

Bihar: a case study of economic policy challenge in India

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The state of Bihar, in the heart of the northern Gangetic plain, presents a microcosm of the challenge facing India's economic planners and political leadership today. Lying along the Ganges River Valley, the state is blessed with some of the most fertile soil in the world, and with proper irrigation and technological input, the state could become an agricultural powerhouse. To the south of the state, rich mineral resources, including coal, provide the basis for Bihar to rapidly industrialize. Yet, today, Bihar is one of India's poorest states (see **Tables 1-13**).

The rapid development of Bihar is urgent. The state has a population of 70 million—more than the entire population of either Vietnam or Thailand, or more than all of the Ibero-American countries with the exceptions of Brazil and Mexico. Its population density is 403 persons per square kilometer, or equal to the population densities of the Low Countries in Europe.

Some commentators like to point to Bihar for proof of the malthusian dogma: too many people! But even a cursory survey of the state's problems shows that there is no demographic *deus ex machina* in Bihar's predicament. The malthusians are merely covering up for the devastation of Bihar and all of India under British imperial rule, a devastation from which the state has not recovered. As the following outline of a development program for Bihar shows, the state is not only capable of sustaining its own population, but also of contributing major surpluses to the rest of the nation and to the world.

Survey of the problem

But today, Bihar is constrained by its character as a basically agricultural state. Fifty percent of the state's population, located mostly in north Bihar, depends exclusively on agriculture. That agriculture is low yielding and below the national average for output.

At the same time, Bihar has the highest average investment per person employed in industry in India. The reason for the paradox is that industrial investment in Bihar—to the tune of \$4.5 billion over the years—has been in medium and large industry, such as the public sector's Heavy Engineering

Complex in Ranchi—which generates little employment.

Such industry—located primarily in south Bihar—offers no alternative to the poor or landless farmers in the north. And the power it requires to utilize its capacity comes at agriculture's expense. According to one report, units in the industrial sector in south Bihar absorb 97% of infrastructure (where fuel consumption is taken as a proxy for infrastructure)! Even the power generation units located in north Bihar transmit their energy to feed the south's industry.

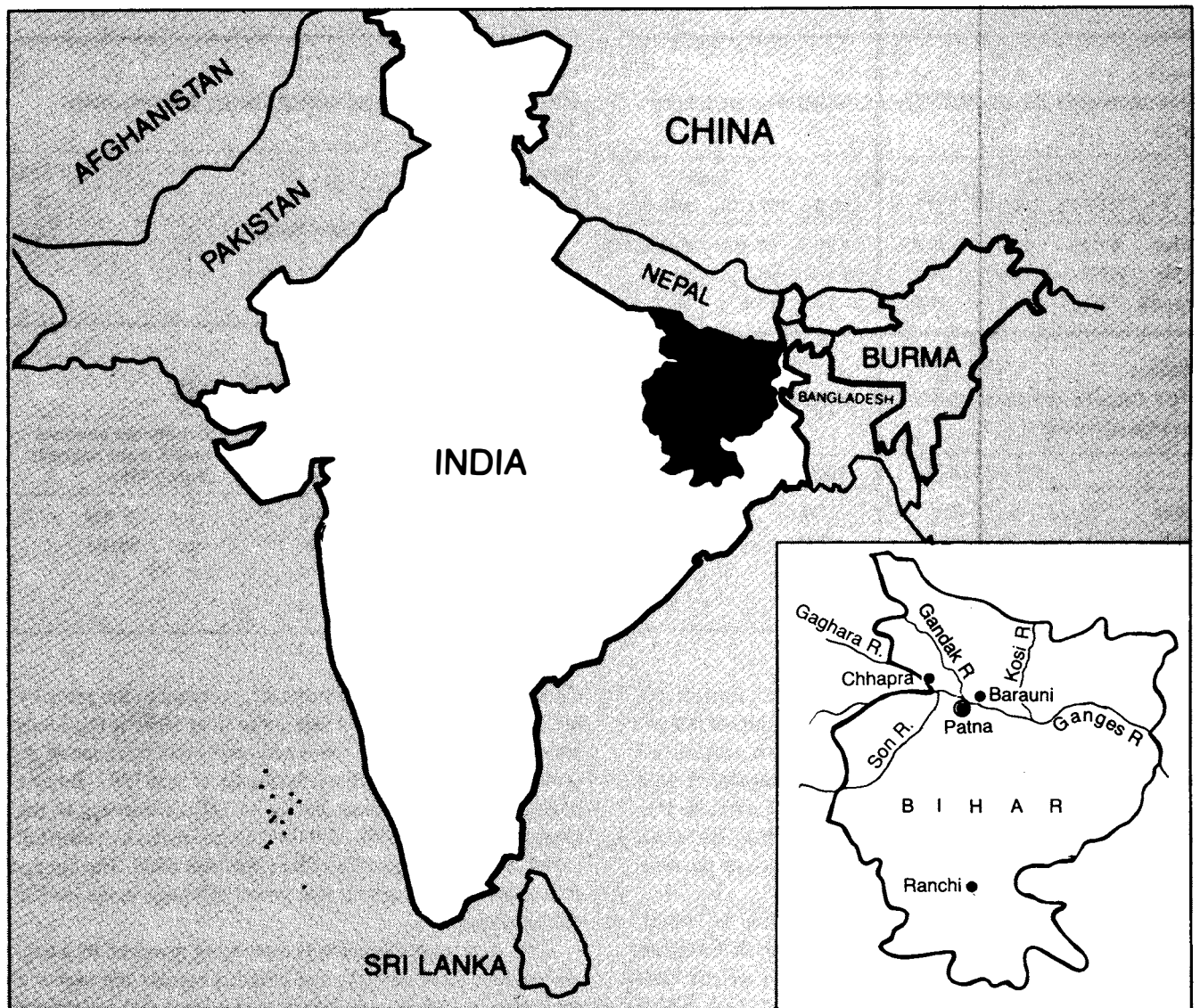
The result is not only power starvation in the farm sector, but 95% of those employed in small-scale industry—the only kind of industry that exists in the north—operate without any power at all and are thus highly unproductive.

The reason for this imbalance is the lack of infrastructure—energy, transport, and water.

Power. In 1986-87, Bihar produced 3,564 million units of electricity—26.9% short of the official requirement. But Bihar is rich in coal deposits; about 36% of India's coal is extracted from Bihar's mines. Still, the state's entire installed thermal power generation capacity in March 1987 was only 1,425 MW. That amount is only a little more than India's capital city New Delhi consumes during the peak summer season!

Transport. Bihar is split across the entire extent of its width by the mighty Ganges River. To this date, there are only two bridges connecting the two sides of the state. North and south Bihar and their respective rail systems were connected through ferry service at only five points along the river. Patna, the state's capital and most populous city, is connected by a road bridge to the other side of the Ganges. A combined rail and road bridge was finally completed in 1971 at Barauni, but it serves mainly as a freight link, not as an all-purpose traffic conduit.

Water. Most of north Bihar gets flooded during the monsoon, causing crop and property damage that, according to the 1980 National Flood Commission Report, is increasing annually. But during the dry season, people and cattle alike suffer from drought-like conditions. The dry wind blows away the precious topsoil in thousands of tons, depositing it in riverbeds and hydropower reservoirs—thereby ensuring



that the floods worsen each season.

The British legacy

The fact is that Bihar has never recovered from British rule. From 1757 to 1947, the British looting of land resources created a vast rural peasantry with no middle class. The looting of land resources also precluded the growth of urban centers, making the state completely dependent upon the port of Calcutta. Without urban centers, Bihar also lacked any university, and higher education was literally very far away for most Biharis.

When the British took over control of Bihar, Bengal, and Orissa—all three states being one province at the time—in 1757, Bihar was a rice-growing state and its population was heavily dependent upon spinning, weaving, and other handicrafts.

The British interest in Bihar, however, was exclusively land oriented. In 1793, the British East India Company, with

Cornwallis as its governor general, imposed Permanent Settlement in Bihar and Bengal. Permanent Settlement, besides declaring the *zamindars* (landlords) “proprietors of the soil,” fixed forever their dues to the state. It drove the Bihari population deeper into misery, rusticity, and rural idiocy.

The control over the landlords, which the Permanent Settlement had imposed, was necessary for the British. If the soil itself was a precious commodity for colonialization, the produce of the soil was even more so. This emphasis on the produce of the soil drove Bihar’s textile industry into the ground. The British interest in Bihar soon took the form of demands for three commodities: opium, indigo, and saltpeter. The British were in the process of achieving a virtual worldwide monopoly on all of these products.

In Bihar, cultivators were forced to grow indigo in place of rice or cotton. Most of the planters were Europeans (non-British), who had been lured to the job by the East India Company’s offers of interest-free cash. Since the Bihari cul-

TABLE 1

Percentage of population below the poverty line

	Rural		Urban		Total	
	1977-78	1983-84	1977-78	1983-84	1977-78	1983-84
Bihar	57.8%	51.4%	44.8%	37.0%	56.3%	49.5 %
India	51.2	40.4	38.2	28.1	48.3	37.4
Punjab	13.1	10.9	25.6	21.0	16.4	13.8

TABLE 2

Per capita consumption of electricity

(in kilowatt-hours)

	1970-71	1980-81	1985-86
Bihar	65	76	93
India	90	135	176
Punjab	159	315	422
Maharashtra	158	272	313

tivators refused to grow indigo, the planters built up a private militia. If cultivators had not planted for their quota of indigo, the militia raided their homes, took their women, and burned their homes and fields. This brutal history continued until 1859-60, when a violent uprising, known as the indigo revolution, destroyed the indigo plantations. But, by then, chemical dyes were beginning to overtake indigo on the market.

The other British-enforced planting was that of opium. In 1773, the British had taken over the monopoly in the opium trade. The cultivation of opium in Bihar was strictly controlled by the government through an opium board, which fixed both the acreage and price, and the revenue derived from it was one of the chief sources of British government income. By 1855, Bihar was a chief center of opium production.

Saltpeter had also been found in Bihar, where it was scraped off and its vital ingredients distilled for use in the manufacture of gunpowder. In the late 19th century, Scotsmen, who had also been active in the saltpeter trade, began to exploit coal reserves in southern Bihar. The entire mining operation was carried out in a semi-rural milieu with the active assistance of landlords who provided the chain-gang labor.

The wages of apathy

But the exploitation of Bihar's resources and the degradation of its population have not ended with the removal of the British from the subcontinent in 1947. Although New Delhi can be held ultimately responsible for the state's lack of development, a recent letter from Prime Minister Rajiv

TABLE 3

Percent of villages electrified: March-end 1987

Bihar	57%
India	72
Kerala, Haryana, Punjab, Tamil Nadu	100

TABLE 4

Rural water supply: April 1, 1985

	Total number of inhabited villages	Population covered under water supply: March 1985
Bihar	67,546	77.8%
India	579,132	56.2%

Gandhi to the Bihar chief minister, released to the press by the PM's office, reported that more than 50% of the funds allocated to the state for renovation and modernization of its power plants were unutilized during fiscal year 1987. Bihar's payload, Gandhi pointed out, is 33-34%, compared to the national average of 56%, and the state has a massive shortfall in fulfillment of targets for village electrification. The figures also show, Gandhi noted, that power pilferage in the state is extremely high.

The state's development is now being thwarted by a corrupted state bureaucracy, for whom progress represents a challenge to their power. Medical and legal racketeering in Patna, mafia control of the mines in Dhanbad, violence in the rural areas carried out by landlords and radical leftists are only manifestations of the cancer in Bihar's body politic which threatens to obliterate the state's potential as a production powerhouse.

The prevailing environment of corruption—from which no local leader has remained immune—has allowed some to loot and make millions, some others to resort to fraud and make hundreds of thousands, and many others to simply draw salaries without a day's honest work in an entire month. Meanwhile, millions of landless agricultural laborers, small and marginal cultivators, underprivileged ethnic groups and urban poor continue to live each day from hand-to-mouth, pawns in the hands of small-time mafiosi, gun-toting leftists or landlords, or all-powerful political bosses.

The harsh results of this political environment are shown in the Tables 1-13, which compare Bihar's performance to India's national average and to some of the more advanced states, such as Punjab.

TABLE 5

**Villages not accessible by all-weather roads:
March-end 1984**

	Total number of villages	Percent not connected by all-weather roads
Bihar	67,566	68%
India	591,929	70
Punjab	12,188	1
Haryana	6,741	2

TABLE 6

Literacy as a percentage of population

	1971	1981
Bihar	19.9%	26.2%
India	29.5	36.5
Kerala	60.4	70.4

TABLE 7

**Infant mortality per thousand live births:
1985**

	Rural	Urban	Combined
Bihar	109	50	105
India	105	57	95
Kerala	32	30	32

TABLE 8

**Per capita expenditure on education
(in rupees)**

	1970-71	1986-87
Bihar	9	63
India	15	105
Kerala	28	174

Solution starts with infrastructure

Yet, despite its problems, given the political will—a will that must be mobilized from New Delhi—Bihar can be transformed into a highly productive state, capable of sustaining its current and future millions in population. There is no quick solution in attempting to build up a Bihar “middle class” to boost consumption, or setting up free trade zones to draw in quick foreign investment, but in tackling the state’s basic problem: raising productivity through infrastructure. An effective development process in the state begins with water, electric power, transport, education, and raising productivity and reducing acreage in agriculture.

Water management. Water management in Bihar consists of training the Ganges and its tributaries—a task which not only involves Bihar, but also the states of Uttar Pradesh, West Bengal, Orissa, and to a certain extent Haryana and Punjab. The only way the Ganges and its tributaries can be effectively trained is by acting upon the Ganges River basin as a whole. The entire basin acts as a single unit with its symbiotic relationship with land, surface water flow, groundwater flow, and drainage. Training the Ganges involves flood control, and in particular utilizing the Ganges water—and the monsoon precipitation—to recharge the shallow groundwater aquifers. This recharged groundwater, and artificially trapped rainwater in thousands of reservoirs, can then be pumped out for agriculture, and domestic and industrial use during the dry season, leaving the dry season river flow undisturbed. The pumped-out water will also be used for keeping the vegetative cover on the land intact, reducing dry season erosion and slowing down the heavy monsoon rainwater run-off. This, in turn, allows the flowing water to seep

into the groundwater aquifers and recharge naturally.

Bihar, where emphasis has been put on building embankments to contain the river water, is a good example of a contrary, narrow, and unscientific approach. Last year’s large-scale failure of the embankments to hold flood waters underlined the point. Indeed, how could embankments solve anything when land erosion is extensive throughout the Ganges basin as a result of a chain reaction that begins with deforestation in the Himalayas? The surface wind during the dry season removes the topsoil from the land and deposits it in the riverbeds and reservoirs, making them shallower and slower. The result: increasingly devastating drought in the dry season, and increasingly destructive flooding in the rainy season.

Bihar’s River Kosi is an example of the process. One of the major tributaries to the Ganges from the north, the Kosi drains the catchment area of the world’s three greatest peaks—Mount Everest, Mount Makalu, and Mount Kanchenjunga. The Kosi carries a heavy load of sediment, about 95 million cubic meters every year, which gets transported to the main channel of the Ganges. Since the average flood width of the Kosi is more than 6-15 km, variation in average depth along the river is small. But the Kosi’s slope varies significantly along its length—from 0.96 meters/km at Chatra to only 0.06 meters/km at the outfall—and this ensures that the sediment will settle on the riverbed and raise its level to the point that the river cannot handle the volume of water that comes during the monsoon.

It is not only the Bihar rivers that have a problem with siltation; it is a phenomenon which is seriously affecting the entire Ganges basin. One estimate shows that fully 80,000

TABLE 9
Per capita income of states at current prices
(in rupees)

	1970-71	1982-83
Bihar	418	1,154
India	633	1,887
Punjab	1,067	3,377

TABLE 10
Fertilizer consumption per hectare of gross
cropped area

	1968-69	1985-86
Bihar	7.3 kg	52.0 kg
India	10.7 kg	50.1 kg
Punjab	34.4 kg	159.9 kg

hectare-meters of sand and silt are carried by the Ganges annually. Dredging the entire river would entail an annual expenditure of about \$1 billion, not to mention the problem of disposing of the dredged-up silt. It has been estimated that it would require 60,000 acres of land annually to hold silt to a height of 10 feet!

The only way to deal with this problem is to reduce the width of the river, forcing the water to flow faster and carry the sediment with it. Simultaneously, by using gates on either side of the river, volumes of water can be released in a controlled and planned manner for use in agriculture and also for recharging the groundwater aquifers during the wet season.

This method of training the river is no secret, but still the embankments are built, probably to show that action is taken to counter flooding. The embankment business also brings in a lot of money regularly which can be looted by the powers that be. According to one estimate, in the last 35 years about 3,400 km of embankments along the major rivers of Bihar have been constructed at a cost of about \$375 million, and another \$475 million has been spent on their maintenance. But last year, 144 breaches occurred nonetheless, and most of the embankments failed to contain the floods. Many villages were completely washed out, and thousands perished.

Besides training the Ganges and dealing with the basin as a whole, there are strong indications that plenty of fresh water is available in deep aquifers in the Terai zone of the Himalayas which could be piped throughout Bihar for domestic use in particular.

Power. Power is the backbone of agro-industry—in Bihar as well as in all of India. By the turn of the century, Bihar's population will be close to 80 million, assuming a growth rate of 2% during the next decade. With an average of five persons per family, there will be about 16 million

TABLE 11
Number of tractors in use per thousand
hectares of cultivated land

	1972	1981
Bihar	0.52	1.69
India	0.97	3.54
Punjab	8.28	21.75

TABLE 12
Yield of major food crops per hectare
(average of 1981-82 to 1985-86)

	Rice	Bajra	Maize	Wheat	Gram
Bihar	938 kg	583 kg	1,180 kg	1,535 kg	793 kg
India	1,402 kg	505 kg	1,267 kg	1,858 kg	677 kg
Punjab	3,090 kg	1,065 kg	1,793 kg	3,155 kg	505 kg

families living in Bihar.

Now, assuming that these families will have semi-decent living quarters covering 500 square feet of land area and will be using an illumination of 1 watt/sq. ft. and two ceiling fans, the total power consumption of each family for five hours in the evening will be about 3.5 kilowatt-hours daily. Under such minimum necessary conditions, the domestic power consumption in Bihar will be about $20,400 \times 10^6$ kilowatt-hours. As a rule of thumb, domestic power consumption in an agro-industrial society is about 13-14% of the total power consumed. Taking this as a basis, and assuming line loss to be 10% and plant load factor to be 70%, the installed electricity generation capacity in Bihar by the year 2000 should be close to 36,000 MW.

We are not aware of what the officially designated "electricity demand in Bihar" for the year 2000 is, but it is public knowledge that the power demand of the entire country for the year 2000 has been set at 177,000 MW. It is highly unlikely that Bihar will be allotted much more than 10,000 MW of that—but the fact remains that 36,000 MW of installed capacity is what is required for Bihar to broaden its agriculture and industry in such a way that a substantial amount of productive employment can be created and a minimum living standard provided.

Much of Bihar's power requirement can be met with the state's large coal deposits. The coal can be used close to the pithead, eliminating costly transport of coal and ash. But a number of new agro-industrial centers will have to be established away from the mines in both north and south Bihar, and each will require a large power plant to supply electricity and steam to the entire complex. In this way, electricity can be consumed at its source of production, thus eliminating transmission costs and line loss (which presently amounts to 23% in Bihar). To make these centers healthy and pollution-

TABLE 13
Milk production
 (in lakh tons)

	1971-72	1981-82	1985-86	1985-86 per capita production in kg
Bihar	17.5	20.4	24.2	31.8
India	211.7	334.0	423.1	56.7
Punjab	21.4	34.9	40.2	220.9

free, nuclear power plants would be the best available choice.

Transportation. Transport development is essential to open up the state to its own population. There is hardly any question that at least six more bridges are required to span the Ganges across the state. Preferably these bridges should be two-level—one for the railroads and the other for motor vehicles. The rivers Kosi, Gandak, Ghaghara, and Son, as well as the Ganges, ought to be made navigable for barges to carry freight. Even seasonal use of these rivers for freight transport would benefit the economy. Further, an extensive network of rail lines, connecting to the interstate rail lines, needs to be developed in both north and south Bihar.

It can be done

These are some of the basic programs needed to make Bihar move. If such programs are implemented, some of the social problems will vanish, though not all. What is certain is that without such large-scale infrastructure programs, the state cannot be kept in one piece.

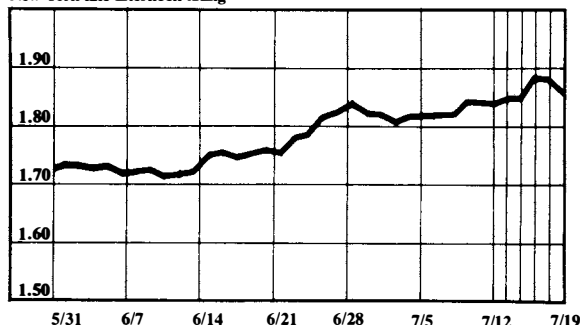
To achieve success in these basic areas, Bihar will have to put more people to work than it can mobilize. At the same time, completion of each phase of work in the basic areas will lead Bihar to become an agro-industrial state able to absorb manpower at a faster rate than the expected growth of its population. Such a process will provide meaningful and productive employment not only to the landless laborers in the rural areas, but also to those now practicing fraud in the streets of Patna to make a living.

What will Bihar look like? It will be an agro-industrial state producing some food crops, many cash crops, including cattle fodder to keep its cattle away from grazing. It will mine coal, iron ore, bauxite, copper, ore, pyrites, fireclay, and other ores abundantly available in the state. It will have the basic industries, such as more steel mills, aluminum plants, copper extraction plants, machine tools, engineering industries, etc. The population will be employed in agriculture, mining and quarrying and basic industrial and engineering manufacturing activities. But the real bulk of employment has to be generated in developing a highly productive small-scale industrial sector, with a few people in each enterprise and advanced machine tools. It is a necessary and realizable vision.

Currency Rates

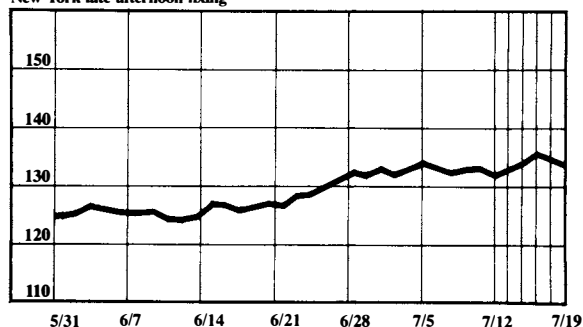
The dollar in deutschemarks

New York late afternoon fixing



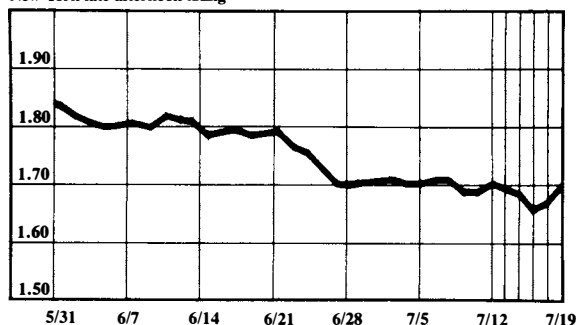
The dollar in yen

New York late afternoon fixing



The British pound in dollars

New York late afternoon fixing



The dollar in Swiss francs

New York late afternoon fixing

