

IRRIGATION V/S PRODUCTION AND PRODUCTIVITY IN NORTH BIHAR

Nawal Ram

Research Scholar,

B.R.A. Bihar University, Muzaffarpur.

Abstract

It is clear that physical environment of North Bihar is exclusively fit for bumper harvest. It is also clear that the study area is a good example of man: Land ratio. Population is zooming without any pause and the land area per capita is shrinking drastically and presently availability of per capita land is less than 0.06 hectare, perhaps the lowest in the country. It is also clear that region is industrially backward. In such an odd socio-economic situation along with burgeoning population only one thing available in the region is tottering agriculture situation and it can only be improved by enhancing production and productivity through water utility.

Twelfth Five year plan has pinpointed the importance of agriculture not only for Bihar but for India as a whole. Its revealing is "Agricultural development is central to economic development of the country". In reality, it is more central in the context of North Bihar. Here nothing can move unless agriculture moves and agriculture cannot move until irrigation is made available to the fields. Against this background the present chapter has been added to scheme of study.

CO-RELATION BETWEEN IRRIGATION AND AGRICULTURE

Irrigation, agricultural production and productivity are intricately balanced with each other like a co-web. In a monsoonal environment water is very valuable and crucial because of variable nature of spatial distribution of rainfall in time and space context. North Bihar's annual receipt of rainfall is 132 cm and rainfall tends to decrease from east to west and from north to south. Apparently this amount of rainfall is sufficient to support standing crops in normal monsoon year, but such situation is not a common phenomenon. The study area experiences rainfall variability between 15% to 45% and this range is fatal to the standing crops. Hence to save crops being destroyed, timely supply of water to the fields is the primary requisite for sustenance of agriculture. Thus, co-relation between irrigation and agriculture is very vital.

No doubt irrigation is the most critical element for boosting agriculture and beneficial to the economy of the study area. Really it forms the datum line for sustained successful agriculture. It alleviates sufferings, preserves life, averts famines and advances the material prosperity of the area under reference. In fact, as pointed out by Sir Charles Trevelyan a noted agronomist of world repute. "Irrigation is everything in India: water is more valuable than land, because when water is applied to land it increases its productiveness at least six-fold and renders to great extents of the land productiveness, which otherwise would produce nothing or next to nothing. Almost similar view expressed by Dr. Knowles, a famous British agronomist, may be quoted here "the irrigation works have made security of life, they have increased the yields and the value of the land revenue derived from it. They have lessened the cost of famine relief and have helped to civilize the whole region. In addition, yield gives handsome profits to the government and government may venture upon the social welfare works.

Dr. Gadgil, Deputy Chairman during the period of 1958-61 studied the economic effects of the Godawari and Pravara Canal in Deccan region of South India has shown that the total direct and indirect effects of the irrigation projects were very favourable. Due to irrigation, farmers could make additional investments in cattle, farm implements and on more valuable crops like sugarcane and the total employment of the farmers and labourers was greater. In the line of Gadgil study, Triveni Canal irrigation project in the then Champaran district was studied by Dr. P.N. Jha of planning commission of Bihar and his findings are as such, "canal irrigation has helped in promoting the greater utilisation of land; enlarging the average size of the farm; generating demand for additional farm labour;

shifted in new and better varieties of crops; increasing an additional productive investments in farm business; favourable input output ratio; widening the scope for increase in land revenue and other local receipts. All these revelations prove that there is greater impact of irrigation on agricultural production and productiveness.

In nutshell, it can be said that agriculture is influenced by irrigation from two points of view, firstly, irrigation acts as protective impetus to the agriculture. Irrigation makes up the moisture deficiency in soils during the cropping season so as to ensure proper and sustained growth of the crops grown; secondly, it enables a second or third crop being harvested efficiently, more particularly during the post or pre monsoon periods. While the protective aspect helps in stabilising agricultural production against droughts, the second facility cannot be thrown away by an intelligent and responsible cultivators. Irrigation also is capable of changing soil sterility caused by drought into fertility viz, overcoming low productivity due to dryness or excessive water supply.

AGRICULTURAL SITUATION IN NORTH BIHAR

Agriculture forms the backbone of the economy of North Bihar in particular and India in general. After bifurcation of Jharkhand portion of Bihar in 2000, agriculture has become even more important. More than 80% population of Bihar are dependent upon agriculture and it is now beyond agriculture to absorb incoming labour force. A sector which is everything for its people has been prey to horrifying negligence. From Table 1.1 relative position of agriculture may be perused-

Table – 1.1

Relative Position of Agriculture in Selected Regions

Sl. No.	Region	Percentage share in region's economy	Percentage employment in agri-sector
1.	U.K.	2	2
2.	U.S.A.	3	3
3.	Canada	4	3
4.	Australia	5	6
5.	China	11.6	41
6.	India	22	57
7.	North Bihar	90	93

Source: Agricultural Statistics at a glance 2016.

From perusal of Table 1.1 it is clear that the study area is heavily dependent upon agriculture not only for employment but for income also. Thus, it may be said it is the backbone of our economy and its prosperity can also largely be responsible for the prosperity of the entire economy. Virtually North Bihar practices humid type of cultivation with source infusion of agriculture.

AGRICULTURAL DEVELOPMENT & GROWTH

The significance of agriculture in North Bihar arises & from the fact that the development in agriculture is an essential condition for the development of the economy the general economic development of the study area cannot be industrial based because the region is almost devoid of mineral as well as power related raw materials. Creation of industrial base is not only capital intensive but time taking also. Contrary to it growth of population is very fast, outpacing every region of India. Then only option available in the region is to develop agriculture in

scientific way so that yield and productivity of agriculture may be increased rapidly to absorb incoming working force. It is the problem of agriculture because of that extremism is going on in the entire Bihar.

During British period agriculture was a neglected lot. Floods and droughts were concurrent events and people were bound to lead a hapless, precarious and miserable life. It is evident from the fact that the mortality age of our population was between 43-47 years. Fortunately, India became independent in 1947 and then after emphasis of our govt. was to develop our agriculture with rapid speed. With the policy of "Grow more Food" important changes took place in our agriculture especially after 1965. Its consequence was positive that may be seen below-

- (a) There was steady increase in area under cultivation.
- (b) There was a steady rise in the average yield per hectare or rise in agricultural productivity, and
- (c) As a result of the above two factors, production of all agricultural crops recorded a rising trend.

But studying the agricultural development two points should be kept in mind-firstly, agricultural production in Bihar- which is the function of area, productivity per hectare and total output is influenced large, by rainfall and weather conditions. There are year to year variations in area under cultivation. Average yield per hectare and total output. It is difficult to isolate the weather factors and study only the effects of agricultural inputs and of technology agricultural growth. This point is of paramount importance in the context of the tall bureaucratic claims about the success of bio-chemical technology more popularly known as the green revolution. After the introduction of New Technology based agriculture, agricultural scenario in the study area underwent considerable change in general land use cultivation based purely on weather and agriculture in particular; From Table 1.2 growth in area and yield may be studied.

Table – 1.2

Growth in Area and Yield of Principal Crops in North Bihar

Sl. No.	Crops	Growth rate in Area		Growth rate in Yield	
		1950-51 to 1964-65	1964-65 to 2003-04	1950-51 to 1964-65 Quintals	1964-65 to 2015-16 Quintals
1	All Food Grains	1.4	0.1	All Food Grains	-
	(a) Rice	1.3	0.6	10.8	20.8
	(b) Wheat	1.7	2	9.1	27.6
	(c) Coarse Cereals	0.9	1	5.1	11.5
	(d) Pulse	1.2	-0.5	5.2	6.2
	All Non-Food Crop	2.5	0.3	-	-
2	(a) Oilseeds	7.6	1.1	5.6	9.1
	(b) Sugarcane	3.5	1.4	47	67
	(c) Potato	4.4	4.5	84	200
3	All Crops	1.6	0.1	-	-

Source: Compiled from Economic Survey 2015-16.

Table 1.2 brings out the growth trends in area under cultivation as well as yields of crops; despite the fluctuation from year to year because of variation in monsoon and weather conditions. During the period 1951 and 1965, that is during the pre-green revolution period, additional lands were brought under the plough and there was extension of irrigation facilities to barren lands. As a result the annual rate of growth in area under crops during 1950-1965 was quite impressive:

All crops- 1.6%

Food grains- 1.4% and

Non-food grains- 2.5%

After 1964-65, the scope for extension of cultivation gradually declined. During the post green revolution period (1965-2015) the annual area growth rate was extremely low:

All crops- 0.1%

Food grains- 0.1% and

Non-food grains- 0.3%

During the period 1965-2015, the increase in area under rice was only 22% while the area under wheat rose by 92%. As a result, the annual rate of growth of area under rice was a mere 0.6%, while it was 2.0% for the wheat. The extension of area under wheat was clearly due to the introduction of bio-chemical technology but it was at the expense of coarse cereals and pulses. There has been a shifting cropping pattern between the two periods. The share of wheat in the total cropped area had gone up from 8.5% to 14%, and the share of wheat in the irrigated area had gone up from 15% to 38%.

Under non-food grains spectacular progress was achieved by potatoes (200%).

RATE OF GROWTH OF YIELDS (Since 1957)

With the introduction of the planning in 1950-57, there was rapid extension of irrigation and application of intensive methods of cultivation. After the introduction of modern agricultural practices including the adaptation of hybrid seeds since 1964-65, there has been a steady and continuous increase in yield per hectare of all crops. Table 1.2 illustrates the yield growth rates in the region since 1950-57. From Table 1.2 we come to know that monsoon and weather conditions affect average yield per hectare and, therefore, the effects of improved agricultural techniques but also that of natural factors, such as monsoon onslaughts and weather conditions.

In 2002-03 there was extensive failures of rains due to delayed monsoons. Area under cultivation and agricultural production per hectare declined steeply during the aforesaid period. However, this does not reflect the normal trend of agricultural growth.

During the pre-green revolution period, rice recorded the most impressive growth rate in yield-from 7 quintals per hectares in 1950-51 to 11 quintals by 1964-65. The annual rate of growth was 2.1% yield per hectare in the case of wheat improved from 6.6 quintals in 1950-51 to 9.1 quintals in 1964-65, a modest annual rate of growth of 1.3% among non-food grains. Sugarcane recorded modest growth rate during the period.

During the second plan period, however, the most spectacular growth rate was recorded by wheat (3.2% per annum) potato too recorded an impressive growth rate of 3.1% per year. Per hectare average yield of wheat is now 27.6 quintals as compared to 20.8 quintals (average) in the case of rice. Rice registered a steady annual growth rate of 1.8% in yield. Productivity of coarse cereals rose by 2.2% per year. On the other hand pulses recorded a growth rate of 0.1% per year and oilseeds, a mere 1.2% per year. This shows that the new bio-chemical technology was particularly suited to wheat production but was not effective in the case of other crops-

Table – 1.3**STUDY AREA IN COMPARISON WITH SELECTED COUNTRIES, INDIA, INDIA'S BEST REGION**

Sl. No.	Crops	Potentials of H Yielding Indian Varieties (Quintal/Hectare)	Actual Yield in India	Actual yield in Bihar	Actual yield of the Worlds Largest Products	World's Highal yield	Country
1	Rice	40 to 58	29.3	18.8	63.2	88.8	Egypt
2	Wheat	60 to 68	25.8	16.09	39.7	80.5	U.K.
3	Maize	60 to 80	16.7	26.1	83.9	96.9	Italy
4	Sugarcane	-	680	547.5	686	1190	Egypt
5	Jute	25 to 30	20.0	21.9	20.0	25.2	China
6	Potato	-	179	189.9	-	-	-

Source: FAO Production Year Book (2010), Agricultural statistics at a glance (2002).

From perusal of Table 1.3 it is clear that position of India and Bihar (Both) in Comparison with other countries of the world is very disturbing. Egypt is a desert country but it leads all countries of the world in the yield per hectare. Similarly U.K. has recorded the highest yield per hectare (2805). The corresponding figure of rice and wheat for Bihar is 18 and 17 quintals per hectare respectively. It shows our worsening condition on agriculture front despite being overwhelmingly an agrarian state. Except in the yield rate our position in relation to other agro-commodities is not encouraging. Hence much more is needed to prosper our agriculture through scientific cultivation. Here the role of irrigation must be taken as the most important input for enhancing production.

CHIEF CROPS & CROPPING GPATTERN

North Bihar experiences transitional climatic conditions between U.P. and West Bengal. Physical environment (rainfall, temperatures, soils, water resources) as well as human resource are fully favourable for cultivation of varieties of crops and horticultural produces. But mushrooming population and dwindling share of cultivable land are posing great hurdles in the way of agricultural development. From Table 1.4 availability of cultivable land may be studied. We come to know that the total geographical area of North Bihar is 53538 Km² (or 54% of Bihar) of the total geographical area. Cultivable land covers slightly more than 73%, current fallow, cultivable wasteland and other fallow land have been included in the cultivable land. It means that North Bihar has more cultivable land in relation to Bihar and India. It is recorded by land not usable for cultivation. With the progress of time the share of this category of land is going up and in future it will go up even more rapidly due to cultural development and settlement. So, to cope with mushrooming population. Increasing demand of land for non-agricultural uses, production and productivity of cultivable land must be enhanced without losing time.

Table – 1.4**Land Utilisation in the Study Area.**

Sl. No.	Categories of Land	Total Area (Km2)	Percentage of the total Area
1	Net Sown Area	34790	64.96
2	Current fallow & other fallow land	4270	7.83
3	Barrenland suitable cultivation	60	0.39
4	Land used for Non-agricultural uses	9620	17.9
5	Barren & Non-agricultural	1872	3.34
6	Grazing & garden land	1902	3.58
7	Forest	1071	2
Total		53538	100

Source: Bihar: Facts and Figures, 2015.

Another important fact regarding land utilisation is that the share of forested land is merely 2% of the total geographical area. It shows the deteriorating condition of environment to save environment as a living place for humanity, hence forest must reach to the level of 33%. Unfortunately, the region is virtually non-forested area and its consequences are felt in the form of floods and droughts every year. Hence this existing trend must be reversed immediately if we really want to make the region human friendly.

Conclusion

From land utilisation it has become evident that 65% geographical area is under net sown area. This average percentage varies from district to district-out of 22 districts in the study area, Siwan holds 1st position (77.3%) followed by Gopalganj (71.02%), Madhepura (70.06%) and Gaya (69.6%) in the share of net sown area, respectively. West Champaran has the lowest netsown area (50.78%) among all districts and followed by Katihar (54.65%), Madhubani (58.48%) and Darbhanga (60%). Except seven districts such as West Champaran, Katihar, Madhubani, Darbhanga, Vaishali, Supaul and Araria, the remaining 14 districts of the study area have higher percentage of net sown area than the state's average (63.23%). Despite such a high percentage of net sown area, the vision has not been able to feed its people. This alarming situation has come into focus because of non-performing irrigation facilities available in the region. Quick measures must be taken to arrest the worsening situation.

References:

1. Anwar Aalam (2015): Farm Mechanisation- Keeping Pace with Change, The Hindu, Rays of Indian Agriculture.
2. B.D. Dhawan (2008): Irrigation in India's Agricultural Development.
3. Bhalla G.S. (2007): Indian Agriculture Since Independence P. 107.
4. Bose, S.R. Ghosh P.P. (2002): Agro-Economic Survey of Bihar – Pilot Study, Patna.
5. Dekshinamurti C. Michael. A.M. Shri Moharn (1991): Water Resources of Bihar and their Utilisation in Agriculture.
6. Kulkarni, D.G.: Problems of Irrigated Agriculture PP. 2-4.
7. Rao, K.L. (2000): India's Water Weath.
8. Robert M. Hagan Howard R. haise (1999): Irrigation of Agricultural Land. PP.1-4.
9. Singh Baljit (1945): Wither Agriculture in India, Reprint – 2011.