Problems and Prospects of Agricultural Production in Mokama Group of Tals in Bihar

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ABSTRACT

Mokama group of Tals in Bihar suffers due to stagnation of water during monsoon period and delay in drainage thereafter. This is a monocropped area with very low productivity. Though the fertility status of soil is good, yet the quantity and quality of produce is poor. In this paper, authors have presented general features of the Tal lands, existing cropping pattern and sowing time, soil characteristics, and major problems in Mokama Tal area. Appropriate management strategies have been chalked out and suggested to improve the agricultural production in the area.

INTRODUCTION

Tal area is termed as the stretch of land having bowl shaped depressions inundated in Kharif season due to spill / overflow from rivers or run-off from upstream end. Mokama group of Tal lands lies mainly in Patna, Nalanda and Lakhisarai districts of Bihar in south of the river Ganga. It extends in a length of about 104.60 km and width varying in the range of 6.5 to 17.6 km from Fatuha in the west to the vicinity of Lakhisarai in the east and consists of seven Tals covering an area of 1062 sq km. Out of seven Tals namely Fatuha, Bakhtiarpur, Barh, Pandarak-More, Mokama, Singhul-Sarmera and Barahiya, the minimum area is in Fatuha Tal and maximum is in Pandarak-More Tal. (Report of Mokama Tal Technical-cum-Development Committee, 1988).

GENERAL FEATURES OF MOKAMA GROUP OF TALS

Mokama group of Tal lies mainly in the Kiul-Harohar river basin. The Kiul-Harohar river system drains an area of 17,225 sq km in Bihar. The average annual rainfall in the basin is 1104 mm and 90% of this rainfall occurs during monsoon months from June to October. The Kiul and Harohar rivers flow almost on the ridges in their lower reaches. The bankful capacity of these rivers as well as that of its tributaries like the Sakari, the Falgu, the Mohane and the Paimar are inadequate due to which they are unable to

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contain the flood discharges and consequently spilling takes place over their banks causing floods in the basin. The Punpun River is also instrumental for water stagnation in low lying areas due to back water flow/over flow from the river. It drains a total catchment area of 9,026 sq km, which covers the districts of Patna, Jahanabad, Gaya, Aurangabad, Hazaribag and Palamu. Average annual rainfa l varies from 954 mm near its confluence with the river Ganga to 1817 mm in uppermost reaches. Due to low bank and inadequate channel capacity, all the channels in the lower reaches spill heavily over their banks even during normal floods. The spilling of floodwater on left bank of the Punpun has however been checked to a great extent after construction of its left bank embankment under Patna town protection scheme Sinha (992). Some portion of the flood water on the right bank of the Punpun flows to the Dhowa river system and aggravate the flood situation in Mokama Tal area. When water level in the river Ganga rises and the back water flow enters into the Punpun, the Dardha and the Dhowa river systems, it results in inundation of a large area besides adversely affecting Mokama Tal area.

In the recent past, the maximum depth of submergence was recorded in the year 1987, which varied from 3.86 m in Fathua Tal to 5.76 m in More and Mokama Tals. Fatuha Tal, Bakhtiarpur Tal, Barh Tal and More Tal have the submergence frequency between 50% and 75% in 5 to 8 years (out of 18 years). While the frequency of same submergence seemed to be very high for Mokama Tal, Barahiya Tal and Singhul Tal (11, 16 and 15 years, respectively) Lohani *et al.* (1997). Delayed draining of Tals adversely affects the prospects of Rabi crops. Analysis reveals that frequency of years in which Mokama Tal was free from submergence by mid October is the least (11 out of 18 years).

CROPPING PATTERN AND SOWING PERIOD IN TAL AREAS

In Tal area generally single crop is taken during Rabi season so it is known as *mono cropped* area. In this area pulse crops like Gram, Lentil, Lathyrus and Pea are popular Rabi crops. Linseed, Rai and Toria are grown as mixed crop with main pulse crop. Wheat is also grown as mixed crop with Gram. Now-a-days in some area, where farmers have facility of irrigation through shallow tube wells, they are growing onion crop in their fields during summer season. Earlier farmers used to take summer rice during summer months, but due to early break of monsoon, most of the times whole of the crop was washed away from the fields, so this practice was abandoned.

Due to distinct topographical features and existing drainage system, drainage from different Tal areas occurs at different times. While conducting the survey at different locations in the Tal area, it was realized that due to clogg ng of existing drainage way and defunct sluice gate, water recedes by first week of January in Pandarak-More Tal and the farmers of the area usually sow their Rabi crops around 15th January. In Mokama Tal, the fields get free from flood water by the end of October and the farmers comfortably sow the Rabi crops during the appropriate time i.e. first fortnight of November. In Barahiya Tal, usually the sowing of Rabi crops gets slightl y delayed i.e. in the last week of November or first week of December due to delayed drainage. As a consequence of delay in the sowing of the Rabi crops, less time is availab e for growth and maturity of the crops, resulting in poor production and inferior qualit y of the produce.

The Rabi crops mostly suffer from the infestation of various insects and diseases. Usually, insects such as *Kajra Pillu* and Pod Borer heavily damage the gram crops at the time of germination and flowering, and at the time of pod formation, respectively. Under present condition of flooding on the fields, farmers are unable to sow the crops at appropriate time resulting in loss in yield and quality of the produce. However, it was observed that the attack of insects could be minimized if the crop is sown at proper time.

SOIL CHARACTERISTICS

Soils of this area are grey to dark grey in colour, medium to heavy in texture, and neutral to slightly alkaline in reaction. Soils have high bulk density, poor infiltration rate, and very sticky and plastic character. During summer, the cracks of 2 to 3 cm wide and more than 100 cm deep, are seen in the soil. Clay content varies from 50% to 70 % throughout the profile. The soils become bone dry a few days after ploughing. Generally the soils are of good fertility status and are rated as neutral, poor to medium in organic carbon and available phosphorus, and medium to high in available potassium. About 40% soils are deficient in available Zinc, 35 per cent in Boron and 4 per cent in Fe. Mn is found in sufficient amount to meet the need of the crop.

PROBLEMS OF TAL LANDS

After interaction and discussion with the farmers of the Tal areas following problems were realized.

- Clogging of existing drainage ways (locally called as pian) due to deposition of silt transported with river water spillage, collapse of side slopes of drainage way, etc.
- Choking of the natural drainage ways (nailas) due to inadequate capacity or non-existence of culverts below roads.
- Most of the existing sluice gates are non-functional and broken. At many locations, sluice gates do not exist where these are badly required.
- Due to delayed drainage, the sowing of Rabi crops is delayed, on account of which less time is available for growth and maturity of the crops, resulting in poor production and inferior quality of the produce.
- Attack of pod borer and other insects like Kajra Pillu is very common.
- Grazing of crop by cattle without control.
- Lack of network of Government or private tube wells for irrigation during Rabi and summer season.
- Non-availability of diesel, and good quality inputs like seeds, agricultural implements, insecticides, pesticides and fertilizers at appropriate time.
- Low infiltration and hydraulic conductivity, and occurrence of hardpan in the subsurface layer.
- Bone-dry hardness of soil appears just after ploughing and leads to less soil seed contact after sowing resulting in poor germination and consequently low productivity.

- Lack of shelter places, Kacha/Pacca storage arrangements on the farm.
- Lack of road, infrastructure, communication, and marketing facility.
- Lack of schools and Government Hospitals.
- Lack of drinking water facility.
- Non-availability or frequent failure of electric power supply.
- Law and order problem by antisocial elements.
- Less availability of agricultural labours in the area.
- Lack of knowledge among farmers about new farming practices, techniques, and strategies for management of natural resources.

APPROPRIATE MANAGEMENT STRATEGIES FOR TAL LANDS

For successful implementation of any policy or programme, there is a need of political will, positive thinking, dedicated efforts by all concerned, sharing of responsibilities by all stakeholders, periodic review and monitoring of the work by various departments in participatory mode, co-operation and coordination among farmers and concerned departments, development and maintenance of infrastructural facilities, and improvement in law and order situation. Improvement in agricultural production may be expected if a system approach involving management of all resources is adopted. Some of the management strategies related to soil, water, crop, and human resources, which need immediate attention of planners and policy makers, are listed below:

SOIL MANAGEMENT

- Soils of Tal area have cracks, so to utilize the available moisture content in the soil, sowing should be done within two days after ploughing.
- Soils need to be tested to know the status of nutrients. Since excess dose of any fertilizer and micronutrients is uneconomical, so balance dose of fertilizer should be applied on the basis of assessment of nutrient status.
- Incorporation of plant residues and organic wastes in the soil along with tillage practices improves physical condition of soil. Green manuring through *Sesbania sp.* may be effective.
- Experiments reveal that deep tillage upto 45 cm depth along with application of 100 q/ha rice husk during first week of June before the occurrence of flood lowers the bulk density and increases the rooting depth as well as grain and straw yield of wheat.

WATER MANAGEMENT

- Creation of water storage and recharging structures in the upstream reach.
- Removal of obstruction and periodic repair and maintenance of existing drainage ways by farmers themselves. (Kishore, 1992)

- Construction of new sluice gates wherever required and repair and maintenance of existing sluice gates to make them functional.
- Deepening / widening of drains and construction of new missing link drains.
- Introduction of horticultural crops like Mango, Litchi, Guava, Ber, and plantation of Bamboo, coconut, Palm and Neem in upstream side to check runoff as well as soil erosion.
- Construction of shallow tube wells to utilize good quality ground waters during Rabi and Summer seasons.
- Applying light irrigations through sprinkler or micro-irrigation systems so that seepage loss through large cracks reduces and flow in forward direction increases.
- Construction of ponds, reservoirs in the deep Tal lands which can be utilized for growing fish and to provide supplemental irrigation in the nearby area during dry spells in Rabi and Summer seasons.

CROP MANAGEMENT

- Selection of appropriate cultivars of Lentil and Gram as per the recommendations of State Agricultural University and other institutions related to agriculture.
- Purchase of seed and other agricultural inputs from a reliable licensed shop.
- Seed treatment with fungicide like Thiram/Captan @ 2.5 gm/kg of seed followed by Chlorpyrifos 20EC @ 8 ml/kg seed, protects the crop from pest infestation.
- Rhizobium culture after 24 hours of seed treatment helps in making atmospheric Nitrogen available to plants, resulting in 15 to 20 % increase in yield.
- Sowing of recommended seed rate of Lentil or Gram between mid October to mid November give good yield and sowing thereafter results in deterioration of quality and quantity.For weed control a spray of Pendimethaline 30 EC @ 5 lit per hectare is effective and economical.
- Introduction of additional crop in summer months like Moong, which is of shorter duration, needs minimum water and gives good returns. In irrigated areas onion is remunerative and less susceptible for grazing, Sunflower, sesamum, maize, and short duration paddy may also be tried during summer months.

HUMAN RESOURCE DEVELOPMENT AND MANAGEMENT

- KVKs and other extension agencies need to be geared up for dissemination of suitable soil, water and crop management practices, farm machineries and post harvest technologies, through front line demonstrations, farmers' fair training camps and other communication means.
- Extension agencies should help farmers to strengthen farmers association and committees. Few young persons need to be trained about crop and animal husbandry so that they can be self reliant and help the farmers of their villages in making available the quality inputs from reliable licensed shops in time.

- Farmers need to be educated about the loss in yield due to delayed drainage. They should be motivated to clean and maintain the existing drainage ditches in a participatory mode.
- Farmers should be informed about the Financing institutions providing credit or loan for purchase of agricultural inputs or development of irrigation facilities.

CONCLUDING REMARKS

Tal lands have tremendous potential for improvement in agricultural production because of good fertility status of the soil but due to lack of proper management of available resources yield potential has not been realized so far. The main problem of Tal lands is delayed drainage due to which farmers are not able to perform farming activities in time, resulting in poor agricultural production. Appropriate planning and implementation of management strategies by the Government departments and voluntary organizations with farmers association in participatory mode can improve the agricultural production many folds in this Tal area.

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