

Agriculture-Industry Linkages in Agricultural Development in India: A Preliminary Survey

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Introduction

Based on the basic macro-economic indicators shown in Table 1 and 2, the five countries that are taken up in this session can be classified in terms of the degree and pattern of industrialization and urbanization.

First comes the Republic of Korea. Its annual growth rate of GDP during the period from 1965 to 1988 was the highest among the five and it has become one of the leading NIEs, with 69 percent of the total population in its cities. Value added in manufacturing in Korea increased by 6.3 times from 1970 to 1987 and now is almost equal to that of India.

Korea is followed by Malaysia. Industry's share of GDP in Malaysia for 1988 was 35 percent and its urban population accounted for 41 percent of the total.

The third group comprises Indonesia and India. They have more or less similar structures of production and the same proportion of urban population. While the value added in manufacturing in Indonesia increased by 4.8 times between 1970 and 1987, it grew by only 1.8 times in India. As a result the change in industry-wise composition of the labour force has been much less in India than in Indonesia.

Kenya is an example of rapid growth of urbanization with an disproportionately slow rate of industrialization and a very high growth rate of population.

In this paper I would like first to trace very briefly the development of agrarian policies in India and then take up for a factual survey three aspects of the linkage

Table 1. Basic Indicators

Items		Korea (Rep.)	Malaysia	Indonesia	Kenya	India
Area (1000 km ²)		98	330	1,905	583	3,288
Population (millions) mid-1988		42.0	16.9	174.8	22.4	815.8
Average annual growth rate of population						
1965-80		2.0	2.5	2.4	3.6	2.3
1980-88		1.2	2.6	2.1	3.8	2.2
GDP (millions of dollars)						
1965		3,000	3,130	3,840	920	46,260
1988		171,310	34,680	83,220	7,380	237,930
Average annual growth rate of GDP						
1965-80		9.6	7.3	8.0	6.4	3.6
1980-88		9.9	4.6	5.1	4.2	5.2
GNP per capita (dollars 1988)		3,600	1,940	440	370	340
Average annual growth rate of GNP per capita (1965-88)		6.8	4.0	4.3	1.9	1.8
Distribution of GDP (%)						
1965	Agriculture	38	28	56	35	44
	Industry	25	25	13	18	22
	(Manufacturing)	18	9	8	11	16
	Services, etc.	37	47	31	47	34
1988	Agriculture	11	(84) 21	24	31	32
	Industry	43	35	36	20	30
	(Manufacturing)	32	19	19	12	19
	Services, etc.	46	44	40	49	38
Value added in manufacturing (millions of 1980 dollars)						
1970		4,239	1,681	2,723	263	16,281
1987		26,650	6,770	13,165	919	30,035
% of population of working age (15-64 years)						
1965		53	50	53	48	54
1985		64	59	56	45	56
% of labor force in						
1965	Agriculture	55	59	71	86	73
	Industry	15	13	9	5	12
	Services	30	29	21	9	15
1980	Agriculture	36	42	57	81	70
	Industry	27	19	13	7	13
	Services	37	39	30	12	17

Table 1. (Continued)

Items	Korea (Rep.)	Malaysia	Indonesia	Kenya	India
	(1988)	(1988)	(1985)		
Agriculture	21	31	55		
Industry	28	23	10		
Service	51	46	35		
Average annual growth rate of labor force (%)					
1965-80	2.8	3.4	2.1	3.6	1.7
1980-85	2.7	2.9	2.4	3.5	2.0
Urban population as % of total population					
1965	32	26	16	9	19
1988	69	41	27	22	27
Average annual growth rate (%)					
1965-80	5.8	4.5	4.8	8.1	3.9
1980-88	3.7	4.9	4.8	8.2	4.0

Source: *World Development Report, 1988 and 1990.*

Note: 1. The figures of value added in manufacturing are taken from the above report of 1987.

2. Industry-wise percentages of labor force in 1988 for Korea and Malaysia are taken from *Ajia Dōkō Nempō, 1989*, Tokyo, Institute of Developing Economies, 1989.

Table 2. The Contribution of Manufacturing to Employment in the Five Countries 1970-80

Country	Manufacturing Employment as Share of Total Labor Force		Increment 1970-80*
	1970	1980	
Korea (Rep.)	7	14	36
Malaysia	9	16	33
Indonesia	7	9	23
India	2	3	5
Kenya	2	2	4

Source: The World Bank, *World Development Report 1990*, p.63.

Note: The figures are based on registered employment in manufacturing.

*The ratio of the increase in manufacturing employment to the increase in the labor force.

between agriculture and industry after the introduction of the High-Yielding Varieties Programme:

- (1) Industry as a supplier of modern inputs to agriculture,
- (2) Agriculture as a supplier of foodstuff to industry, and
- (3) Industry as an absorber of surplus labour from agriculture.

To complete this survey, some other important aspects, e.g. agriculture as a supplier of raw materials to industry and a market for industry should also be examined. These aspects, however, are not discussed in this paper.

I. Development of Agricultural Policies in India since Independence

It is a well known fact that the year 1965/66 marked an important turning point in the development of agricultural policies in India.

The period from 1946, when several provincial governments were formed in the anticipation of independence, to 1965/66 can be again divided, but not so distinctly, into three phases. The first phase covers from 1946 to 1952. In this phase, in the wake of the fever of independence movement, several provinces announced their intention to abolish the "*zamindari system*" and to establish a "self-cultivation system." And they made an attempt to introduce the *panchayat* system with the aim of incorporating villages into the provincial administrative structure.

During the second phase, from 1952 to 1956, in some districts the Community Development Programme, in collaboration with the U.S., was introduced and later it was expanded into the National Extension Service. But there appeared some administrative confusion among the newly introduced system of rural development, the old rural administration based on the assessment, imposition, and collection of land revenue, and the grass-roots democracy of the *panchayat* system established in the first phase. In 1957 the central government recommended that the state governments introduce a three tiered *Panchayati Raj* system which aimed at "democratic decentralization."

Meanwhile, A.V. Bhave tried to correct the defects of the *zamindari* abolition acts, which did not impose any ceiling on land-holding by former landlords. He appealed to big landowners to voluntarily surrender some land, and sometimes whole villages to land-poor people. In some states *Bhoodan Yojna* Acts were enacted to encourage this movement, but the result was very limited. On the contrary, in some states, such as Punjab and Uttar Pradesh the consolidation of holdings laws were put into effect, and middle and upper "self-cultivating" farmers took full advantage of these laws to strengthen their political as well as economic position.

Reflecting such political and economic developments, a serious conflict arose among the leaders of the then ruling Indian National Congress Party as to the next step to be taken to increase agricultural production and to promote rural development. The question was whether priority was to be given to further institu-

tional reforms or to technological changes in cultivation. How serious this state of affairs was can be grasped from the following facts.

The Food Enquiry Committee appointed in June 1957 recommended a policy to accept the assistance of wheat and rice from the U.S., and next year an agreement on food assistance was signed between India and the U.S. In January 1959 the Agricultural Production Team sponsored by the Ford Foundation visited India on the invitation of the Ministry of Agriculture of the Government of India and submitted its "Report on India's Food Crisis and Steps to Meet It." Following this recommendation, in 1960 the Intensive Agricultural District Programme was launched in selected districts.

On the other hand, in 1956 the Planning Commission of the Government of India sent a delegation to China to study about agrarian cooperatives. And in March 1958 the AICC Economic Review organized a symposium on cooperative cultivation. In November the next year the Agricultural Production Sub-Committee of AICC formulated the following three-year programme: (1) to enact an act to impose ceiling on land-holding by March 1959, (2) to implement it by 1961, and (3) to gradually shift from multipurpose cooperatives to farming cooperatives.

Thus, at the 64th annual session of the Indian National Congress held at Nagpur in 1959 the "Resolution on Agrarian Organizational Pattern" was passed despite the very strong opposition by the delegates from states such as Uttar Pradesh, Bihar, Andhra Pradesh, Punjab, etc. This resolution envisaged the completion of all land reforms, including a ceiling on land-holding, within one year, by the end of 1959. It recommended that the surplus land should be vested in the village *panchayat* rather than individuals and be managed through cooperatives of landless laborers. But there was no consensus as to how to implement this resolution among the leaders of the Indian National Congress, especially at the level of state governments. And when the relating acts were passed in several states, not only was the ceiling limit itself set high, but also there were many loopholes in the clauses of the acts to evade the limit.

This kind of ideological confusion was dissolved for the time being after the death of J. Nehru in 1964. And in 1964/65 the Intensive Agricultural Areas Programme was launched covering 1,084 blocks dispersed in 114 districts, and later in 1966/67 it was integrated into the High Yielding-Varieties Programme, with its emphasis on technological improvements in agriculture production rather than on structural reforms in land-holding.

The agricultural development programmes adopted since 1966/67 can be classified into three categories. The first are programmes aimed at increasing agricultural output, with the production technology package of irrigation, high yielding varieties, chemical fertilisers, various pesticides and insecticides, and improved methods of cultivation. All the necessary modern inputs have been provided mainly through the rural development administration and cooperatives with some kinds of subsidies and assistance from the central as well as state governments. The second category comprises programmes related to the marketing and distribution

of the marketed surplus of increased agricultural production. In order to guarantee prices that are stable and remunerative to the farmer, the central government as well as the several state governments have introduced administered prices for particular crops, and also established the infrastructure of warehousing and marketing. The third category comprises programmes that have specific target groups, such as small and marginal farmers or landless laborers, whose benefits from the first category of programmes seem to be less compared to large and middle farmers. In this category can be included programmes with specific target areas like deserts, hill areas, and drought-prone areas.

Once again, in 1971 when the Indian National Congress (I) faced serious opposition from the Congress (R) and other parties in general election, Indira Gandhi promised to reduce the existing ceiling limit and to distribute the surplus land to small farmers and landless laborers. In many states the existing acts relating to the imposition of a ceiling on land-holding were revised to put into effect one of the election manifesto promises. But again their actual impact on the structure of land-holding was not significant.

Since then the above three categories of agricultural programmes have been continued with some renewed names, but with more or less similar contents. More recently the emphasis has been shifted towards poverty alleviation programmes, such as Integrated Rural Development Programmes (1978), National Rural Employment Programme (1980) and Rural Landless Employment Guarantee Programme (1983). The last two have now been merged into Jawahar Rozgar Yojna (1989/90).

II. Industry as a Supplier of Agricultural Inputs

The crux of the new agricultural strategy is characterised by a package of high-yielding varieties of seeds, fertilisers, pesticides, and improved methods of cultivation, together with an assured water supply.

(1) Fertilisers and Pesticides

In 1965/66 the domestic production of N fertiliser in India was only 233 thousand tonnes, and its imports amounted to 58.3 percent of the total volume. But in 1986/87 the production figure reached 5.41 million tonnes and the import share declined to only 17 percent.

In the case of P_2O_5 fertiliser, the production was 111 thousand tonnes that accounted for 88.8 percent of the total available volume. In 1986/87 the production was 1.66 million tonnes and comprised 86.5 percent of the total.

Only K_2O fertiliser is still entirely dependent on imports, totaling 947 thousand tonnes in 1986/87 (the figures are cited from *Economic Survey, 1989/90*).

Among the fertiliser materials rockphosphate imports constitutes around 80 percent of the total availability and the rest is produced indigenously. Sulphur and ammonia are also dependent on imports. Indigenous production capacity of phos-

Table 3. Agricultural Machinery and Implements in India

(1000)

Item	1966	1972	1977	1988
Ploughs (wooden + iron)	39,923	39,294	41,031	40,226
Iron ploughs	3,523	5,359	6,516	6,628
Carts (animal drawn)	12,697	12,960	12,670	12,924
Sugarcane crushers				
Power	45	87	109	120
Bullock	650	678	668	684
Oil engine				
pumps for irrigation	471	1,546	2,359	3,101
Electric pumps for irrigation	415	1,618	2,438	3,568
Tractors	54	148	276	519

Source: Sidhu, D.S. and A.J. Singh, "Technological change in Indian agriculture," in M.L. Dantwala and others, *Indian agricultural development since independence; a collection of essays*, New Delhi, Oxford and IBH Publ. Co., p. 149. Govt. of India, *Indian agriculture in brief*, 19th ed. Govt. of India, CSO, *Statistical abstract, India*, 1986, p. 58.

phoric acid is around 270 thousand tonnes of P_2O_5 . The demand for it has been rapidly increasing and now its imports have reached as high as 1.07 million tonnes of P_2O_5 (the figures are cited from *Fertiliser Statistics, 1986/87*).

Thus it can be said that import-substitution has not yet been completed in the case of fertiliser production.

In 1983/84, nineteen varieties of insecticides, five of fungicides, seven of weedicides, five of rodenticides and fumigants, one of acaricides, two of antibiotics, and two of plant growth regulators were domestically produced and the total production reached 58,793 tonnes (technical grade).

(2) Agricultural Machinery

Some of the agricultural machinery and implements used in India are shown in Table 3.

All this agricultural machinery and these implements are indigenously produced. Entering into the 1980s the traditional types of ploughs made of wood with iron tips started to decrease, and instead of them modern iron ploughs came into use more widely.

In 1965/66 the number of tractors produced in India was only 5.7 thousand, and in addition to this about 2 thousand were imported. In 1970/71 and 1971/72 the number of tractors imported recorded highs of 13.3 thousand and 19.7 thousand respectively. Thereafter only in 1976/77 did imports register as high as 2.9 thousand, and since then there has been no import of tractors. On the other hand, indigenous production has been increasing steadily, from a 30 to 40 thousand level in the 1970s to a 70 to 85 thousand level in the 1980s. This makes India the third largest country in the world for tractor sales, next to the U.S.A. and the U.S.S.R. [Sidhu, D.S. and A.J. Singh, 1986].

In the case of power tillers, imports were stopped in 1974/75, and the indigenous

Table 4. Area Irrigated by Sources

	(million ha)					
Source	1960/61	1970/71	1975/76	1980/81	1984/85	1987/88
Government canals	9.2 (37.2)	12.0 (38.5)	12.9 (37.4)	14.4 (37.3)	15.4 (36.8)	
Private canals	1.2 (4.9)	0.9 (2.8)	0.9 (2.5)	0.8 (2.2)	0.5 (1.2)	
Tanks	4.6 (18.5)	4.1 (13.2)	4.0 (11.5)	3.2 (8.2)	3.3 (8.0)	
Tubewells	0.1 (0.6)	4.5 (14.3)	5.8 (19.8)	9.5 (24.6)	11.3 (26.9)	
Other wells	7.2 (29.0)	7.4 (23.9)	7.6 (21.9)	8.2 (21.1)	8.7 (20.5)	
Others	2.4 (9.8)	2.3 (7.3)	2.4 (6.9)	2.6 (6.6)	2.6 (6.2)	
Total (Net Irrigated Area)	24.7 (100.0)	31.1 (100.0)	34.6 (100.0)	38.8 (100.0)	41.8 (100.0)	44.5
Gross Irrigated Area	28.0	38.2	43.4	49.9	54.1	58.0
% of Total Cropped Area	(18.3)	(23.0)	(25.3)	(28.8)	(30.7)	(32.8)

Source: Govt. of India, *Indian agriculture in brief*, 22nd ed, New Delhi, 1988, pp. 32–37.

production has increased from 1.4 thousand in 1970/71 to 3.3 thousand in 1986/87.

It should be noted that the numbers of oil engines and electric pumps for irrigation have been rapidly increasing and all of them are domestically produced.

(3) Irrigation

The use of high-yielding varieties has been extended under well controlled irrigation conditions. An assured water supply is a prerequisite for intensive agriculture based on high-yielding varieties of seeds and a high level of use of fertilisers.

It can be seen from Table 4 that although the area irrigated by government canals increased 1.7 time from 1960/61 to 1983/84, its proportion to the total net irrigated area has been constant at around 37 percent. In contrast to this the area irrigated by tubewells, which was negligible in 1960/61, recorded a tremendous increase during this period, and its share in the total went up to 27 percent. Against this, the area irrigated by the traditional means of lifting water from rather shallow wells was stagnating both in absolute and relative terms. This change corresponds to the spectacular increase of oil engines and electrical pumps mentioned above.

Remarkable success of the new agricultural strategy has been recorded in areas where irrigation by the preexisting government canals has been supplemented by tubewells to assure a stable, timely, and adequate supply of water when and as the need arises. Punjab, Haryana, and western Uttar Pradesh are typical examples of this success. In this region one of the largest government canal irrigation systems in the world has been working since as early as the mid-nineteenth century.

(4) Electricity

Electricity generation in India is under the jurisdiction of state governments.

Table 5. Area under High-Yielding Varieties

(mn. ha, %)

Crop	1966/67	1970/71	1980/81	1985/86	1986/87	1987/88
Wheat	0.88	6.48 (35.5)	16.10 (72.3)	19.08 (83.0)	19.19 (83.0)	19.69 (85.4)
Rice	0.54	5.59 (14.9)	18.23 (45.4)	23.47 (57.0)	24.03 (58.4)	22.25 (57.3)
Jowar	0.19	0.80 (4.6)	3.50 (22.1)	6.08 (37.8)	5.50 (34.5)	6.06 (38.7)
Bajra	0.06	2.05 (15.9)	3.64 (31.2)	4.99 (46.8)	5.27 (46.8)	3.95 (45.5)
Maize	0.21	0.46 (7.9)	1.60 (26.6)	1.80 (31.0)	2.19 (37.0)	2.15 (34.9)
Total	1.88	15.38 (16.7)	43.07 (44.9)	55.42 (57.3)	56.18 (57.6)	54.10 (56.4)

Source: Tata Services Ltd., *Statistical outline of India 1989/90*, Bombay, 1990, p. 60. India, Govt. of, *Economic survey, 1989/90*, New Delhi, 1990, p. 25. Sidhu, D.S. and A.J. Singh, "Technological change in Indian agriculture," in M.L. Dantwala and others, *Indian agricultural development since independence*, Bombay, Oxford & IBH Publ. Co., 1986, p. 145.

Generation by public utilities, such as the state electricity boards and public corporations, increased by 3.4 times from 55.8 billion kwh to 187.8 billion kwh, between 1970/71 and 1986/87. During the same period the proportion of electricity used for agricultural purposes has grown from 10.2 percent to 20.7 percent with the spread of tubewell irrigation.

It has been reported repeatedly that in many states the shortage of electricity has been a serious constraint to the full use of the installed capacity of tubewell irrigation.

According to an estimate made by the Government of India the deficit in electricity is around 10 percent of the existing capacity (the figures are cited from *Economic Survey, 1989/90*).

(5) High-Yielding Varieties of Seeds

The production and distribution of foundation and certified seeds are done through the National Seeds Corporation, the State Farms Corporation of India, and the State Seeds Corporations. The High-Yielding Varieties Programme introduced in 1967/68 and covering rice, wheat, jowar, bajra, and maize, has covered a large area under cultivation by different crops. By the end of the Sixth Plan the total areas covered under the high-yielding varieties was 56 million hectares. An area of 70 million hectares was targeted during the Seventh Plan. The area covered by high-yielding varieties under different crops can be seen from Table 5.

There seems to be still much room for the expansion of high-yielding varieties for rainfed crops, such as rice, jowar, bajra, and maize [Hanumantha Rao, 1988].

III. Agriculture as a Supplier of Wage Goods to Industry

As a result of the implementation of the High-Yielding Varieties Programme India's foodgrains production has been increasing mainly through the improvement of yield per unit of land, especially in Punjab, Haryana, and western Uttar Pradesh, which have been endowed with assured irrigation sources.

At the all-India level the performance of agricultural production looks rather modest.

As regards the growth performance of Indian agriculture after the start of the new agricultural strategy, the following three points are stressed (Table 6): (1) the increase in area as a source of output growth has dwindled in its importance; (2) taking agriculture as a whole, there is no indication that the yield improvements have compensated for the declining thrust of the increase in area; and (3) foodgrains show a modest increase in the growth rate of yields, but there appears to have been a deterioration in the growth rate of non-foodgrains yields [Rao, V.M. and R.S. Deshpande, 1986].

The net production of foodgrains (87.5 percent of the gross production, 12.5 percent being provided for feed, seed requirements, and wastage) which stood at the level of 70 million tonnes in the early 1960s, reached 130 million tonnes in the middle of the 1980s. Since 1975, 10 to 15 percent of this net production has been procured by the Food Corporation of India with administered prices for the Public Distribution System. The government stock of foodgrains has been fluctuating depending on food availability conditions, and stands at the level of 2.6 million tonnes upto 1990.

In 1972, six years after implementation of the new agricultural strategy, India was able to achieve self-sufficiency in foodgrains production. But the growth rate of around 2.6 percent has been just enough to keep pace with the growing population, and the foodgrains availability per person per day did not show any perceptible increase from the early 1960s to the 1980s. It was 457.9 grams for the three years of 1961/63 and 469.2 grams for 1984/86. This much of foodgrains would supply about 1,600 calories per capita per day. Including other items of foodstuff, such as edible oil and sugar, the total per capita availability of calories is estimated at 2,054 per day [Dandekar, V.M., 1986].

Among the foodgrains, pulses have been lagging behind cereals in terms of both yield and production performance. The index numbers of agricultural production (triennium ending 1969/70 = 100) for the year 1988/89 stood at 299.1 for wheat, 181.2 for rice, and 190.6 for both combined. Against this the index numbers for pulses and gram were 123.9 and 97.3 respectively.

New trends in foodgrains production are pointed out for the last decade (1978/79 to 1988/89) in comparison with the first decade of the green revolution: firstly, such crops as rice, pulses, and oilseed are now showing higher growth rates, and secondly, Assam, Bihar, Orissa, Madhya Pradesh, and West Bengal, which lagged

Table 6. Agricultural Growth Rates (Percent per Annum)
Pre-Green Revolution and Post-Green Revolution

Crop Group	Pre-Green Revolution (1952/53-1964/65)			Post-Green Revolution (1967/68 – 1983/84)		
	Area	Yield	Output	Area	Yield	Output
All crops	1.2	1.8	3.0	0.5	1.7	2.6
Foodgrains	1.0	1.5	2.5	0.4	1.8	2.6
Non-foodgrains	2.3	1.7	4.0	0.8	1.3	2.5

Source: Rao, V.M. and R.S. Deshpande, "Agricultural growth in India; a review of experiences and prospects," *Economic and political weekly*, Vol. 21, Nos. 38/39, Sept. 20–27, 1986, p. A–102.

far behind Punjab, Haryana, and western Uttar Pradesh in the first decade, have shown a much better performance in the last decade [Hanumantha Rao, 1989].

IV. Industry as an Absorber of Surplus Labour from the Agricultural Sector

After having achieved independence on August 15, 1947, India has been making an attempt to modernize its economy through seven Five-Year Plans. As a result of this, the share of industry and services sectors of GDP (at 1970/71 prices) has been continuously increasing, and that of agriculture has decreased from 59 percent in 1951 to 40.2 in 1980/81, and further to 35.7 percent in 1985/86. But this change in the industrial structure has not yet made any appreciable effect on the proportion of agricultural workers to the total number of workers. (See Table 7)

The total population of India, which stood at 361.1 million in 1951, just after independence, reached 685.2 million at the time of the 1981 Census. After that it has increased at an annual growth rate of more than 2 percent, and now it is estimated to have exceeded 800 million. Of this, more than 72 percent are rural population living in about 560 thousand villages all over the country.

The total number of agricultural workers increased by 36 percent from 1951 to 1961 and by 20 percent from 1971 to 1981. The number of workers mainly engaged in agriculture was 153 million in 1981, and if subsidiary workers were included, it reached 172.7 million. During the period of these 30 years the proportion of agricultural workers in the total workers decreased only from 74 to 69 percent. It is remarkable that the proportion of cultivators decreased from 52.8 percent in 1961 to 43.4 percent in 1971 and to 42.1 percent in 1981, while that of agricultural wage laborers increased from 16.7 percent in 1961 to 26.3 percent in 1981.

This trend can be attested to with another source. According to the findings of the Rural Labour Enquiries, the total number of rural households increased from 70.4 million in 1964/65 to 82.1 million in 1974/75. Of this, the number of agricultural laborer households grew from 15.2 million to 20.8 million in the same period, and their proportion to the total number of rural households increased

Table 7. Main Workers Classified by Industrial Category, 1961–81

(million, %)

Category	1961			1971			1981		
	Persons	%	Growth Rate	Persons	%	Growth Rate	Persons	%	Growth Rate
1. Cultivators	99.51	52.81	–2.37	78.27	43.36	1.69	92.52	41.58	–0.36
2. Agricultural laborers	31.48	16.71	4.20	47.49	26.31	1.57	55.50	24.94	2.88
3. Livestock, etc.	5.91	2.75	–1.87	4.30	2.38	1.51	4.99	2.24	–0.19
Sub-total	136.90	72.27		130.06	72.05		153.01	68.76	
4. Mining & quarry		0.00		0.92	0.51	3.19	1.26	0.57	
5. Manufacturing	19.99	10.61		17.07	9.46		25.14	11.30	
(1) Household	12.03	6.39	–6.19	6.35	3.52	1.96	7.71	3.47	–2.20
(2) Other	7.96	4.22	3.02	10.72	5.94	4.99	17.43	7.83	4.00
6. Constructions	2.06	1.09	0.78	2.22	1.23	4.85	3.57	1.60	2.79
Sub-total	22.05	11.70		19.29	10.69		28.71	12.90	
7. Trade & Commerce	7.64	4.05	2.77	10.04	5.56	3.33	13.93	6.26	3.05
8. Transport, etc.	3.00	1.59	3.90	4.40	2.44	3.26	6.07	2.73	3.58
9. Other Service	19.55	10.37	–2.12	15.77	8.74	2.16	19.53	8.78	0.00
Sub-total	30.19	16.01		30.21	16.74		39.53	17.77	
Total	188.42	100.00	–0.43	180.49	100.00	2.12	222.52	100.00	0.84

Source: Compiled from the data given in Rekesh Mohan, "Industry and urban employment, 1961–81; a preliminary exploration," *Economic and political weekly*, Vol. 24, Nos. 44/45, Nov. 4–11, 1989, p. 2482.

from 21.8 percent to 25.8 percent. But the proportion of agricultural labor households with land increased appreciably from 43.9 percent to 49.2 percent [Ahuja, 1986]. This trend can be attributed to the entry of marginal farmers in the labor market.

As to wage labor (males) in the rural areas, the National Sample Survey data for the 27th round (1972/73) and the 38th round (1982/83) show two major trends: firstly, an increase in the overall percentage of wage labor and secondly, casualisation of wage labor. Wage labor accounted for 34.1 percent of total male workers in rural areas in 1972/73 and 39.6 percent in 1982/83. And the proportion of casual male wage laborers to the total wage laborers was 64.6 percent in 1972/73 and 72.8 percent in 1982/83 [Parthasarathy, 1987].

The percentage of male unemployed persons to the total persons over age 5 on the current day status in rural areas was 4.75 in 1972/73 and 4.79 in 1982/83. Thus, the proportion of open unemployment seems not to be so large, but there is a vast body of underemployed persons in rural areas. Effective labor utilisation, defined as a ratio of estimated employment in normative terms of standard person years to the actual employment of persons, was around 50 percent for agriculture compared to 80 percent or more in other sectors [Thamarajakshi, 1989].

Table 8. Industrial Employment in India

1. Private Sector (1000)

Year	Primary Sector		Secondary Sector		Tertiary Sector		Total	
	Persons	Annual Change	Persons	Annual Change	Persons	Annual Change	Persons	Annual Change
1981	988 (13.36)	—	4,652 (62.91)	—	1,755 (23.75)	—	7,395 (100.0)	—
1982	980 (12.98)	-0.81	4,768 (63.17)	+2.49	1,800 (23.85)	+2.56	7,548 (100.0)	+2.07
1983	967 (12.81)	-1.32	4,761 (63.04)	-0.15	1,824 (24.15)	+1.33	7,552 (100.0)	+0.05
1984	932 (12.69)	-3.62	4,578 (62.32)	-3.84	1,836 (24.99)	+1.66	7,345 (100.0)	-2.73
1985	920 (12.59)	-1.29	4,530 (63.98)	-1.06	1,859 (25.43)	+1.25	7,309 (100.0)	-0.50
1986	933 (12.67)	+1.30	4,597 (62.34)	1.48	1,843 (25.48)	-0.86	7,373 (100.0)	0.88
1987	939 (12.74)	0.75	4,507 (61.16)	-0.97	1,923 (26.09)	2.56	7,369	0.09

2. Public Sector

1981	1,281 (8.28)	—	3,274 (21.14)	—	10,929 (70.58)	—	15,484 (100.0)	—
1982	1,289 (8.08)	0.62	3,402 (21.34)	3.91	11,255 (70.58)	2.98	15,946 (100.0)	2.98
1983	1,360 (8.26)	5.51	3,475 (21.12)	2.15	11,621 (70.62)	3.25	16,456 (100.0)	3.20
1984	1,416 (8.39)	4.12	3,570 (21.16)	2.73	11,883 (70.45)	2.25	16,869 (100.0)	2.51
1985	1,472 (8.52)	3.95	3,667 (21.23)	2.72	12,130 (70.24)	2.08	17,269 (100.0)	2.37
1986	1,492 (8.44)	1.35	3,781 (21.38)	3.10	12,410 (70.18)	2.31	17,683 (100.0)	2.40
1987	1,499 (8.3)	0.00	3,837 (21.3)	1.48	12,690 (70.4)	2.23	18,028 (100.0)	1.95

Source: Compiled from Govt. of India, *Economic Survey, 1988/89*, pp. S-46-47.

Note: Figures with * relate to non-agricultural establishments in the private sector employing more than 10 and more persons. Figures for 1987 are provisional.

In the agricultural sector itself, with the progress of the mechanization of many agricultural operations, such as ploughing, irrigation, pumping, and threshing, the demand for hired labor has been rather decreasing. It is observed that labor absorption, which was initially high during the initial stage of the green revolution, has been declining due to the adoption of labor-saving innovation [Basant, 1987] or labor-displacing technological packages [S. Bhalla, 1989].

Then the problem is whether or not non-agricultural activities, especially industry, can provide enough job opportunities to absorb the surplus rural population.

This prospect also seems to be not so bright in the near future.

Entering into the 1980s India's industrial production seems to have gathered the momentum to grow much faster than in the previous decade. The compound growth rate for industry, which stood at 3.5 percent per annum for the period from 1965/66 to 1975/76, increased to 4.6 percent for the period from 1975/76 to 1980/81, and again to 6.2 percent for the three years from 1980/81 to 1983/84 [Ahluwalia, I.J., 1988]. From 1984/85 onward industry has been recording an annual growth rate of 7 to 9 percent. In particular, the durable consumer goods industries have registered much faster growth rates compared to non-durable consumer goods industries. And the registered sector of industries has grown faster than the unregistered one (*Economic Survey, 1989/90*).

Despite this quickening pace of industrialisation, the prospect for employment generation in industry seems to be not so promising in the near future.

The increase in employment in non-household manufacturing between 1971 and 1981 was significant: with about 5 percent a year [Mohan, R., 1989]. But since 1982 this pace of growth seems to have slowed down. This declining trend of employment in organized sectors, both private and public, can be seen from Table 8.

V. Summary of Findings and Prospects

Industry as a supplier of agricultural inputs has been making great contributions to the increase of agricultural production. Still the shortage of important inputs like fertiliser and electricity is sometimes felt very acutely in some places. In this aspect of the agriculture-industry linkage, there is an alarming fact that all these modern inputs are very heavily subsidized by the central as well as the state governments.

Annual subsidies both on imported and domestically produced fertilisers, which stood at 5 billion rupees in the early 1980s, have been sharply increasing and they reached 20 billion rupees in 1987/88 and 30 billion rupees in 1988/89. This is more than the total annual plan outlay for agriculture of both the central and states' sectors put together [Hanumantha Rao, 1988]. With respect to irrigation and electricity, most state governments have been incurring heavy losses, amounting to 14.6 billion rupees on both accounts in 1987/88. According to one estimate the total input subsidies per hectare (average 1980/81 to 1986/87) came to 511 rupees at the all-India level [Gulati, 1989].

It can be asserted that agriculture as a supplier of wage goods to industry has recorded more or less satisfactory achievements with the introduction of the High-Yielding Varieties Programme. It cannot be denied that the per capita foodgrains availability level is still lower than the norm of the poverty line (2300 calories). But there is further room for the expansion of production, especially of rice, bajra, jowar, and pulses.

Industry as an absorber of surplus agricultural population provides the most alarming picture. The High-Yielding Varieties Programme has been introduced

against the background of a very skewed landholding structure, with twenty-five percent of farm households controlling seventy-five percent of the total operated area. There is a sign of improvement, but still forty percent of the rural population lives under the poverty line [Hanumantha Rao, 1985]. Most of them are agricultural laborers and marginal and small farmers who are chronically underemployed. This is the reason why the Government of India has been emphasising poverty alleviation programmes, especially from the start of the Sixth Five-Year Plan in 1980. But there is a fear that these kinds of programmes may divert financial resources that otherwise could be utilised for more productive activities.

REFERENCES

- Ahluwalia, I.J., "Industrial policy and industrial performance in India," in R.E.B. Lucas and G.F. Papanek, ed. *The Indian economy; recent development and future prospects* (Delhi: Oxford Univ. Press, 1988).
- Bardhan, Kalpana, "Poverty, growth and rural labour markets in India," *Economic and political weekly* (hereafter referred as *EPW*), Vol. 24, No. 12 (Mar. 25, 1989).
- Basant, Rakesh, "Agricultural technology and employment in India; a survey of recent research," *EPW* (Aug. 1 and 8, 1987).
- Bhalla, G.S. and D.S. Tyagi, "Spatial pattern of agricultural development in India," *EPW*, Vol. 24, No. 25 (June 24, 1989).
- Bhalla, Sheilla, "Employment in Indian agriculture; retrospect and prospect," *Social scientist*, No. 192–193 (May–June 1989).
- Bhattacharya, B.B. and Arup Mitra, "Industry-agriculture growth rates; widening disparity—an explanation," *EPW*, Vol. 24, No. 34 (Aug. 26, 1989).
- Dandekar, V.M., "Indian economy since independence," *EPW*, Vol. 23, No. 1/2 (Jan. 2–9, 1988).
- Dantwala, M.L. and others, *Indian agriculture since independence; a collection of essays* (New Delhi: Oxford & IBH Pub. Co., 1986).
- Desai, A.R., "Rural development and human rights in independent India," *EPW*, Vol. 22, No. 31 (Aug. 1, 1987).
- Ghose, A., D. Chakravarti and A. Sinha, "Impact of rural incomes on the market for urban manufactures," *EPW*, Vol. 23, No. 44 (Oct. 29, 1988).
- Gulati, Ashok, "Input subsidies in Indian agriculture; a statewide analysis," *EPW* (June 24, 1989).
- Mohan, Rakesh, "Industry and urban employment, 1961–81; a preliminary exploration," *EPW*, Vol. 24, No. 44/45 (Nov. 4–11, 1989).
- Nadkarni, M.V., "Crisis of increasing costs in agriculture; is there a way out?," *EPW*, Vol. 23, No. 39 (1988).
- Nath, V., "Urbanisation in India; review and prospects," *EPW*, Vol. 21, No. 8 (Feb. 22, 1986).
- Parthasarathy, G., "Changes in the incidence of rural poverty and recent trends in some aspects of agrarian economy," *Indian journal of agricultural economics* (hereafter referred as *IJAE*), Vol. 42, No. 1 (Jan.–Mar. 1987).

- Rao, C.H. Hanumantha, *Changes in rural poverty in India; implications for agricultural growth; Dr. Rajendra Prasad Memorial Lecture* (Akola: Dec. 29, 1985).
- Rao, C.H. Hanumantha, "Technological change in Indian agriculture; emerging trends and perspectives," *IJAE*, Vol. 44, No. 4 (Oct. – Dec. 1989).
- Rao, C.H. Hanumantha, "Current agrarian scene; policy alternatives," *EPW*, Vol. 23, No. 13 (Mar. 26, 1988).
- Thamarajakshi, R., "Agricultural growth, rural development and employment generation," *EPW* (Mar. 25, 1989).
- Vaidyanathan, A., "Labour use in rural India; a study of spatial and temporal variations," *EPW*, Vol. 21, No. 52 (Dec. 27, 1986).

Appendix

Rural Development Programmes

Plan	Year	Programmes
First	1952	Community Development Programme
	1953	National Extension Service
Second	1957	Khadi and Village Industries Programme
	1957	Village Housing Projects Scheme
	1959	Multi-Purpose Tribal Development Blocks Programme
	1960	Package Programme
Third	1960	Intensive Agricultural District Programme
	1962	Applied Nutrition Programme
	1962	Rural Industries Projects
	1964	Intensive Agricultural Areas Programme
	1966	High Yielding Varieties Programme
Annual	1966	Farmer's Training and Education Programme
	1966	Well Construction Programme
Annual	1967	Rural Works Programme
Annual	1968	Tribal Development Block
Annual	1969	Rural Manpower Programme
	1969	Composite Programme for Women and Pre-school Children
Fourth	1970	Drought-prone Areas Programme
	1971	Cash Scheme for Rural Employment
	1971	Small Farmers Development Agency
		Marginal Farmers and Landless Labourers Agency
Fifth	1972	Tribal Area Development Programme
	1972	Pilot Projects for Tribal Development
	1972	Minimum Needs Programme
	1972	Pilot Intensive Rural Employment Project
	1974	Command Area Development Programme
	1975	Hill Area Development Programme
	1975	Special Livestock Production Programme
	1977	Food for Work Programme
	1977	Desert Development Programme
	1978	Integrated Rural Development Programme
	1979	Whole Village Development Programme
	1979	Training Rural Youth for Self-Employment

Rural Development Programmes (Continued)

Plan	Year	Programmes
Sixth	1980	National Rural Employment Programme
	1980	Prime Minister's New Twenty Point Programme
	1982	Development of Women and Children in Rural Areas
	1983	Rural Landless Employment Guarantee Programme
Seventh	1985	Integrated Rural Development Programme to be continued
		Development of Women and Children in Rural Areas to be continued
		Composite Rural Training and Technology Centre to be established in every district
		Special Livestock Breeding Programme
	1989-90	National Rural Employment Programme to be continued
		Drought-prone Area Development Programme to be continued
		Jawahar Lal Nehru Rozgar Programme
		Jawahar Rozgar Programme to incorporate NERP and RLEGP

Source: Desai, A. R., "Rural development and human rights in independent India," *Economic and political weekly*, Vol. 22, No. 31, Aug. 1, 1987. Dantwala, M. L. and J. N. Barmeda, "Rural development; approaches and issues," in M. L. Dantwala and others, *Indian agricultural development since independence; a collection of essays*, New Delhi, Oxford and IBH Pub. Co., 1986. India, Govt. of, Planning Commission, *Seventh Five-Year Plan 1985-90*, Vol. 2, New Delhi, 1985. India, Govt. of, *Economic Survey 1989-90*, New Delhi, 1990.