Strategy for sustainable livestock farming and climate change: Departmental Vision cum Roadmap for Development of Animal Husbandry and Veterinary Sector in the State of Assam, India

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By

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Innovation for sustainable livestock farming and climate change.

A review of unique farming and traditional practices is important for sustainable livestock farming and to identify ways to enhance the resilience of animal husbandry sector within the state to climate change.

Unique farming system

Assam is known for the pockets of nomadic systems of rearing of large number of local cattle and semi wild swamp buffalos[1] popularly known as *Khutis* (Picture 1, Picture 2). They are found in islands, interior of the forests and riverine areas. Near organic milk and its products viz., ghee, curd etc. produced in these *khutis* are generally sold in nearby villages or towns. The unique farming system has in recent year suffered from problems which includes problem of existence (erosion, eviction from forest areas etc.) inbreeding, shortage of fodder, non-remunerative prices of milk etc.

Picture 1 Khuti in riverine areas of Silapathar, Dhemaji District of Assam

(Photo credit: Dr Ganakanta Doley)

[1] Swamp buffaloes are different then the riverine buffaloes common in known dairy belts of India

Picture 2 Swamp buffalo from a Khuti at Bhalakata, Bishwanath Ghat

(Photo credit: Dr Mahendra Bharali)

Observed relevant traditional knowledge and practices

Traditional Knowledge System (TKS) represents traditional knowledge related to ecology and ecosystems, natural resource management, technology, institution, ethos and ethics of the communities living closer to certain ecosystem, usually called as 'Eco-system People'. These eco-system people, who live closer to nature and ecosystem, interact with the ecological assets and their services from generation after generation. They through their observation and working experiences, build their cognitive understanding, which represent their repository of TKS.

In case of livestock farming, there are many such TKS practices in breed selection, breeding, fodder and feeding management, grazing, shelter or shed construction, healthcare based on ethno- medicinal practices, etc. Following are few of the important observed and documented practices in Assam. Many of these practices, if documented and promoted can help in enhancing the resilience of animal husbandry sector within the state to climate change.

Mesi Lakhor system

Picture 3 Mesi Lakhor in Bodohapur village, Balijana Development Block, Goalpara District

(Photo credit: Jayanta Kumar Sarma)

'Mesi Lakhor' is a community-based cattle grazing system of Rabha community (Picture 3). In this system one or two persons are given responsibility of keeping the cattle of all the households of the village. Generally, they happen to hail from landless families. They are paid in terms of rice by the households based on the number of cattle they have and its paid after harvesting of the paddy. Usually, there is a common place where cattle are kept in the afternoon period in summer where they are provided with water. Basically, it is a provision to protect the cattle from intensive heat during the midday time. The practice is adopted by the community to manage their domesticated cattle and protect their crop field from straying cattle. Mesi Lakhor works for around nine months in a year. It is a cattle management practice that also provides opportunity of livelihood for the landless people-based on the collective responsibility of the community.

Community managed system

There exists a traditional practice to protect standing transplanted paddy crop among the Dimasa community of Dima Hasao district of Assam, and to ascertain that they have specific land use practices. Most commonly, their homestead areas with housing spaces are clustered at one zone and their paddy fields are outside that zone. There is an enclosure with bamboo fencing surrounding the homestead area (Picture 4); in the wet paddy season the bamboo gate at main approach to homestead

area are closed, so that their domesticated cattle are unable to go out and that helps in controlling the damage of the standing crop. However, to feed the cattle in enclosures, they practise stall feeding during that period, which also helps in preventing many diseases of the animals which usually occur during the monsoon period. It is a common practice in village like Samparidisa of Dima Hasao.

Picture 4 Village gate in the homestead area to keep cattle inside during cropping season

(Photo credit: Jayanta Kumar Sarma, Place: Saparidisha, Dima Hasao district)

Shed construction and feed stock storage for domesticated animal

There are multi-storeyed cattle sheds in neighbouring villages of Pathsala, Barpeta (Picture 5). Here villagers keep their domesticated cattle in multi-storeyed cattle sheds, where one part of the ground floor is used for fodder storage and rest is used as collection space of dung. The first floor of the bamboo –steel multi-storeyed cattle shed is used for keeping the cattle. According to many villagers, these practices ultimately help them maintain clean cattle sheds and make it easy to collect the dung. The clean cattle shed helps in maintaining cattle health, particularly from diseases that occur in the summer and monsoon season.

Picture 5 Multi storied bamboo cattle shed in neighboring villages of Pathsala

(Photo credit: Jayanta Kumar Sarma)

Most of the indigenous community of the state provide paddy hay to domesticated cattle as feed/fodder. After the harvesting of the paddy, the farmers used to keep their paddy hay separately for future uses. The Tiwa community living in Kumoi area of Morigaon district, keeps their paddy hay above a bamboo platform, which help in reduce the loss of hay due to degradation in rainy season. (Picture 6)

Picture 6 Paddy hay storage system of Tiwa community, Kumoi, Morigoan district

(Photo credit: Jayanta Kumar Sarma)

Reference from existing action plans

Draft Assam State Action Plan for climate change.

The increase in environmental temperature due to climate change is likely to reduce milk production of crossbred cattle. The erratic rainfall patterns that are being reported Assam will create favorable conditions for new diseases of animals in future. Besides suggesting use of heat and disease resistant Indian indigenous breeds for artificial insemination and creation of gene bank, the draft Assam State Action Plan for climate change 2015-2020, have suggested following community model as adaptation strategy which can be proposed to be funded under National Gokul Mission.

"Establish scientifically designed community-based shelters in all blocks to accommodate at least 300 cattle and buffalo of small and marginal farmers- with plantations around for reducing temperature of the surrounding microclimate, and with water harvesting structures. These community centres should harness energy from dung to produce biogas and undertake fodder cultivation using hydroponic technique. ……..Excerpts of Draft Assam State Action Plan for climate change 2015-2020, Department of Environment, Government of Assam"

District plan prepared under National Initiative on Climate Resilient Agriculture

National Initiative on Climate Resilient Agriculture (NICRA) has prepared district plan for 26 districts of Assam. Each of these plans covers contingent strategies for livestock and poultry for situations like drought, flood, cyclone, heat / cold wave, snowfall, earthquake, landslide whichever is applicable to concerned district. These plans suggest measures related feed and fodder availability, availability of drinking water, health and disease management, shelter management for animals etc. Measures suggested in each of this district plans are grouped under before event, during the event and after the event measures.

Key learning from expert consultation:

The expert consultation on sustainable livestock farming and ways to enhance resilience of animal husbandry sector within the state to climate change included the following questions.

A. What community infrastructure can be supported?
B. What can we do to strengthen the institutions engages in sustainable livestock farming?
C. How can we facilitate private investment to promote sustainable livestock farming and / or traditional practices?
D. What input is needed to enhance sustenance of traditional practices?
E. What incentive will work for people to continue practices?
F. What can we do differently to support traditional practices while promoting commercial farming?

The followings are the synthesis of the consultations:

1. Include subject of traditional knowledge system as Continuous Veterinary Medical Education (CVME) program for field vets and para-vets.
2. The panchayat should be encouraged to set up garden of medicinal plants that are also useful for animals.
3. Efforts should be made to develop animal welfare and sustainable livestock farming related NGOs in every panchayat.
4. Veterinary department can work jointly with local community, tour operators and responsible tourism groups to ensure development of livestock sector linked agri-tourism camping sites (Refer Table 1 for some potential areas)
5. Livestock farming should be integrated with homestead agroforestry (Bari).
6. Vetiver grass can be used on the river bank areas as pasture land development.
7. The institutional recognition of traditional knowledge practitioners will incentivize the growth of sustainable livestock farming systems.
8. Certification of livestock products originating from traditional farming system can help create high value niche market for the products.
9. Loose animal housing system should be promoted for commercial dairy farms as same is environment friendly (e.g. Reduced methane production, low water requirement etc.)
10. Integrated farms e.g. duck cum fish should be promoted.

Potential areas in Assam for livestock linked agri-tourism
Organic coffee plantation area with piggery and poultry in Dima Hasau district;
Small tea garden area with cattle, poultry and piggery – Singpho, Taiphake and Tangsa Naga villages in Margherita Development block of Tinsukia district
Homestead agroforestry with Piggery and goatery neighborhood in Bodo villages of Manas National Park in the district of Baksa and Chirang;
Homestead Agro-forestry, Traditional Irrigation system (Dong), Piggery, Poultry, cattle – in the neighboring villages Subankhata Reserve Forest in Baksa district
. Homestead agroforestry, Bamboo groves, Jhum, Piggery and Cattle in the Kohora River Basin area of Karbi-Anglong near to Kaziranga National Park
River island (Chapori) of Brahmputra river with dairy farming (Khuti/Bathan) and birding in Jorhat and Majuli districts (particularly out of protected area);
Agro-forestry, Sacred groves, Jhum, Traditional Irrigation (Longsor) with piggery and poultry in West Karbi-Anglong district

Table 1 Potential area in Assam for livestock linked agri-tourism

10 Point strategy for promotion of sustainable livestock farming and climate change

> *Solution to the environmental challenges posed by livestock is to manage them better. When we realized cars and airplanes were bad for the environment, we didn't do away with them, we worked to find ways to make them more efficient. It's the same with livestock – we are looking for better efficiency. Well-managed livestock farming could reduce global warming while protecting farmers from the economic impact of animal losses as a result of climate shocks and stresses. Raising productivity in animals through better feeds, improved animal health and using the most suitable breeds offers the potential to double yields per animal and reduce their environmental footprint.*
>
> *Jimmy Smith, Director General, International Livestock Research Institute*

The following is the suggested strategy for sustainable livestock farming and climate change:

1. Protection and revival of traditional *khutis* through focused support e.g. seeds of vetiver grass, certification / branding of milk produced in khutis etc.
2. Documentation and promotion of traditional institutions of livestock management e.g. Mesi Lakhor system of Rabha community etc.
3. Scouting, documentation and promotion of traditional knowledge and practice related to breeding, feeding, shelter / shed construction etc.
4. Rejuvenation of grasslands and fodder production through agroforestry.
5. Reduction of greenhouse gas emissions from livestock through promotion practices like loose housing system for cattle, improved feeding technologies, better manure management (Bio-gas generator) etc.
6. Promotion of efficient water use in livestock farming.
7. Setting up of community farm unit as suggested under Assam State Action Plan for climate change 2015-2020. (Subject to feasibility study in case to case basis)
8. Promotion of district plans prepared by National Initiative on Climate Resilient Agriculture, Indian Council of Agricultural Research.
9. Promotion of areas with visible traditional practices and availability of value-added livestock products[2] as agri tourism destination.
10. Promotion of integrated livestock farming and integration between crop and livestock production.

[2] Milk cream and curd produced at Sorbhog, Barpeta district.

Relevant SDG goal and action plan

Relevant SDG Goal	Action points
Goal 6: Clean water and sanitation. *(Ensure availability and sustainable management of water and sanitation for all)* Goal 7: Affordable and clean energy Ensure access to affordable, reliable, sustainable and modern energy for all. Goal -11 Sustainable cities and communities *Make cities and human settlement inclusive, safe, resilient and sustainable.* Goal -12 Sustainable consumption and production. *Ensure sustainable consumption and production pattern.* Goal -13 Climate Action *Take urgent action to combat climate change and its impact.* Goal -15 Life on Land *Protect, restore and promote sustainable use of terrestrial ecosystem, sustainably manage forests, combat desertification and halt and reverse land degradation and halt biodiversity loss.*	Promote loose animal housing of large animals for reduced water requirement and methane production. Ensure proper livestock waste disposal. Promote setting up of bio gas plants. (Turning animal manure into clean and renewable energy). Ensure development and implementation of suitable regulation for livestock rearing in municipal areas to protect public health. Promote small holder production of quality milk and meat-based value-added products. Coordinate and ensure reference to district climate agricultural contingency plans developed by NICRA, ICAR. Promote implementation of climate change / disaster preparedness and mitigation measures. E.g. stocking of fodder prior to flood / construction of high-rise platforms, scientific feeding for reduce methane emission etc. Focus on fodder production through agroforestry. Promote fodder production as means to prevent soil erosion e.g. vetiver grass. Support rejuvenation and appropriate use of pasture land. Support conservation of local breeds.