ABSTRACT

IMPACT OF RECLAMATION OF SALINE ANDALKALI LANDS ON THE
RURAL DEVELOPMENT OF ALIGARH DISTRICT
In a country like India, where about 77 percent of the population is engaged in agriculture, where there is tremendous pressure on land, and which is bedeviled by poverty, illiteracy, unemployment, socio-economic inequalities, all the planning should be directed towards making best use of land. Comprehensive analysis of the nature of the soil necessarily precedes better utilization of land. Assessment of soil conditions is not only relevant in agriculture but is also very relevant to the planning of other land uses such as the development of forests, pasture lands, recreation grounds, extension of settlement sites, communication lines, establishment of factories, schools etc. Large tracts of lands have become unsuitable for cultivation due to floods, erosion and other natural calamities like saline and alkali lands and waterlogged lands. These lands could be reclaimed and utilized in various ways if a detailed knowledge about the conditions in these areas are available before hand. This calls for a micro-level study of the areas which have remained unproductive and unattended. Wherever attempts have been made to reclaim problematic soils, critical examination must be made of the methods adopted for the development of the area, input-output balance sheet of the expenditure involved and etc. With this aim in view, 'Impact of Reclamation of Saline and Alkali Lands on the Rural Development of Aligarh District,' was undertaken.
Aligarh, one of the important districts of Uttar Pradesh, lies in the central part of the Ganga-Yamuna doab. It spreads from 27°29' to 28°11'N latitudes and 77°29' to 78°38'E longitudes. The district has been divided into seventeen blocks spread over 1,769 villages. The total area of the district is 502,580 hectares, out of which 77.66 percent is net cultivated, while the total cultivated area is 127.9 per cent. The total area under usar (saline-alkali and alkali lands in common parlour) and unculturable lands is 33,810 hectares which is 6.73 percent of the total area.

The salient features of the present study are -

i) to survey, delineate and map the intensity of saline and alkali lands in the 1,769 villages of Aligarh district;

ii) to assess the soil conditions and evaluate the causes which led to the formation of such soils;

iii) to critically examine the different reclamation measures adopted in the various villages and to suggest suitable measures for reclamation based on the conditions in different areas;

iv) to prepare a balance-sheet of expenditure involved and the likely additions to food production and to make future projections for the whole district and
v) to evaluate the impact of reclamation on socio-economic development of the rural masses living near the saline and alkali lands.

The work has been divided into three parts spread over six chapters.

Part one comprises of general introduction to the subject plus the chapter I which deals with nomenclature, classification, origin, formation, geographical distribution and general management and reclamation techniques of saline and alkali soils of India as well as in the world.

Part two includes chapters II and III. Chapter II makes an attempt to analyse the physical features, drainage and climate of the district and how these factors have helped in the formation of saline and alkali soils in Aligarh district. Chapter III is devoted to the examination of soils of the district. Here an assessment has been made of the various types of soils, their potentiality and fertility status.

Part three presents the crux of the problem investigated. This section comprises of chapters IV, V and VI. Chapter IV presents the results of survey of the saline and alkali lands in Aligarh district. The incidence and intensity of saline and alkali soils in every village, causes of their formation, physico-chemical analysis and profile studies of these soils were carried out and the pattern that evolved on block-wise
level was presented. Chapter V deals with the on going reclamation schemes in the district and gives an account of the actual cost incurred and profits accruing from reclaimed lands in various villages. It also elucidates general reclamation techniques that can be applicable in the district and estimates of the input-output balance of the expenditure involved. In Chapter VI, an attempt has been made to assess the impact of reclamation on rural development in Aligarh district on the basis of actual reclamation work going on in some of the villages. Based on the results obtained in selected villages future projections have been attempted for the entire district.

For surveying, mapping and delineating the saline and alkali lands of the study area, cadastral maps of all the 1,769 villages of Aligarh district were collected from the six tehsil headquarters at Koil, Atrauli, Sikandra Rao, Hathras, Iglas and Khair. Verification of the data and further information was collected from Khasra Bandobast (land records), Sankhiki Patrika (Statistical Bulletin) of the district, field inspections and personal conversations with the village Patwaris (village accountants). On the basis of these data, a map was prepared to show the incidence and intensity of saline and alkali lands in Aligarh district with the help of quartile technique (Fig. 4.1). Various soil profiles and physico-chemical characteristics like pH, ECe, ESP, Calcareousness were determined with the help of Regional Soil Testing Laboratory, Aligarh. At
selected places, the depth of water table was also determined with the help of personnels from Ground Water Investigation Organisation, Aligarh.

Result of soil analysis, field surveys, prolonged discussion with the personnels engaged in various projects, past reclamation experiences and the results of the on going works have helped the author to suggest suitable technology which could be adopted in various areas of the district.

On the basis of actual results obtained from the various projects working in the district, a balance sheet of expenditure and income was prepared and future projections for the whole district were extrapolated. Projections were made in terms of additional food production, additional employment, demand for improved seeds, fertilizers, bullocks, tractors, tube-wells and the additional income. An important consideration in making these projections would be the future strategy of development pursued by the Government.

For assessing the impact of land reclamation on rural development, it was difficult to study all the usar infested villages, so the writer chose six villages where reclamation is actually in progress and where the people are getting the fruits of reclamation. The methods chosen for this study were based on personal interrogation and interviews with the rural masses and the personnels engaged in various projects. The
questions put before the rural masses were descriptive and simple regarding their views, their reactions, their sense of involvement, their degree of confidence, their dream of future benefits, their difficulties or hinderance, the amount of help both technical and financial from the Government and so on.

Out of 1,769 villages in Aligarh district, 688 villages are suffering from the problem of salinity and alkalinity. In the blocks of Akrabad, Hasayan, Sikandra Rao, Jawan, Dhanipur, Lodha and Chandaus the problem is acute. When one travels across these blocks, one observes, the grim sight of white, white-greyish and greyish fields stretching on either side of the road. Deposits of saline and alkali soils are commonly seen in these blocks during the summer months, while during rainy season waterlogged fields are a common sight. These soils are mainly found in belts or patches or at times in considerable expanse which vary from less than one hectare to more than 100 hectares in size.

Soil samples were collected from 44 

usar patches lying in the blocks of Akrabad, Sikandra Rao, Hasayan, Jawan, Chanduas, Tappal, Dhanipur, Lodha, Khair and Sasni. The results of soil analysis point to wards the fact that the soils are alkaline in nature. These soils have a high pH, more than 8.5 and in some cases more than 10.0. The ESe is less than 4 going to as low as 0.891 mmhos per centimeter at 25°C. The ESP is more than 16 and at times it goes to as high as 77. A number of
profiles from the usar patches lying in the villages of Ladhua, Sinchauli, Thathpur, Chandaukha, Kasairu, Gursikaran, Deosani, Gomej, Taud and Hamidpur were examined. Generally, the profile is sandy loam to loam at the surface and is underlaid by silty-clayey loam to clayey loam with whitish grey to dark grey colour. The surface soils are dry while the lower layers are moist. Usually, kankar of various sizes is found in the sub-soils, occurring at depths ranging between 0.5 to 1.8 meters. The water table generally occurs at a depth of 3 to 5 meters.

Since these soils occur in various stages of deterioration and present a highly variable pattern from a few scattered patches to large extensive blocks, reclamation requires handling the problems at various levels. In Aligarh district, it was observed that the large blocks requiring capital and technical skill were tackled by Governmental or Semi-Governmental agencies. The projects actively engaged in reclaiming and developing these lands for the purpose of cultivation, pasture and afforestation are - Action for Food Production, Usar Land Reclamation and utilization under National Botanical Research Institute, Usar Land Reclamation Under Ramganga Command Area Development Programme and Bhumi Sudhar Nigam. Bigger units were the responsibility of Gram Samaj while the small patches and mild types of saline and alkali soils, which can be treated by simple and cheap methods, were reclaimed by the cultivators.
On the basis of various experiments conducted at Aligarh, the cost of reclamation was calculated. In Aligarh district, the per hectare cost of reclaiming saline soils, saline alkali soils and alkali soils comes to Rs.1,489.50, Rs.4,930.50 and Rs.7,244.00, respectively. These are huge amounts beyond the reach of an average Indian farmer. Thus to encourage reclamation programmes, the Government is giving subsidy on gypsum of 75 percent to marginal and small farmers and 50 percent to large farmers. The actual cost of reclamation of alkali soils, during the first year, incurred by the Action for food Production Project working at Gursikaran Village was Rs.4,290 per hectare as capital requirement and the cost of paddy and wheat cultivation during first year was Rs.7,452 per hectare. Trees and grasses are also planted on these problematic lands. The total cost for growing trees on alkali lands is about Rs.22,000 per hectare while the per hectare cost of grass cultivation on these lands is about Rs.3,000. However, experiments proved that paddy and wheat cultivation is more economical and suitable than tree plantation and grass cultivation. Therefore, these lands are generally reclaimed for the production of food grains. On the basis of actual results obtained in Aligarh district from paddy and wheat production, an input-output balance sheet was prepared for per hectare of reclamation, the average cost of reclamation and the additional food grain production. It was observed that during the three years of reclamation (1983-86) in
Gursikaran village, there was a net return of Rs 5,005 per hectare by the cultivation of paddy and wheat.

It is quite difficult to estimate which grains and in what quantity will be grown if all the unusable and unculturable lands of the district are brought under cultivation. But seeing the prevalent practice of cultivation of paddy and wheat in the fields during reclamation, a rough estimate of 3.5 tonnes per hectare of paddy and 2.0 tonnes per hectare of wheat was made. The total cost for reclaiming 33,810 hectares of unusable and unculturable lands of Aligarh district, at an average rate of Rs. 11,000 per hectare, comes to Rs. 371,910,000 during the first year of reclamation. Capital requirement for land reclamation will be required only in the first year and from the second year only Rs. 7,452 per hectare will be needed. Therefore, from the second year the total cost of reclamation, at an average rate of Rs. 7,500 per hectare, will be about Rs. 253,575,000 per annum. The estimated additional production of paddy and wheat will be about 118,335 and 67,620 tonnes valued at Rs. 279,946,800 per annum. These are average estimates and figures will be more favourable in later years.

To assess the impact of land reclamation on rural development six villages - Gursikaran, Mahuakhera, Chherat, Keeratpur, Gopi and Ladhua, were selected by the writer.
Results obtained in these villages show that there was increase in cultivated area, production, employment opportunities, factor demand and gross and net income. Additional employment is generated from these newly reclaimed lands. It is estimated that the annual human Labour requirement will be about 150 days per hectare. On this basis, it has been worked out that if all the \textit{usar} and unculturable lands of the district are reclaimed, there will be an additional opportunity of about 5,071,500 human labour days per annum. There will be additional annual gross income of Rs.279,946,800 and additional annual net income of Rs.42,262,500. The additional annual demand for improved seeds of wheat and paddy, at an average rate of about 0.10 tonnes per hectare of wheat and 0.04 tonnes per hectare of paddy, will be about 3,381 tonnes and 1,352.4 tonnes. The need of fertilizers for wheat and paddy production on these lands will be, at an average rate of about 2.4 quintals per hectare, about 81,144 quintals per annum. In addition to these benefits, there will be increased demand of bullocks, tractors, tube-wells, plant protection measures, threshers, spade, sickles, \textit{kudali} etc. These demands will create new avenues for workshop and stores in rural areas. Opening of such depots will create new employment opportunities to rural skilled labour.

This seems to be a very rosy picture and a word of caution may not be out of place. It may not be possible to reclaim every bit of such lands but the results unmistakeably
prove that it will go a long way in relieving us of the problem of food shortage, fuel shortage, pasture lands, rural unemployment, skewed land holdings, landless labourers, poor wage structure and low standard of living in rural areas. Thus, the land reclamation seems to be a dire necessity for our country which will immensely help in improving the socio-economic conditions of rural life.