

Efficient Land Use and Integrated Livestock Development

- A Road Map



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Preamble

Livestock sector, an integral component of India's agricultural economy, has been growing at much faster rate (over 4 per cent) compared to other components of the agriculture sector. It has emerged as an important source of income to the farmers. Moreover, this sector contributes 31.6 per cent to the national agricultural gross domestic product (GDP) and the demand for animal food products is growing much faster.

It is also evident that the sustainability of livestock sector depends mainly on sufficient availability of feed and fodder resources at affordable cost. In dairy farming, nutrition constitutes about 60 per cent of the total expenditure. Thus, feed and forage of high nutritive value and better digestibility are critical for the viability of dairy sector. Their scarcity is a major constraint for accelerating growth of livestock production. India with about 2.3 per cent of the land area of the world supports about 10.71 per cent of the world's livestock population, which is expected to grow at the rate of around 1.24 per cent in the coming years. In 2019, India had 535.78 million animal heads. The number of cross-bred female cattle has increased (39%) from 33.76 million (2012) to 46.95 million (2019). Likewise, the number of indigenous female cattle rose (10% increase) from 89.22 million (2012)

to 98.17 million (2019). India is the world's largest and leading buffalo germplasm holder and its *Murrah* germplasm is under demand worldwide.

It is estimated that only 5 per cent farmers have access to livestock related new technologies and information. Pricing of milk is mostly based on its fat and SNF contents ignoring feed prices. Cooperatives cover around 17 million farmers and procure about 11 per cent of total milk output.

The large Indian land mass has among other things to generate nutritional support to a huge animal (536 million), poultry (740 million), human (1,352 million) populations besides an additional vast population of pet and stray canines, wild life and a vast populations of fauna. This raises a relevant, question as to how effective is our land use and how it will sustain such a large population in future.

The three main sources of forage supply are crop residues, cultivated fodders and forage from common property resources like forests, permanent pastures and grazing lands which are presently contributing 54, 28 and 18 per cent, respectively. Currently, India faces a challenge to feed its livestock population. The projected demand for dry fodder, green fodder and concentrate for 2020 is 468, 213 and 81 mt on dry matter basis, whereas the availability is estimated

to fall short by 11, 35 and 45 per cent, respectively. Hence, bridging the existing gap is a major challenge presently.

Hence, any attempt towards enhancing availability of feed resources and economizing the feed cost would result in enhanced livestock and dairy production and increased income to livestock farmers. Despite all these, India has achieved 'White Revolution' on account of rich animal diversity, institutional and infrastructural support and competent human resource, besides policy support for linking smallholder farmers to markets. Today, India is the world's largest milk producer with around 185 mt in 2018-19.

As per the current estimates, area under cultivation of fodder crops is about 4 per cent of the total cultivated area with slightly higher share (7-10 %) in the states of Punjab, Haryana and Western Uttar Pradesh. Moreover, common grazing lands comprise 3 per cent of the geographical area and are an important source of fodder, especially for landless and small landholders. The grazing lands, on the contrary, are degrading continuously both quantitatively as well as qualitatively. Moreover, between 1980-81 and 2008-09, the area under pastures and grazing lands has declined by 14 per cent. In India, around 69 mha of land is under forest cover, a part of which is also used to grow grasses, shrubs and trees to augment fodder requirement.

Current Challenges and Opportunities

Unfortunately, the fodder crop production and improvement have not received much attention because of

lack of synergy between the Department of Agriculture and Department of Animal Husbandry at the Centre and in the States. Majority of the livestock farmers are smallholders or landless and, therefore, they need to be better informed about innovations and low-cost technologies and provided required financial support. Considerable knowledge gap exists despite good research carried out to develop new varieties, and efficient cultivation and pasture management practices. In fact, the current extension system for livestock management is very poor.

The key driving forces for higher feed and fodder requirement in the coming years would be on account of productivity enhancement and shifting of livestock production to semi-intensive/ commercial production systems. Moreover, the non-availability of quality seeds of high yielding varieties (HYVs) and hybrids is a serious concern. The estimated availability of certified/truthfully labeled seed of high yielding improved varieties/hybrids of fodder crops is far below the estimated annual seed requirement. At present, the seed replacement rate in fodder crops is less than 10 per cent. Hence, there is an urgent need to enhance production of quality seed of high yielding varieties (HYVs) and hybrids and made available to the farmers at reasonable price at right time. Fodder seed banks are also needed to be established.

Grasslands that once existed as natural ecosystems are now highly denuded due to heavy grazing pressure. Rehabilitation of degraded grasslands for livelihood support especially in hill, semi-arid and arid regions, and also utilization of wastelands with improved range grasses and legumes

is urgently needed on participatory basis. Unfortunately, the major constraint for revegetation/restoration is the ownership of land as mostly these are common property resources. Hence, peoples' participation for implementation of such programs is the key to success.

In India, due to pressure on land, we invariably have very small area (approx. 12.3 mha) under pastures/grazing lands, as against 41 per cent in US for livestock rearing. Brazil has shown that Indian breeds of milch cattle do much better for milk production provided enough land per animal for grazing is ensured. Hence, there is a need for region-wise focus on land use planning for livestock development possibly by establishing a National Grassland Development Authority to deal with all aspects relating to management, protection and improvement of the existing grasslands.

The huge gap in the demand and supply of green and dry fodder as well as concentrates is a major challenge presently. Fodder deficit can mainly be attributed to our limitations in increasing the area under fodder crops, relatively less coverage under the high yielding improved fodder varieties, poor quality of dry fodder like paddy/wheat straw, and changing cropping patterns in favour of food and cash crops, etc. Besides, low priority accorded to investment in fodder production, lack of post-harvest management for surplus fodder, poor management of grazing/pasture lands and inadequate manpower and financial resources for research and extension are also additional reasons for shortage of feed and fodder.

Efforts need to be made for qualitative improvement of feed and fodder resources aiming at better nutritive values. Under

these circumstances, dual purpose crops grown for grains as well as fodder need priority attention. Special efforts are required to develop Fodder Atlas of the country and to have the correct estimates of fodder production and enabling policies for better land use planning. The Ministry of Animal Husbandry, Dairying and Fisheries and the Department of Agriculture and Cooperation (DoAC) under the Ministry of Agriculture and Farmers Welfare, besides the Indian Council of Agricultural Research (ICAR) are independently dealing with the subject of fodder and livestock production which creates operational difficulties. In order to deal with the subject holistically, there should be greater coordination and convergence among these departments. The initiatives taken under the Government Departments and ICAR sometimes do not get adequate support for implementation which needs priority attention.

The National Livestock Mission (NLM), created during the 12th Five Year Plan on the lines of National Horticulture Mission, should strategically include land use planning for livestock intensification. It must be strengthened for rapid livestock and dairy development involving holistic approach. The disconnect between livestock experts, fodder experts and the fodder seed producing agencies/departments is a long standing concern which must be addressed and resolved. There is thus an urgent need to restructure the total feed and fodder policy both at the central and state levels through effective land use planning, augmenting the carrying capacity of land and through vertical intensive livestock production. There is also a need for use of foresight, big data and innovative approaches to address the problems relating to forage and feed grain

production. The role of private sector for seed production of fodder/forage crops needs to be encouraged. The technologies for fortification of crop residues for making good quality fodder also need to be outscaled. In addition, there is a problem of insurance of animals which also needs to be addressed to save the farmers from incurring huge losses in case of death of cattle and buffaloes. Hence, revitalization of National Livestock Mission offers great opportunity to address most of the current concerns such as: poor animal health, shortage of vaccines, shortage of feed and fodder, reproductive diseases/disorders, late sexual maturity, wide gap between availability and requirement of proven dairy bulls, infertility among cross-bred males, and poor diffusion of latest technologies.

By 2050, milk demand in India would be 350-380 mt, farm numbers will decrease and average herd size would be large (around 250), partly due to smallholders will associate themselves to producer companies requiring need-based technological backstopping.

Unfortunately, the policies for development of feed and fodder have not received required attention. Its share in total livestock expenditure has hardly ever exceeded 1.0 per cent in the last two decades though feed and fodder scarcity has been a major challenge in India. The increasing demand for animal food products implies an increased demand for feed and fodder and thereby an intense competition for limited land and water resources between food and feed-fodder crops. It is, therefore, imperative to lay greater focus on feed and fodder research, feed management, feed-processing technologies and their dissemination to livestock producers.

Enhancing the production and productivity of forage crops and feed products thus becomes critical at this juncture.

Though area under natural grasslands/pastures/ common property resources are on decline, in some of the regions especially under arid ecosystem, these resources are of considerable importance for livestock keepers. Excessive stocking pressure and degeneration of some important pasture grasses and range legumes has led to decline in biomass productivity. Currently, village *panchayats* are not much involved in fodder and livestock production. However, they can play a significant role in forage production using pastures, grasslands and common property resources.

The problem of feed and fodder scarcity is more acute in arid and semi-arid regions where crop failure is more frequent, while States like Punjab and Haryana have surplus rice and wheat straw. Unfortunately, burning straw and fodder deficit co-exist in our country and considerable proportion of straw is currently not being used due to mechanical harvesting, resulting in considerable amount going as waste. In predominantly rice-growing States, the adoption of technologies such as urea treatment that improves the quality of rice straw may help to address fodder scarcity considerably.

The manufacturing of compounded cattle feed is mainly with the private sector agencies (both organized and unorganized) and dairy federations. The usage of compounded cattle feed has not witnessed the desired level of growth over the years. The shift of focus towards rearing animals for higher production through stall feeding is likely to enhance production and consumption of nutritionally balanced compounded feeds.

The National Dialogue

In order to address above issues, a “National Dialogue on Land Use for Integrated Livestock Development” was organized at NASC Complex, Pusa, New Delhi on 1-2 November 2019 by the Trust for Advancement of Agricultural Sciences (TAAS) jointly with the Indian Council of Agricultural Research (ICAR) and International Livestock Research Institute (ILRI) and supported by the Arid Zone Research Association of India (AZRAI). The main objectives of the Dialogue were to: i) assess the current land use for forage and livestock production, ii) find out gaps in demand and supply of green fodder, dry fodder and concentrates, iii) look at the best possible options for efficient land use planning for forage production, iv) suggest needed policy reforms to meet both forage and feed requirements, and v) develop future strategy and action plan. The Dialogue comprised six technical sessions on various themes: i) livestock production on land use systems, ii) demand/supply scenario for fodder, feed and seed, iii) grasslands and common property resources: concerns and opportunities, iv) alternate feed and fodder resources, forage conservation and value addition, v) role of institutions for integrated forage production, and vi) enabling policies for enhancing fodder, feed and seed production including a panel discussion. A total of 115 participants from the national agricultural research system (NARS), private sector, Department of Animal Husbandry, Dairying and Fisheries (DoAHD&F), Central Forest Department, civil society organizations (NGOs, FOs), livestock farmers, entrepreneurs, and policy makers attended the Dialogue.

The Road Map

For harnessing full potential of land for integrated fodder and livestock development, sound strategies need to be developed, promoted and implemented expeditiously for which the following Road Map is proposed:

1. The availability of both dry and green fodder as well as concentrate for the livestock is continuously decreasing throughout the country. As per the best estimates available, the projected demand for dry fodder, green fodder and concentrate is 468, 213 and 81 mt on dry matter basis, whereas the availability is around 417, 138 and 44 million tons leaving a short fall of 11, 35 and 45 per cent, respectively. This wide gap between demand and availability is of prime concern and hence needs to be addressed on priority. As a first step, the Government needs to have more reliable estimates of area under fodder cultivation in the country, for which use of big data and GIS could be helpful. Also, the minimum area under fodder production has to be almost doubled as against 4.6 per cent at present. Similarly, the estimates of demand and supply of feed and fodder as well as area under cultivation are based on secondary data and are highly variable. As feed and fodder is an important component, the need for reliable data at field level is most critical. For this, the National Statistical Office (NSO), Ministry of Statistics and Program Implementation, should generate reliable data on a regular basis being a national priority. Also, an expert committee should be constituted

to assess and suggest ways to meet the requirements of green and dry fodder as well as concentrates for accelerating the growth of livestock sector in India. The committee could comprise of Animal Husbandry Commissioner, Directors of ICAR Institutes (IGFRI, NDRI, NIAP, and CAZRI), Project Coordinator (Forage Crops) and some senior scientists including economists/statisticians. This committee could also review the database on feed and fodder resources, forage seed production requirement, economics of livestock production, marketing, credit and finance, and trade related issues and suggest measures for future growth.

2. Availability of quality seed is the most important input for increased fodder production. Hence, priority attention is needed towards increased availability of quality seed and planting materials. Also, the old varieties need to be denotified and replaced with new high yielding varieties/hybrids and their seed production be accelerated through public/private partnership. The Central and State Government fodder farms need to be assessed for their better utilization for production of seed and planting material. Forage seed indent and production chain must be maintained through better coordination and advance planning. Keeping in view the shortage of feed and fodder, a well-planned and closely monitored program on forage development including quality seed production under the on-going “National Livestock Mission” must be initiated and monitored closely. Also, there is a need to establish fodder banks/seed banks for use during the

natural calamities. The National Seeds Corporation, State Seeds Corporations and other certified seed companies need to think some ‘Out of Box’ solutions like establishing farmer producer companies (FPCs), farmer associations, market linkage with private sector agencies, follow seed quality norms strictly, need to revisit the seed quality standards, explore possibilities to market fodder seeds beyond cooperatives and promote seed production, etc. Involving ICAR institutions, State Agricultural Universities (SAUs), State agencies, private sector along with farmers’ participation in a holistic manner could help in addressing this issue in proper perspective.

3. Adoption of improved production technologies and promotion of some important fodder resources for diverse edaphoclimatic conditions like: *Azolla* (humid and sub-humid conditions), turnip and fodder beets (intensive management system), spineless cactus (semi-arid and arid conditions) and para grass and coix (water logged conditions) can augment fodder resources during the lean period. Similarly, many other non-conventional feed resources considered as waste, can also be used effectively to supplement the existing feed resources. Use of hydroponics, fodder cultivation on field bunds and use of agricultural waste as bioresource for feed could be other possible alternatives. Concerted efforts are, therefore, needed for promoting new food-fodder-based production systems; forage production from problem soils, fodder conservation (bailing, densifying, silage, hay making, complete feed block, leaf meal, legume

blocks, etc.) and better utilization of tree biomass as fodder.

4. There is an urgent need for establishing a National Grassland Development Authority, which could have an oversight role to develop national policy on land use for fodder production, national grazing policy and to take care of all aspects relating to integrated fodder and livestock development. Also, such an institution could build stronger linkages for better coordination and convergence among Ministries and Departments such as: Department of Agriculture and Cooperation (DoAC), Indian Council of Agricultural Research (ICAR), Department of Animal Husbandry, Dairying and Fisheries (DoAHD&F), Forest Research Institute (FRI) and Ministry of Environment, Forests and Climate Change (MoEF&CC).
5. The existing 'National Livestock Mission (NLM)' should also include Fodder Mission for addressing feed and fodder requirement in the country for better impact. Under the umbrella of the Mission, there should be provision of advancing credit and needed subsidy to small and marginal farmers engaged in livestock production. In the livestock sector, insurance scheme which is presently spread in 300 selected districts needs to be promoted to all districts in the country to provide protection mechanism to the farmers and cattle rearers against any eventual loss of their animals and to enhance their risk bearing capacity. Also, there is need to augment the efforts of the States to allow small and marginal farmers to gain better price realization, access to markets, improved technologies for value addition and technical support. In general, the marketing of livestock has not been given due attention either in National Livestock Mission or in Rashtriya Gokul Mission. The technologies for fortification of crop residues for making good fodder need to be outscaled. Value addition of dairy products, namely, milk, *dahi*, cheese including Mozzarella, whey powder, dairy probiotics and nutraceuticals have provided handsome returns and therefore, becomes imperative for the dairy industry.
6. There is full justification for an eco-regional planning in all States for the cultivation of fodder crops. For this, greater focus needs to be given on: (i) characterization of agro-ecological zones (AEZ) coupled with establishment of regional AEZ databases, (ii) initiation of farmer-led innovations through community and stakeholder involvement in agroecology-based agricultural crop planning and implementation, and (iii) utilization of locally available information for most sustainable cropping/farming practices. It is, therefore, suggested that greater emphasis needs to be given now on eco-regional scientific land use planning that is farmer and stakeholder participatory and ecologically sustainable in long-term and will immensely help in bridging the gap between demand and supply of feed and fodder. Also, there is need for intensifying research to develop and grow high yielding nutritive varieties of fodder crops that can withstand well to the changing climate scenario. The local genetic resources

need to be tapped for such purposes and the farmer perception of the older vs. newer varieties must also be kept in view. A single policy approach for the entire country may not be practical and regional needs are required to be considered. Also, research on integration of livestock production and farming systems need to be initiated on eco-regional basis.

7. Grasslands are invariably in very poor state and need to be restored on an urgent basis. In this context, there is an urgent need for improving rangelands, enhancing fodder production from problem soils and from village common property lands. For this, available resources under Mahtma Gandhi National Rural Employment Guarantee Act (MGNREGA), Rashtriya Krishi Vikas Yojna (RKVY), and watershed programs for development of pastures, common property resources (CPRs) and forest lands through involvement of village communities and *panchayat* raj institutions (PRIs) could help to a great extent.
8. The livestock sector, though critically important for sustainable development of agriculture and nutritional security of teeming millions in the country, has not received required policy and funding support which it deserves. The R&D allocation to the livestock sector has hardly exceeded 4 per cent. Therefore, the budget allocation to the livestock sector be increased either to match its contribution to agricultural GDP or at least it be doubled as a first step to overcome existing imbalance. Currently, the sector is facing several challenges rooted to
9. Among other major concerns for the livestock sector are the poor animal health and disease situation which gets further badly dented by poor feed and nutrition shortage. The endemic and newly emerging diseases, shortage of vaccines, poor vaccination coverage, wide gap between availability and requirement of proven dairy bulls, reproductive diseases/disorders, infertility problems and poor diffusion of latest technologies result into a huge financial loss to the national economy. Any road map for livestock development must include a massive inclusive development investment into health sector. By 2050, the milk demand in the country would be 350-380 mt, and the number of animal farms will decrease and herd size would become large (around 250), partly due to involvement of smallholders to form FPCs which will require strong technological backstopping. Hence, the viable options for further improvement of dairy sector are technology-driven production, and enhancing processing and value

addition which need to be given priority attention. There is shortage of frozen semen and progeny tested bulls, and artificial insemination (AI) covers only up to 30 per cent of dairy animals and hence the focus on animal breeding demands immediate attention. Also, the extension system in livestock sector is very poor leading to inefficient delivery system which needs to be addressed on priority.

10. There is need to optimize the number of livestock population in the country. It also needs to be ascertained whether this sector has to be developed based on resource-driven approach (feed, fodder, breeding and health services) or supply-driven approach (number-driven growth). In the circumstances, the country either has to restrict the livestock population or increase area under fodder production to meet existing fodder deficit. Problem of surplus and unproductive animals needs to be addressed urgently under a well defined policy, including scientific intervention like sexed-semen use as a viable option. There is also need to distinguish between non-descript cattle and recognized indigenous dairy breeds, and to optimize the number of desired breeds and their population.
11. With majority of our livestock being reared by owners who are landless or having marginal land holding, the animals have to be fed or taken to pastures for nutrient intake. Grazing pasture and other village Gochar/ grazing lands are particularly essential for pastoralists, who move from place to place for grazing by these animals.

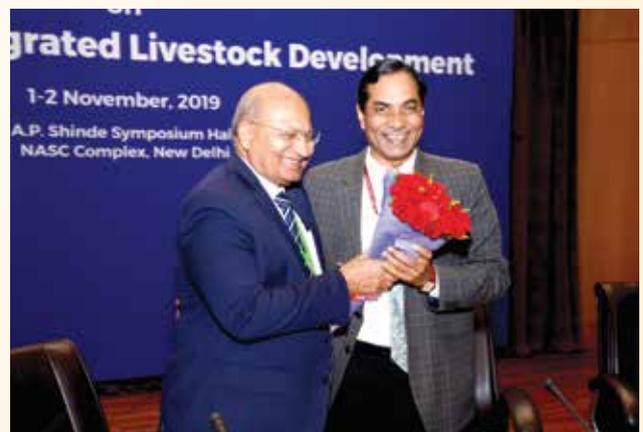
In some ecosystems in the country, animal species like camel, goats and sheep are exclusively reared under hot, dry, desert conditions with animals surviving mostly on browsing. There is an urgent need to provide policy support to these nomads/pastoralists and facilitate and strengthen their nutrient resource base through massive eco-regional agroforestry and/or silvipasture. Also, there is a need for developing an enabling policy framework under which the nomads/pastoralists can operate smoothly.

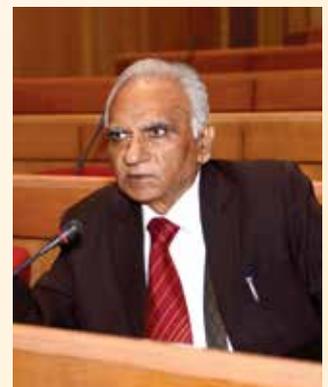
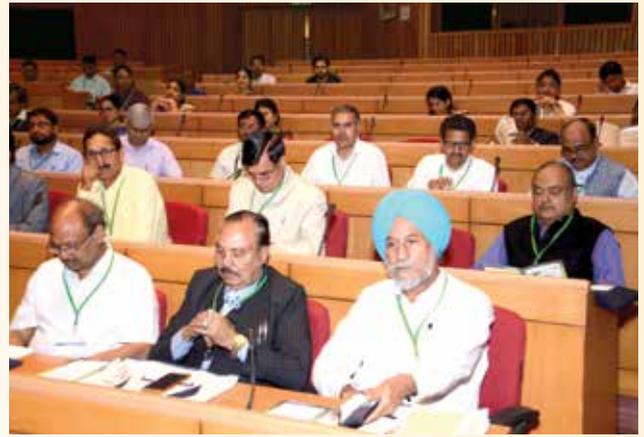
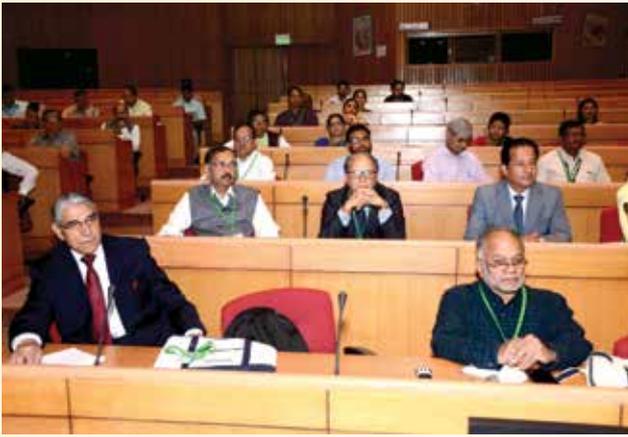
12. There is an urgent need for a suitable policy to make provision of dedicated fodder marketing chain on priority with increased interactions among buyers and sellers, including value addition of dry fodder, use of straw based feed blocks, creation of storage systems on-farm as well as en-route and at the distant markets. There is great need to revamp the market, pricing, and finance and trade issues in the livestock sector. For example, pricing of milk to be changed from two axis (fat and SNF) to three axis model (fat, SNF and bacterial load/quality). Also, we must develop appropriate guidelines for regulation of imports and exports of feeds, and fodder seeds, etc. The technology of developing straw based densified feed blocks for easy transportation from surplus production areas to deficit areas is now available with many institutions but needs a suitable mechanism for popularization among farmers. There is need to provide institutional support like credit facilities, technology development and fodder processing facilities to smallholder farmers.

13. There should be a clear mechanism in place for faster delivery of extension technologies in the livestock sector which has remained grossly neglected in the past as only about 5 per cent of the farm households in India have access to information on livestock technology. Innovative extension strategies are to be developed along with increasing the outreach program through media (print, electronic and social) to motivate farmers to go for fodder production. *Krishi Vigyan Kendras* (KVKs), Agricultural Technology Management Agency (ATMA) and private extension agencies would need to demonstrate the economic significance of fodder production over crop production on research farms and fields for different micro-agro-situations. Also, concerted efforts need to be made to make quality fodder seeds available through milk unions and milk cooperatives (currently it is around 25%), and enhancing research focus on developing improved varieties of fodder crops and improved fodder extension services. There is need for training and capacity building of extension workers of Govt., private sector, dairy cooperatives and NGO's in fodder production and utilization of the latest technologies.
14. Technology on decomposition of ligno-cellulosic material holds great promise. Available technologies need to be assessed and gainfully adopted. There is an urgent need for institutional partnership, especially public-private partnership, for technical assessment and socioeconomic feasibility, since 1 per cent increase in digestibility can enhance milk yield by 6-8 per cent. Such an option can increase productivity and income of farmers tremendously. Integrated feeding system with animal-specific nutrient management along with interactive digitization of feed information is to be taken-up on priority for efficient feeding management. In order to meet the nutritional requirements of animals, there is a need to increase the bioavailability of nutrients from feeds and fodders using biotechnological approaches.
15. Private sector including NGOs can play major role to commercialize the seed production of HYVs of fodder crops to reach to the end user on a large scale. It can contribute significantly towards developing new technologies for breeding better fodder crop varieties, fodder production through hydroponics, and preparation of good quality silage, leaf meals, feed blocks, etc. Community based initiatives also need to be taken up for agrobiodiversity, silvipasture management, upscaling of scientific pasture development, and policy support for fodder production. Entrepreneurship model needs to be developed and public-private participation be encouraged to enhance feed and fodder production to fill the gap between demand and availability.
16. A synergistic approach between the forestry and livestock departments needs to be adopted for controlled grazing and/or for dry fodder production. Animals under controlled grazing help considerably in providing rest period to the grazing areas for further revival of their vegetation cover. Moreover, the forest departments also need seeds of different grasses and legumes with high quality biomass yields. The plantation of trees which have high fodder value needs

to be given a high priority under different afforestation programs. For this, the staff of forest department needs to be educated and trained. Hence, an appropriate system for livestock management needs to be evolved through inter-departmental cooperation and proper understanding. In order to have a faster pace of integrated livestock development, better coordination and management between crops and animal science sectors is

required, quality forage seed production chain be maintained, seed bill needs to be passed by the Parliament, a rolling plan be prepared and the role of private sector, as in other sectors, must be encouraged. The problem of shortage of feed and fodder can also be solved to some extent by reducing waste of dry fodders and horticultural wastes for fodder purposes and linking it with incentive to the farmers.





Important TAAS Publications

- Brainstorming Workshop on Soybean for Household Food and Nutritional Security - Proceedings and Recommendations, March 21-22, 2014.
- The Eight Foundation Day Lecture on “Sustainable Agricultural Development - IFAD’s Experiences” by Dr. Kanayo F. Nwanze, President, IFAD, August 5, 2014.
- Need for Linking Research with Extension for Accelerated Agricultural Growth in Asia - Strategy Paper by Dr. R.S. Paroda, September 25, 2014.
- Global Conference on Women in Agriculture - Proceedings and Recommendations, March 13-15, 2015.
- Brainstorming Workshop on Upscaling Quality Protein Maize for Nutritional Security - Recommendations, May 21-22, 2015.
- The Ninth Foundation Day Lecture on “21st Century Challenges and Research Opportunity for Sustainable Maize and Wheat Production” by Dr. Thomas A. Lumpkin, Former DG, CIMMYT, September 28, 2015.
- National Dialogue on Efficient Management for Improving Soil Health - New Delhi Soil Health Declaration - 2015, September 28-29, 2015.
- Regional Consultation on Agroforestry: The Way Forward - New Delhi Action Plan on Agroforestry 2015, October 8-10, 2015.
- National Dialogue on Innovative Extension Systems for Farmers’ Empowerment and Welfare - Road Map for an Innovative Agricultural Extension System, December 17-19, 2015.
- Round Table Discussion on Promoting Biotech Innovations in Agriculture and Related Issues - Proceedings & Recommendations, August 4, 2016.
- Awareness cum Brainstorming Meeting on Access and Benefit Sharing – Striking the Right Balance – Proceedings, October 22, 2016.
- Delhi Declaration on Agrobiodiversity Management – Outcome of International Agrobiodiversity Congress 2016, November 6-9, 2016.
- National Conference on Sustainable Development Goals: India’s Preparedness and Role of Agriculture, May 11-12, 2017.
- Policy Brief on Efficient Potassium Management in Indian Agriculture, August 28-29, 2017.
- Regional Policy Dialogue on Scaling Conservation Agriculture for Sustainable Intensification, Dhaka, Bangladesh, September 8-9, 2017.
- Policy Brief on Scaling Conservation Agriculture in South Asia.
- Retrospect and Prospect of Doubling Maize Production and Farmers’ Income – Strategy Paper by Dr. N.N Singh, September 10, 2017.
- Indian Agriculture for Achieving Sustainable Development Goals - Strategy Paper by Dr. R.S. Paroda, October, 2017.
- Strategy for Doubling Farmers’ Income - Strategy Paper by Dr. R.S. Paroda, February, 2018.
- Livestock Development in India - Strategy Paper by Dr. A.K. Srivastava, Member, ASRB & Trustee, TAAS, February, 2018.
- Policy Brief on Agricultural Policies and Investment Priorities for Managing Natural Resources, Climate Change and Air Pollution - April, 2018.
- Women Empowerment for Agricultural Development - Strategy Paper by Dr. R.S. Paroda, May, 2018.
- Brainstorming Meeting on Harnessing Intellectual Property to Stimulate Agricultural Growth – Proceedings and Recommendations, July 27, 2018.
- Road MAP on Motivating and Attracting Youth in Agriculture (MAYA).
- Regional Conference on Motivating and Attracting Youth in Agriculture (MAYA) - Proceedings and Recommendations, August 30-31, 2018.
- Motivating and Attracting Youth in Agriculture - Strategy paper by Dr. R.S. Paroda, November, 2018.
- The Eleventh Foundation Day Lecture on “Can India Achieve SDG 2 – Eliminate Hunger and Malnutrition by 2030” by Dr. Prabhu Pingali, Professor in the Charles H. Dyson School of Applied Economics and Management at Cornell University, January 24, 2019.
- Urgency for Scaling Agricultural Innovations to Meet Sustainable Development Goals (SDGs) – Strategy Paper by Dr. R.S. Paroda, April, 2019.
- Horticulture for Food and Nutritional Security - Strategy Paper by Dr. K.L. Chadha and Dr. V.B. Patel, October, 2019.
- Crop Biotechnology for Ensuring Food and Nutritional Security - Strategy Paper by Dr. J.L. Karihaloo and Dr. R.S. Paroda, December, 2019.
- A Road Map on Policy Framework for Increasing Private Sector Investments in Agriculture and Enhancing the Global Competitiveness of Indian Farmers, December, 2019.



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Printed : February, 2020