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Emerging Critical Situations and Threats in India's Agricultural Economy

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For kind attention of:

The Hon'ble Prime Minister's Office,
the Ministry of Agriculture and Farmers' Welfare,
and all others interested

Collective Livestock Fodder Marketing in Aroli Village of Nagpur District

Key highlights

- India is endowed with a significant proportion of the world's livestock population and ranks first in terms of cattle and buffalo population. However, the milk productivity of these animals is very low due to probable malnutrition.
- Shortage of quality fodder and feed are major constraints in improving livestock productivity. India hosts about 13 percent of world's livestock population (as of 2017) on 2.4 percent of geographical area (Government of India, 2020). With only 4.2 percent of the world's water resources, the natural resources of India are under considerable strain.
- Arable land is mainly used for food and cash crop cultivation leaving lesser proportion for fodder production. Land allocation for cultivation of free fodder crops is limited and has hardly ever exceeded five percent of the gross cropped area resulting in a severe deficiency of green and dry fodder (Kalamkar and Sharma, 2020).
- Feed accounts for 65-70 percent of total cost of milk production and maintenance of animals' nutritional component. Its deficit results in exorbitant rise in prices of concentrates and crop residues which puts the livelihood of landless, marginal and small dairy farmers at stake.
- The livestock feed requirement in our country is almost entirely met from crop residues and by-products like grasses, weeds, tree leaves, and from grazing on common lands and harvested fields. Community fodder farms were functional in Kheda district of Gujarat (Shah, 1989; Kalamkar et al., 2020) but collective fodder marketing pattern is not reported so far.
- NITI Ayog in its 'Three Year Action Agenda 2017-2020' emphasized on shifting to high value commodities and highlighted that an important challenge in development of animal husbandry is concerned with fodder availability.
- Maharashtra is the seventh largest producer of milk in the country, accounting for 6.21 percent share in 2018-19. However, per capita milk availability was the lowest in the state (266 grams/day) as compared to all India average of 396 grams per day[1]. Dairying is relegated to western parts of the state which has resulted in shortages of both green and dry fodder availability.
- Government supports dairying by organizing free fodder camps every year in rainfall deficit areas. It also arranges the procurement of sugarcane crops from cane growers, its transportation and ultimate distribution to the livestock owners at subsidized rates. It is often forced to ban the sale of fodder outside the district where it is produced and prohibits cattle herders from the neighboring states.
- Department of Animal Husbandry, Government of Maharashtra estimated the requirement and availability of feed and fodder by taking account of the livestock population as per Census 2011 and observed a deficit of 59 percent of green fodder and 31 percent of dry fodder.

Observations

- In order to increase availability of fodder and boost income through crop diversification, Dr. Ulhas Chandrabhan Nimkar, a veterinary doctor and retired senior manager of an insurance company, successfully implemented the collective marketing model for livestock fodder in his native village-Aroli in Mauda taluka of Nagpur district.
- The cropping pattern in Aroli village had changed from the crops like Banana, Ginger, Potato to Chilli and Paddy crops. Dr. Nimkar convinced the farmers to grow fodder crops (see figure 1), thus achieving two goals, i.e., shifting the age-old cropping pattern and increasing the farmers' income.

1 www.nddb.coop

Figure 1: Hybrid Napier Fodder Crop in an Aroli Village Field

Source: Field Visit

- During his visit to 'Fodder Cafeteria' developed under 'Vidarbha and Marathawada Dairy Development Project' by Dr. Satish Raju and Dr. Pathak and teams in Nanpur village of Wardha district, Dr. Nimkar learnt about hybrid perennial Napier fodder crop cultivation. He conducted series of meetings with farmers alongside Dr. Raju, Dr. Pathak, Dr. Shinde, Dr. Mankar, experts from Animal Husbandry departments, fodder research and Mr. Nitin Deshmukh from Mother Dairy where 45 farmers agreed to form a group for its cultivation and collective marketing in and around Nagpur.

- Aroli farmers had purchased soil testing lab equipment using government subsidy for the ones who intended to join this fodder cultivation program. During the first year, 55 acres land of these 45 farmers was brought under perennial hybrid Napier fodder crop (DHN-10 variety) bringing crop diversification in the village. After a three-year period, 250-acre land was brought under cultivation and about seven crores worth of turnover was estimated during that period.

- Animal Husbandry Department, Government of Maharashtra gave financial assistance to this group post success by reimbursing plantation cost, providing chaff cutter machines and silage bags. Dr. Vani, Dr. Manjusha Pundlik, Deputy Commissioners, Dr. Mangesh Kale and Dr. Hirudkar played a pivotal role in helping the farmers.

- Dr. Nimkar created three group of farmers to manage production and marketing activities. First group is given responsibility of land selection: size of land holdings, selection of stem cuttings/ rooted slips and related issues. Second group handles schedule preparation and hybrid Napier grass cutting, and supply, while the third group looks at the marketing and related aspects of chaffed Napier grass and supplies at pre-agreed rates.

- The pre-agreed selling rate was fixed at Rs. 3.50 per kg for chaffed fodder (see figure 2). Fodder is supplied in 20 kg bags duly chaffed on daily basis throughout the year at the destination point. Payments are received to Aroli group after two days to avoid increased unbearable amount if it is stagnated beyond two days towards dairy farmers. During the year 2018 and 2019, Vishwas group[2] successfully supplied planting material worth Rs. 75 & 80 lakh respectively to the Animal Husbandry Department throughout Vidarbha and Jalna district.

Figure 2: Chaffing and Packing of Hybrid Napier Fodder

Source: Field Visit

2 Three groups for farmers were formed under 'Vishwas Group' to manage production, cutting and marketing of fodder. Besides, a fourth group was formed to look into production and marketing of milk.

Actions Suggested

- Shortage of quality green and dry fodder is major constraint for the growth of livestock sector. The Aroli model provides a good example of planned production and collective marketing of fodder crop which can be replicated in suitable places.
- The reduction in feed and fodder cost can improve the net income of dairy farmers. Community/collective farming of fodder crops must be assessed, encouraged, and effectively communicated to them.
- State government departments could disseminate Aroli's case study among farmers and provide necessary quality fodder seed material at subsidized rates to interested groups in time.
- Government could procure chaffed hybrid Napier fodder from such groups (like sugarcane crops during lean period) to further provide it to livestock owners in deficit areas. It would not only insure availability of quality fodder for milk production, but also help stabilize fodder cost, maintain sustainability in the dairy business and livelihood of rural households.
- As there is very little scope to increase area under fodder cultivation, it becomes necessary to increase the productivity of available forage resources per unit area, improve the efficiency of fodder utilization and minimize fodder wastages to thereby reduce the gap between its demand and supply.

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Bamboo Blooms – A Prospect for Tribes in Tamil Nadu

Key Highlights

- Tamil Nadu is one of the states known for its wide variety of rice. Bamboo rice is one such rare variety that grows only once in its lifetime and is presently being harvested in the Mudumalai Tiger Reserve of Tamil Nadu and neighboring Bandipur.
- Bamboo is a perennial grass/tree and belongs to 'Gramineae' (also called Poceae), the fifth largest flowering plant family. Several species like rice, wheat, oats, barley and maize also belong to this family and bamboos are classified under the sub-family 'bambusoideae'. Bamboo exhibit monocarpic flowering behavior, which means the bamboo dies after flowering.
- The Bamboo rice is indigenous rice that is harvested from the dying bamboo shoots in the forests. Bamboos usually have a life-cycle of around 40 to even 100 years, varying among its species. Normally, new bamboos grow from bamboo shoots at the roots. After the blossom,

the flowers produce seeds which are rare, indigenous and provide an exotic variety called the bamboo rice. Most bamboo plants flower only once in their life cycle at extremely long intervals such as 40 to 80 years.

- The unpredictable flowering and thorniness of the bamboo makes rice harvest a challenging task. To get perfect polished bamboo rice, the area around the base of each bamboo must be cleaned and the debris removed. The base is then smoothed with a clay or cow dung and let dry. Once dried, the bamboo rice is stored in the prepared surface and gathered for consumption.

Observations

- Tribal communities which are allowed to collect minor forest produce have been harvesting bamboo rice for consumption as it has a high nutritive value and contains medicinal properties.
- Bamboo flowering is believed to be the harbinger of famine. This is because the gregarious flowering of bamboo produces large quantities of seeds resulting in population explosion of rats that feed upon other food commodities, thus damaging stored produce leading to famine. Therefore, to prevent rats from ruining the rice, local villagers and forest residents are allowed to collect bamboo rice from the forests.
- Harvesting and collecting this rice also supplements as a major source of income to the tribal communities living in this region (see figure 1). Small tribal groups, mainly of women and children are actively engaged in the collection of bamboo seeds. These seeds collected by the villagers are sold to the forest department as well as used for domestic consumption.
- Excess seeds sold in the adjoining forest areas helped empower and improve the economy for tribal women. Edible bamboo shoots generate self-employment thus reducing the unemployment problem in the tribal region to a level.

Figure 1: Bamboo Rice Collection

Source: The Hindu, February 06, 2021

- Though it has many health benefits, blooming of bamboo happens only once every few decades and is not available or accessible easily. A tribal group that collects bamboo seeds on a regular basis informed that last year they sold unprocessed seeds for Rs. 500 per kilogram in the open market nearby and processed bamboo rice for Rs. 600-700 per kilogram. This year they expect bamboo rice to fetch a price of Rs. 800-1000 per kg in the open market. They are also planning to sell their harvested rice through Tribal Mart. Tribal Mart engages only tribal women as traders managed by women organizations of National Rural Livelihoods Mission (NRLM).
- It bears resemblance to paddy rice and wheat in taste but is comparatively richer in protein. Not only tribes but local people also consider it as a good substitute to rice.

Actions Suggested

- The forest department can purchase bamboo seeds from rice collectors by offering some incentives in price and can use these seeds to germinate bamboo trees in other areas of the state.
- The forest department could also facilitate the setting up of nurseries, where the seeds of these bamboos can be collected and grown before they can be replanted in the forests.

- Proper storage systems could be installed by the government to remove bamboo rice as soon as it is shed. It would help in managing rodents and their population explosion. This is essential to prevent famines in tribal belts.
- The forest department could limit the seed collection by local communities and instead propagate the seeds to allow for bamboo to grow again as they are an important source of food for wildlife too. It is vital for the bamboo seeds to propagate and grow, or their habitats may be taken over by invasive species.
- Bamboo trees could also be promoted as a border crop to act as an effective windbreaker in fruit orchards and other commercial gardens, along with the added advantage of making the nation carbon-neutral as it takes just five bamboo plants to absorb about 400 kg of carbon dioxide (CO_2) each in a year.
- Proper utilization of bamboo seeds as a potential non-timber forest produce can be a boon for ecological and economical sustenance.

Information Sources:

i. Various recent newspaper reports, published sources and media.
ii. Consultation with officials of Horticulture Department, Government of Tamil Nadu

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Enhancing Irrigation Facilities through Renovation of Outlets

Key Highlights

- Development of agriculture and allied sectors is significantly linked with food, nutritional security and other economic activities, particularly in states like Bihar. The overall pattern of land utilization largely remained unchanged in the state during the period 2015-16 to 2017-18.
- Cropping pattern in the state is largely determined by biophysical and climatic factors, irrigation, technological adoption, availability of farm labourers, and socio-economic capability of the farmers. More than 87 percent of the Gross Cropped Area (GCA) was under cereals production in 2018-19, compared to 86.15 percent in the year 2014-15, indicating only a little change.
- Under cereals, paddy and wheat are the main crops for which a timely, assured and adequate irrigation facility is required. Out of the total ultimate irrigation potential of 117.54 lakh hectare (ha), created and utilized potentials were 80.47 lakh ha (68.46%) and 65.04 lakh ha (55.33%) respectively till the year 2019-20 clearly indicating that emphasis needs to be laid on maximizing the utilized potential. The gap of about 19 percent needs to be bridged through existing outlets to fully irrigate GCA of 74.06 lakh ha.
- The factors causing farmer distress are: low utilized potential of created irrigation facility, erratic rainfalls, and consequently, no profitable agriculture, which ultimately results in large scale migration from the state and the region as well.
- In Bihar, water area constitutes about 3.6 percent of the total geographical area. Out of the Gross Irrigated Area (GIA), 63.1 percent is irrigated by tube wells alone, then by canals (29.6%), tanks (1.9%), other sources (3.5%) and other wells (0.7%).
- Bihar is endowed with three distinct 'Agro-Climatic Zones', viz., (i) North-West Alluvial Plain Zone consisting of 13 districts, (ii) North-East Alluvial Plain Zone covering eight districts, and (iii) South Bihar Alluvial Plain Zone which has 17 districts. Bhagalpur and Banka districts fall under

the (iii) zone with alluvial to sandy loam soil type, mean rainfall of 1,102 millimeters (mms) and major crops being: rice, wheat, maize, potato, gram, mango, guava, etc.

Observations

- As of 2019-20, out of the total GCA estimated at 3.04 lakh hectares, and Net Sown Area (NSA) of about 2.43 lakh hectares (for Bhagalpur and Banka Districts taken together), Gross Irrigated Area (GIA) is 2.19 lakh hectares i.e., 72.13 percent of the GCA of the two neighbouring districts. This gap can be bridged by utilizing the created potential.
- Thirty-two outlets installed on the eastern bund of river Chandan had not only been the main source of irrigation for Banka district, but also for about 200 mouzas situated in five gram panchayats under Jagdishpur block of Bhagalpur district. Approximately 60,000 acres (24292 ha)[3] land was being adequately irrigated by the year 2007-08 or so, but declined sharply due to non-functional irrigation structures.
- Even after state government dissuaded taking sand from river Chandan, unchecked and excess excavation of sand has been taking place for the last few years causing water retention capacity reduction. The river has become so deep that irrigation is now impossible and very expensive at some points. These have led to alarming decline in areas under the famous Geographical Indication (GI) tagged Bhagalpuri Katarni Paddy and Garma Paddy.
- Migration of marginal, small farmers and agricultural labourers from the areas of the two districts due to 32 non-functional outlets of river Chandan (see figure 1) has also been one of the negative effects of the area being mono-cropped.

3 One mouza comprises of about 300 acres (122 ha) land area

Figure 1: Non-Functional Outlet in Chandan river bed

Source: AERC Bihar & Jharkhand

- In Rajoun and Amarpur blocks of Banka district and Jagdishpur block of Bhagalpur district, rocky substances are found in the riverbed beyond the depth of 100 feet, not only making water extracting exercises difficult but also leaving the area viable for only single-crop production from more than a decade.

Actions Suggested

- To ensure farmers' prosperity and rejuvenation of Katarni Paddy belt of Bihar, most of the old, non-functional outlets on the eastern bund of river Chandan need to be made operational through channels by construction of check dams on different suitable points in the river.
- Promotion of end-to-end solutions by creating check dams and renovation of channels to farm gates will aid in the fulfilment of the agenda 'Har Khet Ko Pani' under Pradhan Mantri Krishi Sinchayee Yojana (PMKSY). This will be instrumental in achieving the government's goal of doubling farmers' income. It will also effectively check the migration of farm labour from the region.

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