

Extent of Irrigation and Changes in Land Use Pattern: 1965-66 to 2010-11

Dr. Pooja Rana
Department of Geography
Lyalpur Khalsa College, Jalandhar

Abstract

India with its agro-based economy is largely dependent on monsoonal rainfall for its economic development. Hence, its progress and economic well being depend mostly on monsoon spell. The availability of irrigation facility determines the success of all programmes oriented towards agricultural development. Thus irrigation forms important component of current strategy means for boosting agricultural production (Soundarum, 1991). Similarly the necessities of developed and adequate irrigation facilities become highly in Punjab because here rainfall is unreliable and inadequate in both space and time. Williamson (1925) rightly stated that in areas where if co-efficient of variability in annual rainfall exceeds 20 per cent than irrigation becomes pre-requisite for successful crop farming. It is true in case of Punjab, where co-efficient of variability in annual rain fall ranges between 22 to 65 per cent. Changes in irrigation spark the changes in land use pattern because with increased irrigation facilities farmers will bring more land under cultivation and Net Sown Area that will led the reclamation of cultivable waste, low area under fallow and current fallow, more area under non-agricultural uses due to infrastructure, urbanization, industrialization, etc. Thus there would be great upheaval in land use categories.

Introduction

Irrigation is an important component of the new technology package and promotes the use of other inputs in the package like fertilizers, insecticides, pesticides, weedicides and H.Y.V of seeds. Thus irrigation forms important component of current strategy means for boosting agricultural production (Soundarum, 1991). Similarly the necessities of developed and adequate irrigation facilities become highly in Punjab because here rainfall is unreliable and inadequate in both space and time. Williamson (1925) rightly stated that in areas where if co-efficient of variability in annual rainfall exceeds 20 per cent than irrigation becomes pre-requisite for successful crop farming. It is true in case of Punjab, where co-efficient of variability in annual rain fall ranges between 22 to 65 per cent. Changes in irrigation spark the changes in land use pattern because with increased irrigation facilities farmers will bring more land under cultivation and Net Sown Area that will led the reclamation of cultivable waste, low area under fallow and current fallow, more area under non-agricultural uses due to infrastructure, urbanization, industrialization, etc. Thus there would be great upheaval in land use categories.

Land use means the use of land for different purposes like forest, pastures, fallow , net sown area, etc. Land utilization however bears a direct concern with physical characteristics and conditions of topography, soil water, etc. On the other hand either for cropping grazing, etc. Or the conditions of profitability, competitions, shifts and adjustments in other kind of land use (i.e. land use for non-agricultural

purposes) that arise in the utilization of land resources for the economy and welfare of the society (Singh, 1997).

Changes in irrigation spark the changes in land use pattern because with increased irrigation facilities, farmers will bring more land under cultivation and net sown area that will lead the reclamation of cultivable waste land, low area under fallow and current fallow, more area under non-agricultural uses due to development of infrastructure facilities, urbanization, industrialization, etc. Thus there is great upheaval in land use categories. Therefore, to know detailed picture of changes in each land use category present paper is set.

Study Area

Punjab is situated in north-western part of India. It comprises of 1.53 per cent of total geographical area of the country. Its latitudinal extent is from 29°33' N to 32°32' N and longitudinal extent is from 73°54' E to 76°50' E. Punjab is land locked state but holds a great strategic significance as it is bounded by Pakistan in the West. The river Ravi forms a part of its western boundary with Pakistan. It is further bounded by Jammu and Kashmir in the north, Himachal Pradesh in the east, Haryana and Rajasthan in the south-east and south. High diversity is found in its physical environment, i.e. north and north-east parts having hills and rough topography, while southern parts are having frequent occurrences of sand dunes. Whereas flood plains run along the rivers Ravi, Beas, Satluj and Ghaggar subjected to floods every year.

Purpose and Methodology

Present study is intended to evaluate the extent of irrigation during 1965-66 to 2010-11 and its impact on land use pattern. For the present study the adopted methodology is consonance with selected objectives. The present study is empirical in nature. It is based upon secondary sources of data.

(1) Extent of Irrigation

With the expansion of new agricultural technology, especially its biochemical component, importance of irrigation as a key element in agricultural development has further increased. Irrigation is an important component of the new technology package, and promotes the use of other inputs in the package like fertilizers, insecticides, pesticides, weedicides and H.Y.V of seeds.

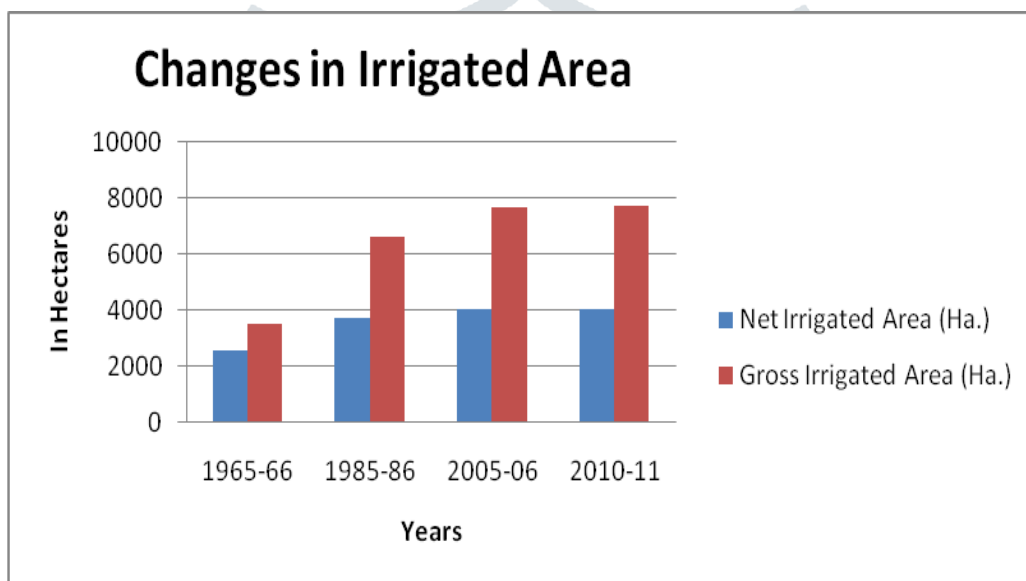
Table: 1 Changes in Irrigation in Punjab during 1965-66 to 2010-11

Year	Net Irrigated Area (Ha.)	Gross Irrigated Area (Ha.)	Extent of Irrigation (per cent)	Number of Tubewells (in Lakhs)

1965-66	2567.1	3516.6	59.72	967.7
1985-86	3749.3	6628.6	87.55	2265.9
2005-06	4060.0	7679.7	97.4	2914.6
2010-11	4074.0	7722.9	97.9	3124.8

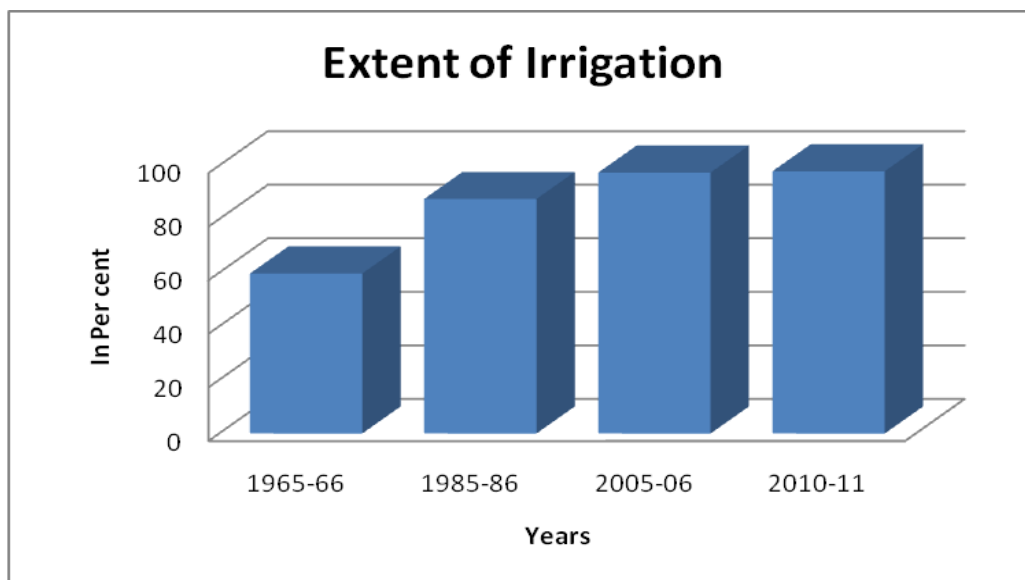
Source; Economic and Statistical Organization of Punjab, Chandigarh.

Figure: 1



Source; Economic and Statistical Organization of Punjab, Chandigarh.

Figure: 2



Source; Economic and Statistical Organization of Punjab, Chandigarh.

As a result, drastic changes have been recorded in irrigation. Punjab has taken significant strides in the process of irrigation development since 1965 which is very clearly indicated that area under net irrigation from all sources was 2567.1 hectares in 1965-66. It has increased to 4074 hectares in 2010-11 and registered a positive volume of change of 1506.9 hectares which looks quite impressive. But in respect of gross irrigated area, it has increased from 3516.6 hectares in 1965-66 to 7722.9 hectares in 2010-11 and this way positive increase of 4206.3 hectares is recorded during study period. But the overall extent of irrigation has increased from 59.72 per cent in 1965-66 to 97.9 per cent in 2010-11. On the whole positive volume of change of 38.18 per cent is recorded during 1965-66 to 2010-11. Thus there is only 5 per cent of net sown area remain unirrigated. This significant positive change is the result of extension in canal irrigation and sinking of tubewells on large scale. The number of tubewells which was 967.7 in 1965-66 has increased in 2265.9, 2914.6 and 3124.8 during 1985-86, 2005-06 and 2010-11 respectively. the rapid increase in number of tubewells is largely the result of development in electricity, liberal loan facilities for sinking of tubewells to farmers and the introduction of the pivots of green revolution technology such as the use of chemical fertilizers, HYV of seeds, insecticides, pesticides, weedicides, etc. thus the development state of irrigation has made feasible the transformation of Punjab agriculture.

(2) A. Forest Land

During 1965-66 to 1985-86, the area under forest land increased from 102 thousand hectares in 1965-66 to 5185 thousand hectares in 1985-86. Overall volume of changes for Punjab was 3.4 per cent. During 2005-06 to 2010-11 area under forest was also recorded 0.7 per cent positive volume of change in the study area. Major causes of low positive volume of change are fertile soil, high degree of development of irrigation facilities and agricultural modernization, etc.

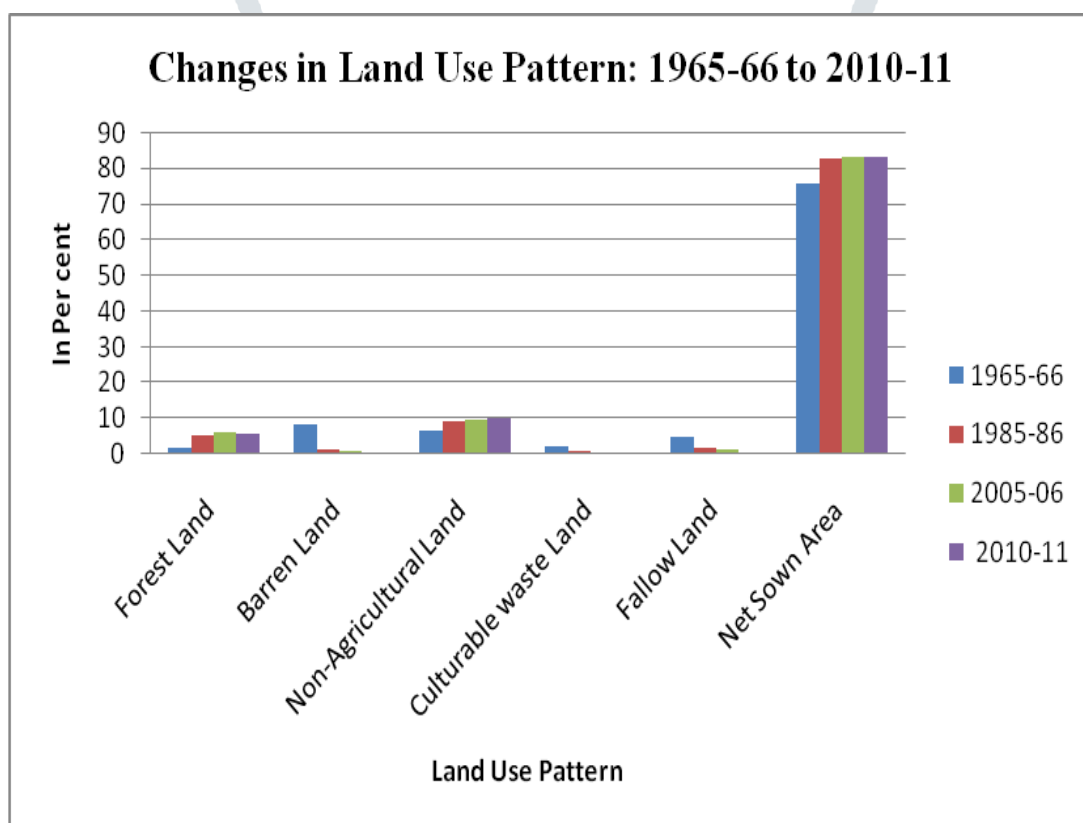
Table: 2 Changes in Land Use Pattern in Punjab during 1965-66 to 2010-11

(In per cent)

Land use	1965-66	1985-86	2005-06	2010-11
Forest Land	1.7	5.1	5.7	5.8
Barren Land	8.2	1.3	0.5	0.2
Non-Agricultural Land	6.5	9.0	9.6	10.0
Culturable waste Land	2.0	0.7	0.2	0.07
Fallow Land	4.9	1.8	1.1	0.07
Net Sown Area	75.7	82.6	82.9	83.1

Source; Economic and Statistical Organization of Punjab, Chandigarh.

Figure: 3



Source; Economic and Statistical Organization of Punjab, Chandigarh.

B. Barren Land

Barren land cannot be cultivated with existing modern technology. It comprising hills , mountains, wetlands (marshes), soft wetlands (swamps), etc.area under Barren land has reduced from 8.3 per cent to 1.3 per cent and 0.5 per cent to 0.2 per cent of the total reporting area during 1965-66, 1985-86, 2005-06 and 2010-11 respectively. Development of irrigation facilities brings major part of barren

land under crop cultivation, development of agricultural infrastructure and reclamation of waste land etc. are the major factors responsible for the negative volume of change in barren land in Punjab.

C. Non- Agricultural Land

Non-agricultural land is that land which is not available for cultivation. These lands include area under roads, railways, canals, industries, human settlements, etc. Non-agricultural land has increased from 6.5 per cent to 9.0 per cent and 9.6 per cent to 10.0 per cent of the total reporting area during 1965-66, 1985-86, 2005-06 and 2010-11 respectively. Expansion of built-up areas like residential, commercial, industrial, urban centres, infrastructure development, etc. have led to increase in non-agricultural land.

D. Culturable Waste Land

Culturable waste land are those lands which are not cultivated from the last five years, owing to natural, social, economic and political reasons. It includes area under saline and alkaline soil, undulating and dissected lands, unchecked growth of natural vegetation, water logging area, etc. these lands have the potential of agriculture but are not cultivated owing to above mention factors. Culturable waste land also known as agricultural potential land. After reclaiming these lands can be cultivated and bring under crops. It has declined from 2.0 per cent to 0.7 per cent and 0.2 per cent of total reporting area during period under present investigation. High degree of development of irrigation, mechanization, developed agricultural infrastructure, extension of net sown area and area sown more than once, etc. are responsible for decline in culturable waste land in study area.

E. Fallow Land

Land which remains uncultivated upto 4 years is called fallow land. Regional variations in the proportion of fallow land are the result of such factors i.e. terrain, natural hazards, development of irrigation, social, political and economic conditions, agricultural mechanization, etc. fallow land has decreased from 4.9 per cent in 1965-66 to 1.8 per cent in 1985-86 and 1.1 per cent in 2005-06 to 0.07 per cent in 2010-11. This decline is the result of extension in irrigation facilities, reclamation of poorly drained lands, improvement in farming techniques, development of agricultural infrastructure, etc.

F. Net Sown Area

The land which is sown at least once in one agriculture year is termed as net sown area. The net sown area includes land actually under food, cash and fodder crops. Regional variations in the proportion of net sown area in cultivated area are associated with some factors that influence the geographic

patterns of cultivated area. Factors other than terrain, climate and soil. Such as agricultural modernization has significantly contributed to regional contrasts in the distribution of net sown area. Net sown area has increased from 75.7 per cent to 82.6 per cent and 82.9 per cent to 83.1 per cent during 1965-66, 1985-86, 2005-06 and 2010-11 respectively. High increase in extent of irrigation, agricultural modernization and reclamation of waste land, etc. are responsible for positive volume of change.

Conclusion

The study is concluded that the overall extension of irrigation facilities have led to the extension of net sown area and intensification of land use. Due to development of irrigation facilities some land like forest land, barren land, Culturable waste land, fallow land and current fallow land are lost area. Whereas net sown area gained area.

Reference

- Singh et al. (1997), "Changing Scenario of Punjab Agriculture: An Ecological Perspective", Indian Ecological Society and Centre for Research in Rural Industrial Development, Chandigarh, pp.2-3.
- Soundaram S.V. (1994), *Irrigation and its Development in Tamil Nadu* Geographical Review of India, Vol. 56, no.3, March, 60-64.
- Williamson, A.V. (1925), *Irrigation in Indo-Gangetic Plains*, Geographical Journal, Vol. 65, No. 2, pp.1-3.