quake-induced changes in the river system can adversely affect the viability of dams as several basic parameters of the regime of rivers and the morphology and behaviour of channels may change.

The last two major earthquakes in the region (1897 and 1950) caused landslides on the hill slopes and led to the blockage of river courses, flash floods due to sudden bursting of landslide induced temporary dams, raising of riverbeds due to heavy siltation, fissuring and sand venting, subsidence or elevation of existing river and lake bottoms and margins and the creation of new water bodies and waterfalls due to faulting (Menon et al 2003). Even more recent research published in *Science* (Kerr and Stone 2009) on Zipingpu reservoir-induced seismicity as a trigger for the massive Sichuan earthquake in 2008 raises doubts about the wisdom of extensive dam-building in a seismically active region.

The devastating 2015 earthquake in Nepal is yet another chilling warning against such adventurism and hopefully will end the debate on the right approach to flood management in Bihar.

(10) Distinct Approach to South Bihar: Since we get so pre-occupied with floods when we plan for Bihar, there is a tendency to overlook the very different approach we need for the districts of South Bihar such as Aurangabad, Banka, Bhojpur, Buxar, Gaya, Jamui, Jehanabad, Kaimur, Lakhisarai, Munger, Nawada, Rohtas and Sheikhpura. Many of these districts have extreme poverty and are also hotspots of left-wing extremism. We need to build a water conserving agriculture in these regions, with a central thrust on watershed development.

The best way to do that is to build on a great traditional system and to use the resources available under the MGNREGA. *Ahar-pyne* is a traditional system of south Bihar by which the natural drainage is blocked and the water impounded for use. Long narrow artificial canals called *pynes* branch off from the rivers and carry water to the fields. The same slope is impounded in extensive reservoirs called *ahars*, which are formed by constructing a series of retaining embankments across the lines of drainage. An *ahar* resembles a rectangular catchment basin with only three embankments, with the fourth side left open for the drainage water to enter the catchment basin following the natural gradient of the land. *Ahars* are very different from regular tanks in that their beds are not dug out and unlike tanks, *ahars* have elevated embankments.

The *ahar-pyne* system of irrigation irrigated about 35% of 2.5 mha of cropped land during the first two decades of the 20th century in south Bihar. The area irrigated by this system has witnessed a constant decline, reaching about 0.53 mha (12%) by the end of the century. While in the early decades of planning, *ahar-pynes* were given great importance, the emergence of alternative forms of irrigation and the non-integration of *ahar-pynes* into new canal systems, have led to their decline over time. We believe these ecologically sound and low-cost systems of water harvesting have a huge potential even today in solving the water problems of south Bihar in a truly integrated manner, simultaneously providing for both water harvesting and drainage that other systems do not provide. What is required is sustained social mobilisation and collective action for the operation and maintenance of these systems, something that has been hard to come by in recent times.

(11) Challenge of Industrialising Bihar: The separation from Jharkhand meant that Bihar lost its large industrial base and mineral resources. Deep inadequacies in power, roads, education and skills have hampered Bihar's efforts to industrialise. Even as we address each one of these, the aim should be to capitalise on the manifold strengths of Bihar: its alluvial soils, plentiful water and its emerging livestock, fruits and vegetables sector. If Bihar were to prioritise its food and agro-processing sector and also give a major thrust to skill and entrepreneurship development, especially in the micro, small and medium enterprises (MSME) segment, it could make giant strides towards eliminating poverty. This is because some patterns of growth are inherently more inclusive than others. For example, rapid growth which involves faster growth in agriculture is much more inclusive than a GDP growth that is driven entirely by mining or extraction of minerals for exports. Similarly,

rapid growth which is based on faster growth for the MSME will generate a much broader spread of employment and income earning opportunities.

- Bihar's industrialisation strategy should focus on food and agro industries (including milk and milk processing and tea and tea processing), leather and leather products, tourism, IT/ITES, electrical and electronics engineering industries, horticulture and floriculture.

- There is great merit in the idea of industrial clusters that the state has promoted. However, there is need to be very selective in moving ahead on these. Not more than a third of the 65 clusters identified by the department of industry may end up being feasible; the others are far too small to be viable. ASSOCHAM estimates that 14 of these clusters (at Patna, Darbhanga, Madhubani, Barauni, Muzaffarpur, Katihar, Madhepura, Bhagalpur, Munger, Nawada, Supaul, Gaya, Bhojpur and Hajipur (Vaishali)) have a capacity of sustaining about 25,000–28,000 units with each providing jobs to 8–10 people. These carefully selected around 20 industrial clusters should be provided cluster specific infrastructure and other support like technology, designs, market, etc (Awasthi 2012).

- A major bottleneck in Bihar's industrialisation is the lack of skilled human resources. The industrial training institutions (ITIs) in Bihar need a complete revamp. Those they train tend to remain unemployable. Government needs to invest in modernising and upgrading ITIs, besides augmenting their intake capacity, with a focus on those industries that the state needs to prioritise in its overall industrialisation strategy. At times it tends to get hamstrung by their insistence on minimum educational qualifications. It must be realised that Bihar has a rich artisanal tradition and the value of the experience of these people needs to be given due recognition. A much more "bare-foot technician" kind of approach needs to be supported given the rich tradition of skills Bihar already has.

(12) Crucial Role of Safe Drinking Water, Sanitation, Health and Education: Another clue to resolving the apparent paradox of why high growth may not always lead to lower poverty is provided by Ravallion and Dutt (2002), who examine the impact of growth on poverty across India's states:

Poor basic education and health inhibited the prospects of the poor participating in growth of the non-farm sector... Amongst the initial conditions we have found to matter significantly to prospects for pro-poor growth, the role played by literacy is particularly notable. For example, nearly two-thirds of the difference between the elasticity of the headcount index of poverty to non-farm output for Bihar (the state with lowest absolute elasticity) and Kerala is attributable to the latter's substantially higher initial literacy rate (Ravallion and Dutt 2002).

It has also been well established in the literature that one of the most important causes of poverty is out-of-pocket health expenditure:

When people have to pay fees or co-payments for health care, the amount can be so high in relation to income that it results in 'financial catastrophe' for the individual or the household. Every year, approximately 44 million households throughout the world face catastrophic expenditure, and about 25 million households are pushed into poverty by the need to pay for health services (WHO 2005).

Improvements in health are virtually impossible without improved access to safe drinking water and improved sanitation. There has been a significant rise in our understanding in recent years regarding the relationship between sanitation and health. An article in *Lancet* (Humphrey 2009) suggests that the impact of sanitation and hygiene interventions on child undernutrition has been seriously undervalued in the existing research as this effect has been modelled entirely through diarrhoea. The study argues that a key cause of child undernutrition is a subclinical disorder of the small intestine known as tropical enteropathy. This is caused by faecal bacteria ingested in large quantities by young children living in conditions of poor sanitation and hygiene. The study finds that provision of toilets and promotion of handwashing after faecal contact could reduce or prevent tropical enteropathy and its adverse effects on growth; and that the primary causal pathway from poor sanitation and hygiene to undernutrition is tropical enteropathy and not diarrhoea. Though based on field studies conducted in Africa, this study has important policy implications for India, especially states such as Bihar. Accelerating provision of toilets and improved drinking water quality will prevent tropical enteropathy, which in turn will yield improvements in child growth, health and survival.

The 2011 Census reveals that Bihar is one of the most backward states in India in respect of sanitation. The percentage of households in rural Bihar with no latrine facilities was as high as 82.4% in 2011, only a marginal improvement over the figure of 86.1% as per the 2001 Census. A study of the Total Sanitation Campaign (TSC) (Spears 2012)⁵ finds that at mean programme intensity, infant mortality decreased by four per thousand and children's height increased by 0.2 standard deviations. Relative to other children born in the same districts or in the same years, rural children exposed to better sanitation in their first year of life were more likely to survive infancy. Districts in which more latrines were constructed over this period saw a greater decline in rural infant mortality rates, controlling for other changes. Rural children born in years and districts with more TSC latrines available in the first year of their lives are taller than children born in other years or districts.

Thus, it is clear that improved sanitation, health and education are crucial to both reducing poverty and enhancing the growth elasticity of poverty. Bihar's abysmal HDI figures show that the state has a lot of catching up to do in these sectors. The moves by the central government to cut down on expenditures on social sector programmes like health, education and child welfare schemes such as Integrated Child Development Services and Mid Day Meal Scheme are a real cause for concern (Mitra 2015). A state like Bihar needs all the support it can get to extend quality health and education services to all its citizens as a matter of right and because of their significance for the state's efforts at poverty elimination.

(13) Redressing Social and Economic Inequality: What is not always adequately recognised is that the growth elasticity of poverty is a decreasing function of the degree of inequality

of the income distribution (Bourguignon 2002). Thus, states with a more equal distribution of income experience a greater reduction in the poverty rate, for a given increase in per capita income. Thus, great emphasis needs to be given to reducing the vast levels of inequality, if we wish to eliminate poverty in Bihar, both directly and by increasing the efficacy of growth as an instrument of poverty alleviation.

Inequality has many social dimensions in Bihar, including caste and gender. The caste system finds a reflection also in land distribution and landlessness. Historically, Dalits did not have a right to landownership in India (Shah 1984). Conflicts over land and caste discrimination have ravaged Bihar for decades. The fact that they often degenerated into a violent form reflects the cynicism and despair faced by those occupying the lowest rungs of the caste hierarchy, the Scheduled Castes and the Extremely Backward Castes (Jha and Pushpendra 2012). Bihar ranks last out of 35 states in the Gender Development Index (GDI), 31st out of 35 states in Gender Empowerment Measure (GEM) and 16th out of 19 states in the inequality adjusted HDI (IHDI) (UNDP 2012).

Many efforts have been made to redress inequalities in the state with special provisions being made for the discriminated castes and a large number of programmes for girls and women. While their significance cannot be underplayed, it is also true that land distribution and land relations remain an enduring bottleneck to eliminating poverty in Bihar. Moving the very large numbers of landless out of agriculture is certainly one way forward but given the humongous importance of the agriculture sector in Bihar, landlessness remains a huge bottleneck. Another possibility is to build alternative livelihood options for the landless poor. The livestock sector, as also a decisive thrust to fisheries, in this water-abundant state would appear to show a clear way forward. A special effort needs to be made to create livelihood options specifically targeted at Musahars and Doms (Maha Dalits) who constitute almost 10% of the state's population.

(14) Giving Bihar's Muslim Artisans a Better Chance: A specific dimension of the social and economic inequalities characterising Bihar is the condition of its Muslims. Around 14 million Muslims live in Bihar, constituting nearly 10% of India's Muslims and about 17% of Bihar's population. Muslim families dominate the rich work tradition in Bihar spanning pottery, carpentry, blacksmith work, leatherwork, woodcraft, metal craft, lacquerware, weaving, tailoring, appliqué, Madhubani painting, basketmaking and bamboo work (ADRI 2004). However, over time, these artisanal works have undergone a decline in the face of competition from the manufacturing sector. Many Muslim families have been reduced to the status of landless labourers in villages or manual labour in cities. The Asian Development Research Institute study estimates that there are 63 migrants for every 100 Muslim households in rural Bihar. Two out of every three Muslim households in rural Bihar send at least one of their working members away to earn.

An integral element of eliminating poverty in Bihar has to be improving the conditions of life of Bihar's Muslim artisans.

Dedicated marketing organisations on the lines of the Jharkhand Silk Textile and Handicraft Development Corporation Ltd (JHARCRAFT) or Developing Ecologically Sustainable Industries, Bangalore (DESI), developing a rural arts and crafts complex on the lines of Shilpgram, creation of social infrastructure such as common facility centre, artisan owned producer companies, rural haats, etc, coupled with an integrated insurance, credit and storage facility, with small business management inputs, are some of the measures required to be undertaken (Awasthi 2012).

Bihar also has very rich tradition of handicrafts and handloom artisans, again mostly Muslims. Of the 1.4 lakh handloom weavers, only about 54% own their handlooms and the remaining depend upon the traders, and more than 50% weavers earn less than Rs 2,000 a month. Organising these weavers into SHGs and SHG Federations could help overcome the syndrome of indebtedness and provide economies of scale in the market.

(15) Massive Unrealised Potential of MGNREGA: Eliminating poverty cannot just be about increasing the growth rate of the economy or even of its most vital sectors. As the eminent economist Raj Krishna remarked more than 40 years ago, India needs a more direct attack on poverty and cannot afford to just wait for the benefits of growth to trickle down to the masses (Krishna 1973). Raj Krishna's work was one of the stimuli for the beginning of anti-poverty programmes in India. These programmes have had a chequered history over the last four decades (Shah et al 1998). The MGNREGA was an attempt to distill the lessons of this history and come up with a radically new programme in both design and content. We have described MGNREGA as a huge success and a massive failure (Shah 2014). It is clear that if the requisite conditions for its success are present the programme has great potential. The key challenge is to draw the right lessons and implement them in real earnest.

There is no doubt that the MGNREGA impact on rural wages (and therefore poverty) has been much larger than all previous rural public works programmes. The National Sample Survey reports an eightfold increase between 2004-05 and 2009-10 in both the number of workers and days of employment in public works. This has been achieved with only a modest increase in the share of rural employment schemes in total central plan expenditure: from an average of 11.8% in the three years before MGNREGA (2002-03 to 2004-05) to 13.3% in 2009-10 to 2011-12 (Planning Commission 2012).

It must also be borne in mind that rural labour relations in a state like Bihar remain largely oppressive and the use of migrant labour for both agriculture and construction is often highly exploitative. A situation where low-cost labour provides the necessary profit margins both disincentivises investments in improving productivity and will not get corrected by itself. A well-implemented MGNREGA will ensure a fairer balance between worker, contractor and employer and will be to everybody's benefit, especially if productivity can be raised (Planning Commission 2012).

There is widespread evidence from independent evaluations (recently summarised in the publication *MGNREGA Sameeksha*) that wherever land productivity has improved and greater water security delivered, small and marginal farmers working at MGNREGA sites have reverted back to farming and allied livelihoods; and also that MGNREGA is enabling crop diversification, particularly into horticulture, wherever it is appropriately converged with schemes of agricultural departments. Thus, the real solution to increasing farm profitability lies in increasing the productivity of the land. Properly designed, the MGNREGA scheme can contribute to this, thus creating positive synergy with agricultural growth. Thus, the scheme has an enormous potential in a state like Bihar and every effort must be made to expand its coverage and improve its performance.

Dutta et al (2011) have carefully examined the Bihar experience with MGNREGA. They find that contrary to what one would imagine, despite being one of India's poorest states, Bihar shows relatively low participation rate in MGNREGA. They also find that there is a large unmet demand for work in Bihar and many other poor states. The key explanation for what is yet another paradox of Bihar's recent development history lies in the lack of requisite capacity across the spectrum in the state:

- Lack of administrative capacity of the state government.
- Lack of professional human resource capacity in the key implementing agency, the gram panchayat (GP).
- Lack of capacity among MGNREGA workers, who are inadequately aware of the procedures and their entitlements under the act.

This also indicates the way forward for MGNREGA in Bihar. Recent changes in the procedures under MGNREGA initiated by the Government of India would make these changes more feasible in the state. These include the deployment of multi-disciplinary teams of professionals called Cluster Facilitation Teams (CFTs) to support GPs to effectively implement MGNREGA. The CFTs will help GPs in

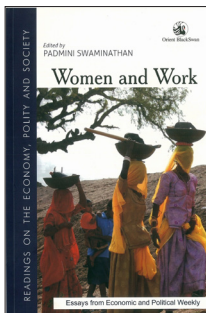
- Preparing labour budgets to more accurately capture demand.
- Preparing a shelf of works that could meet this demand for work.
- Generating awareness among workers of the procedures and entitlements under MGNREGA.
- Effectively implementing the programme so that productive assets can be built.
- Conducting social audits to create transparency and accountability and check corruption.

The long-term vision for MGNREGA has to be that its successful implementation will in itself reduce the demand for the programme, such that over time the very need for the programme is reduced. This will happen through what has been described as the "multiplier-accelerator synergy" in MGNREGA (Shah 2009). The productivity of farming will grow, alternative livelihood options will get created and people will no longer need to be so dependent on government programmes. Specifically in Bihar, MGNREGA funds can be deployed to work out decentralised solutions for the problem of floods and for the revival of the ahar-pyne system (Samaj Pragati Sahayog and Megh-Pyne Abhiyan 2012).

Women and Work

Edited by

PADMINI SWAMINATHAN



The notion of 'work and employment' for women is complex. In India, fewer women participate in employment compared to men. While economic factors determine men's participation in employment, women's participation depends on diverse reasons and is often rooted in a complex interplay of economic, cultural, social and personal factors.

The introduction talks of the oppression faced by wage-earning women due to patriarchal norms and capitalist relations of production, while demonstrating how policies and programmes based on national income accounts and labour force surveys seriously disadvantage women.

This volume analyses the concept of 'work', the economic contribution of women, and the consequences of gendering of work, while focusing on women engaged in varied work in different parts of India, living and working in dismal conditions, and earning paltry incomes.

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NOTES

- 1 This figure is unlikely to have changed in more recent years because of three drought years (2009, 2010 and 2012). The impact of droughts showed up in the National Sample Survey (NSS) consumption estimates too. The 66th round of consumption survey carried out in 2009–10 showed no decline in poverty in the state between 2004–05 and 2009–10 despite very high growth in GDP.
- 2 Inconsistency in secondary data and mistaken use of base and terminal years has misled some researchers to conclude that agricultural growth in Bihar accelerated to more than 5% per annum after 2000. Kishore et al (2014) convincingly bust this myth.
- 3 In the original Ganges Water Machine study, it was estimated that an additional 60 billion cubic metres could be stored in subsurface aquifers along the 3,000 km river reaches in Upper Ganga basin. Fresh studies on UP confirm this and have indicated that it is possible to store between 7% and 19% of the annual monsoon flow in the river (Khan et al 2014).
- 4 This is the name of the new Dutch approach to flood management that shifts focus from dike reinforcement to river relief (Government of Netherlands 2007; ClimateWire 2012).
- 5 This study uses administrative records on implementation of TSC and data from the third round of the District Level Household Survey (DLHS-3) and bulletins of the 2010–11 Annual Household Survey.

REFERENCES

- Ackerman, R (2011): "New Directions for Water Management in Indian Agriculture."
- Asian Development Research Institute (2004): *Socio Economic Status of Muslims in Bihar*.
- Alkire, S and M E Santos (2010): *India Country Briefing*, OPHI www.ophi.org.uk/policy/multi-dimensional-poverty-index/mpi-country-briefings/.
- Alkire, S et al (2011): *Multidimensional Poverty Index 2011: Brief Methodological Note*, OPHI, University of Oxford.
- ASSOCHAM: *Cluster Development for Inclusive Growth in Bihar*, New Delhi.
- Awasthi, D (2012): *Building Industrial Capabilities of Bihar: Infrastructure, Finance, Skills and Entrepreneurship*.
- Bhalla, G S and G Singh (2012): *Economic Liberalisation and Indian Agriculture: A District Level Study*, New Delhi: Sage Publications.
- Bourguignon, F (2002): "The Growth Elasticity of Poverty Reduction: Explaining Heterogeneity across Countries and Time Periods," World Bank.
- Cervantes-Godoy, D and J Dewbre (2010): "Economic Importance of Agriculture for Poverty Reduction," OECD Food, Agriculture and Fisheries Working Papers, No 23.
- COMPED (2010): *Summary of Operations*.
- Dixit, A (2009): "Kosi Embankment Breach in Nepal: Need for a Paradigm Shift in Responding to Floods," *Economic & Political Weekly*, 44(06): 70–78.
- Dutta, P et al (2011): *The Impact on Poverty in Bihar of the National Rural Employment Guarantee Scheme*, World Bank.
- Goswami, D C and P J Das (2002): "Hydrological Impact of Earthquakes on the Brahmaputra River Regime," proceedings of the 18th National Convention of Civil Engineers, Guwahati.
- Government of Bihar (2008a): *Road Map for Agriculture and Allied Sectors*. Department of Agriculture.
- (2008b): *Kosi Flood: Assessment Report*, World Bank, Global Facility for Disaster Reduction and Recovery.
- (2009): *Towards Accelerated Agricultural Development in Bihar*, Report of the Steering Group on Vision of Agricultural Development in Bihar.
- Government of India (2008): *Bihar's Agriculture Development: Opportunities and Challenges*, a Report of the Special Task Force on Bihar, New Delhi.
- (2013): *Statewise Estimates of Value of Output from Agriculture and Allied Activities*, Central Statistical Office, Ministry of Statistics and Programme Implementation, GoI, New Delhi.
- Government of Netherlands (2007): *Spatial Planning Key Decision: Room for the River*.
- Gupta, S (2010): "Bihar Now a Trusted Source of Maize," *The Economic Times*, 26 July, <http://economictimes.indiatimes.com/news/economy/agriculture/Bihar-now-a-trusted-source-of-maize/articleshow/6216735.cms>.
- Humphrey, Jean H (2009): "Child Undernutrition, Tropical Enteropathy, Toilets and Hand Washing," *Lancet*, 374: 1032–35.
- Infrastructure Leasing & Financial Services Limited & FS (2007): "Food Processing in Bihar: The Road Ahead," prepared by IL&FS for the Government of Bihar.
- Jha, M K and Pushpendra (2012): "Governing Caste and Managing Conflict: Bihar, 1990–2011," *Policies and Practices*, 48.
- Kerr, R A and R Stone (2009): "A Human Trigger for the Great Quake of Sichuan?," *Science*, 16 January, Vol 323, No 5912.
- Khan, Mahfuzur, Clifford I Voss, Winston Yu and Holly A Michael (2014): *Water Resource Management in the Gangetic Basin: A Comparison of Three Strategies of Conjunctive Use of Groundwater and Surface Water*.
- Kishore, A et al (2014): *Putting Agriculture on the Takeoff Trajectory: Nurturing the Seeds of Growth in Bihar, India*, IFPRI–IWMI.
- Krishna, R (1973): "Unemployment in India," *Economic & Political Weekly*, 3 March.
- Krishnamurthy, Mekhala (2015): "The Political Economy of Agricultural Markets: Insights from Within and Across Regions," Chapter in *India Rural Development Report 2014* (forthcoming), New Delhi: MoRD and IDFC Foundation.
- Menon, M et al (2003): "Large Dams in the Northeast: A Bright Future?" *The Ecologist Asia*, Vol 11, No 1.
- Mitra, S (2015): *The Myth of Increased Resources for States*, Macroscan.
- Mukherjee, Aditi, Tushaar Shah and Partha Sarathi Banerjee (2012): "Kick-starting a Second Green Revolution in Bengal," *Economic & Political Weekly*, 5 May.
- Pant, N (1998): "Indigenous Irrigation in South Bihar: A Case of Congruence of Boundaries," *Economic & Political Weekly*, 5 December.
- Planning Commission (2007): *Bihar Road Sector Development: New Dimensions*, Planning Commission Report of the Special Task Force on Bihar.
- (2012): *Twelfth Five-Year Plan*, Government of India, New Delhi.
- Pomeranz, K (2009): "The Great Himalayan Watershed: Agrarian Crisis, Mega-Dams and the Environment," *New Left Review*, No 58, July–August.
- Ravallion, M and G Dutt (2002): "Why Has Economic Growth Been More Pro-poor in Some States of India than Others?," *Journal of Development Economics*, 68.
- Revelle, R and V Lakshminarayana (1975): "The Ganges Water Machine," *Science*, New Series, Vol 188 (4188): 611–16.
- Roy, I (2013): "Contesting Consensus. Disputing Inequality: Agonistic Subjectivities in Rural Bihar," *South Asia Multidisciplinary Academic Journal*, <http://samaj.revues.org/>.
- Rorabacher, J A (2008): "Gerrymandering, Poverty and Flooding: A Perennial Story of Bihar," *Economic & Political Weekly*, 43(07): 45–53.
- Samaj Pragati Sahayog and Megh-Pyne Abhiyan (2012): *Leveraging MGNREGA for Flood Control: A Case for Policy Reform in Bihar*, National Consortium of Civil Society Organisations on MGNREGA.
- Shah, Mihir (1984): "Capitalist Development and the Transformation of Agrarian Relations in Chingleput District," PhD dissertation, New Delhi: JNU.
- (2009): "Multiplier Accelerator Synergy in NREGA," *Hindu*, 30 April.
- ed, (2012): *MGNREGA Sameeksha: An Anthology of Research Studies on MGNREGA*, Ministry of Rural Development, Government of India.
- (2013a): "Water: Towards a Paradigm Shift in the Twelfth Plan," *Economic & Political Weekly*, 19 January.
- (2013b): "Understanding the Poverty Line," *Hindu*, 12 August.
- (2014): "How to Reform and How Not To," *Hindu*, 4 November.
- Shah, M et al (1998): *India's Drylands: Tribal Societies and Development through Environmental Regeneration*, New Delhi: Oxford University Press.
- Shah, Mihir et al (2007): "Rural Credit in 20th Century India: An Overview of History and Perspectives," *Economic & Political Weekly*, 14 April.
- Shah, Tushaar, Shilp Verma and Neha Durga (2014): "Karnataka's Smart New Solar Pump Policy for Irrigation," *Economic & Political Weekly*, 29 November.
- Spears, Dean (2012): *Effects of Rural Sanitation on Infant Mortality and Human Capital: Evidence from India's Total Sanitation Campaign*.
- UNDP (2012): *Bihar: Economic and Human Development Indicators*.
- Valdiya, K S (1999): "A Geodynamic Perspective of Arunachal Pradesh," keynote address at workshop organised by the G B Pant Institute of Himalayan Environment and Development.
- WHO (2005): *Designing Health Financing Systems to Reduce Catastrophic Health Expenditure*, Geneva.
- World Bank (2007): *Bihar Agriculture: Building on Emerging Models of Success*, Agriculture and Rural Development Sector Unit, South Asia Region Discussion Paper Series, Report No 4, Washington DC.

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