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Fundamental Aspects and Principles in Promoting Sustainability of Dairy Development in India

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Dairy producers aim to ensure that the safety and quality of their raw milk will satisfy the highest expectations of the food industry and consumers. In addition, on-farm practices should ensure that milk is produced by healthy cattle under sustainable economic, social and environmental conditions. It is important to note that good management of a farming system constitutes the grassroots of the system's economic, environmental and social sustainability. Therefore, one should pay attention to planning and managing well the overall farm system itself. Farmers must and should consider applying the good principles and practices to the whole farm system within a philosophy of continuous improvement, starting with the livestock in scope.

Objectives for Sustainable Dairy Farming

1. Sustainable Farming Systems
2. Economic sustainability
3. Social Sustainability
4. Environmental sustainability

Sustainable Farming System

Site selection and management

When planning a new building for lodging or milking, or a new pasture or crop area for feed, the production site should be checked against any pollution risk1 and protected against those through adequate measures when necessary. An evaluation should be undertaken for new agricultural sites (e.g. pastures or new crop area for feed), taking into account the prior use of land, availability and quality of water resources, pest disease and weed levels and the potential impact of the production on adjacent populations, crops and the natural environment. In particular, the production site should avoid the destruction of forests.

Sustainability management system

Existing practices are examined critically by the producer in view of adapting or changing them in order to ensure continuous improvement towards sustainable production practices over time. Should have tools in place to monitor and improve the economic, social and environmental sustainability. Producers are expected to keep reliable documentation in order to track and trace the inputs and to record their progress in meeting the sustainable production practices e.g. nutrient budgets. Records belong to the producers and shall be disclosed only with their approval. Should choose competent sources for advice and interventions. Producers should go for self -training or self -information with existing tools. If indicated, advice should be sought by producers on how to access and make use of technologies and tools to improve overall dairy production sustainability.

Planting material

Resistance or tolerance to commercially important pests and diseases, adapted to local conditions and meet customers specified requirements. Growing of any genetically modified plants for consumption must comply with all the regulations in place for both countries of production and consumption, and checked if they are accepted by direct customers and consumers. Varieties are planted at the optimal time of the season. Invasive species should not be planted. Seed/Tubers/bulbs are true to type and the quality is checked before use and is traceable to source. Records are kept of the variety name, batch number and seed vendor

Integrated crop management

Rotation of crops shall be considered. Whether rotation is or is not possible farmers shall record on a regular basis suitable indicators of soil health these could be for example: stable or increasing yield, stable or reducing fertiliser/pesticide inputs, stable or increasing organic matter levels, stable soil nutrient levels. The planning of the crop shall take into account the

previous crops protection against pests and diseases. Farmers should use diverse crop rotations and seek to employ these whenever possible to maintain soil condition, minimise risk of nitrate leaching and reduce pest and disease development to maximise plant health as well as to spread the farm income streams. If soil conditions allow, chopping and incorporation of crop residues as well as organic manure or compost shall be used to help improve soil fertility by increasing organic matter content, improving nutrient and water retention and reducing erosion.

Animal breed

The selection of breeds takes into account market requirements, feed availability, resistance to diseases and environmental conditions. Have secure boundaries/fencing. Avoid direct contact of visitors with animals and take safety measures in precaution of spreading of diseases. Should have bio security measures in place to minimise the risk of spread of disease within the farm and between other farms (transport cattle only in cleaned and disinfected vehicles, dispose fallen stock properly and have a contingency plan for an infectious disease outbreak etc). Farmers should try to source animals of known disease status and control their introduction onto the farm. Special policy is recommended for introducing stock of unknown disease status. If possible, utilise disinfectant as a means of undertaking cleaning and disinfecting of boots/clothing, vehicles and facilities. Only use clean equipment from known source. Use a recognised system that allows all animals to be identified individually from birth to death. Develop an effective herd health management program focused on prevention that meets the farm's needs as well as regional and national requirements. Regularly check animals for signs of disease. Sick animals with contagious diseases should be attended to, quickly and in an appropriate way. They should be isolated when necessary. Keep written records of all treatments and identify treated animals appropriately. Manage animal diseases that can affect public health (Zoonoses).

Milking hygiene, milk storage and milk safety

Ensure that the milking area is kept clean. Ensure that the milkers follow hygiene rules. Ensure that the milk is cooled to the specified temperature and/or delivered to a processing plant in a specified time. Ensure that milking equipment is sanitized with potable water or water free of pathogens. Ensure that the milk storage area is clean and tidy. Ensure that milk storage equipment is adequate to hold milk at the specified temperature. Keep the access for bulk milk collection unobstructed.

Animal feeding and water

Ensure that the nutritional needs of the animals are met. Ensure that good quality water supplies are provided, regularly checked and maintained. Use different equipment for handling chemicals and feedstuffs. Ensure chemicals are used appropriately on pastures and forage crops. Only use approved chemicals for treatment of animal feeds or components of animal feeds and observe withholding periods for grazing. Separate feeds intended for different species. Feed storage areas must be constructed to protect as far as practical against entrance and harbouring of domestic animals, wildlife and vermin. Efforts must be made to protect feedstuffs from soiling and contamination. In particular, evidence of faecal contamination, or stale feed, at the point of presentation to dairy cattle is not acceptable.

Animal welfare & lodging

Design and construct buildings to be free of obstructions and hazards. Provide adequate space allowances and dry bedding. Protect the animals from adverse weather conditions and the consequences of thereof. Provide housed animals with adequate ventilation. Ensure that the floors are not slippery. Have an effective herd health management programme in place and inspect animals regularly. Protect the animals against lameness. Do not use procedures and practices that cause unnecessary pain. Follow appropriate calving and weaning practices. Have appropriate procedures for marketing calves. Should have herd management and husbandry procedures that do not unnecessarily compromise social activity

Economic sustainability

Safety, quality and transparency

Production and milking methods should be properly chosen and conducted so as to maximise product quality, safety and traceability. Milking and milk storage facilities shall be properly and regularly

maintained and cleaned. In addition, the delivery of milk to the client shall be done in a way that ensures product quality and traceability.

Financial stability

Dairy producers should make sure they have access to relevant information and tools in order to optimize their production system (e.g. productivity, quality, safety, inputs use, water use, waste, etc.) in line with the market environment.

Market

Dairy producers are encouraged to associate with relevant service oriented and transparent organisations, such as associations or cooperatives. Dairy producers are encouraged to access appropriate market information enabling sound decision taking for negotiating attractive prices and a fair share of the value in the food chain. As policies at the local and regional level have significant influence on farm income, dairy producers shall try to understand these policies.

Diversification

Diversification of the farm into either farming or non-farming activities could be sought if appropriate.

Social sustainability

It is recognized that the majority of the farms are family run and family labour helping on the farm is often an essential component for the sustainability of the farm.

Working conditions

Discrimination on the basis of ethnic groups, national origin, religion, disability, gender, sexual orientation, worker organisations or political affiliation with regard to contracts, compensation, training, promotion, dismissal or retirement of its personnel should be strictly prevented. Same rights and obligations should be conceded to women and men. Employees and workers should not be asked to leave deposits or identity cards behind. Employees and workers should have the right to freely practice their religion or fulfil their needs relating to race, national origin, religion, disability, gender, sexual orientation, membership in worker organisations or political affiliation. Behaviour, including gestures, language, and physical contact that is of a sexually abusive, coercive and threatening nature must be prevented. Decent working conditions and dignity should be provided to all workers regardless of their employment status. Daily working hours for registered employees should not exceed the maximum number of hours set by national regulations. Registered employees should be conceded for every six working days at least one day of rest, covered by their salary. Overtime work shall be demanded only in exceptional circumstances over a short-term period due to the business cycle, notably during the harvest season. Overtime should be compensated adequately. Registered employees who have worked at the farm for more than one year should have a period of paid leave

Environmental sustainability

Soil

Fertilization should be adequate, taking into account soil resources, crop nutrient requirements, climatic conditions and surface, groundwater and contamination risks. Use a nutrient budget to determine fertilizer requirements. Adequate stocking rate in pasture should be sought. Avoid standing animals in pastures when soils become water logged.

Water

The amount of water drawn from the environment should be minimized. The release of polluted water into the eco-system must be prevented. Proper use of water for irrigation as well as careful and adequate use of inputs should be made to preserve the volume and quality of water reserves and courses. Comply with industry standards and meet the requirements of national legislation regards to environmental effects (e.g. knowledge of quantity of manure or effluents, correct storage and spreading). Manage pastures to avoid effluent runoff by spreading farm manures in accordance to local conditions.

Biodiversity

Dairy farming practices should preserve and improve the habitat for animal and plant species as well as biodiversity on and around the farm.

Air

Odours emanating from the dairy herd and of the effluent storage should be minimized.

Climate change

On the basis of established mechanisms and available inputs, estimate and monitor greenhouse gas emissions (like methane, nitrous oxide, carbon dioxide) of the dairy herd and of manure storage as well as from other on-farm practices and off-farm inputs. Mitigate and minimise these greenhouse gas emissions

Energy

Continually seek to optimize energy use. Energy assessment should be performed in order to identify areas for minimizing the relative use of non-renewable resources and maximizing the relative use of renewable energies. Wherever possible, the farm should strive to reduce the use of non-renewable sources of energy and increase the use of renewable sources of energy.

Waste

Ensure that animal and human wastes are stored and managed to minimize the risk of environmental pollution. Manage farm wastes properly and optimise their agronomic value (recycling etc). Ensure proper treatment of human and animal waste from dairy farm in order not to contaminate pasture or feed.

Conclusion

Based on the detailed information on the sustainable dairy production all conditions are available in India to fulfill the necessary requirements. The realization of sustainable dairying will mainly depend on enhancement of the extension service for the dairy farmers and the financial support by the government. As the GDAA (2014) stated: *Sustainability is a journey not a destination*. In this sense, no doubt, India will be successful.

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