

THREE-LEVEL OPTIMIZATION OF AN IRRIGATED
AGRICULTURAL GROWTH SYSTEM

by

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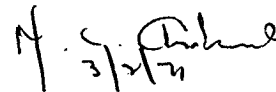
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CERTIFICATE

This is to certify that the thesis entitled 'THREE-LEVEL OPTIMIZATION OF AN IRRIGATED AGRICULTURAL GROWTH SYSTEM', which is being submitted by Mr. K.N. Duggal to the Indian Institute of Technology, Delhi, for the award of the degree of DOCTOR OF PHILOSOPHY, is a bonafide piece of research work carried out by him under our guidance and supervision. The quality of his thesis fulfills all requirements of the regulations relating to the said degree.

The results contained in this thesis have not been submitted in part or full to any other university or Institution for the award of any degree or diploma.



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ABSTRACT

The planning policies for the development of irrigated agriculture of a region should interlink the decisions of the regional project investments with the farmers' response to the investments, for a meaningful technologic and socio-economic achievement of objectives. However, when the region itself forms a part of a large region i.e. the country having a high measure of agricultural sectoral activity, the planning policies must also take into account the regional-national interactions. That means the planning policies need to be decided at three levels of activity which are termed as National, Regional and Farm Levels.

In the present study reported herein, issues affecting planning policies are analysed at the three levels for determining optimal cropping activities in the context of the development of water resources distributed spatially and temporally. Conceptual models termed as the National, Regional and Farm Models are evolved and run iteratively so as to interlink the activity outputs at the three levels. In this way, the decisions on cropping activities at the Regional level are made to satisfy those at the Farm Level and also brought in agreement with the planning objectives at the National Level.

Preference at the regional level is to the State of Punjab. It is found that for the Fifth Plan period i.e. 1974-79, the targets set for the State of crops production can be profitably achieved provided optimal cropping patterns are evolved which satisfy the available resources of budget, water from both the State as well as privately-owned sources, land and other agricultural inputs. The optimal cropping patterns are such that they also help farmers and farm labourers gain higher and equitable incomes.

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