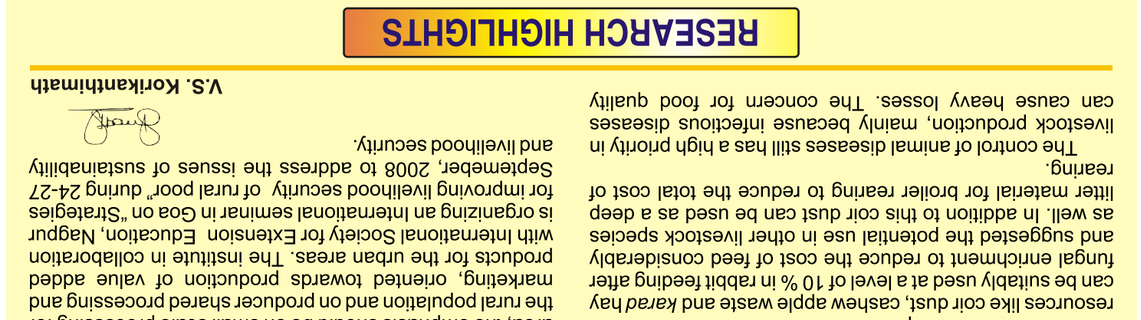

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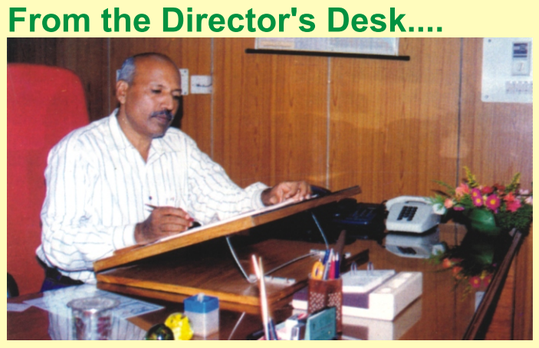
From the Director's Desk....



Sustainable livestock production

Livestock plays an essential role in the agrarian economies like India and other developing countries. About 12 % of the world's population is entirely dependent on livestock production. The largest share of the world's livestock population is found in the developing countries viz., 61% cattle, 43% sheep, 79% goats and 57% pigs.

The sustainability of crop and livestock production systems is threatened by increased population, changes in consumption pattern, increased cropping intensity, changes in cropping pattern replacing the area under grasses and fodders. Strategies for sustainable agricultural and livestock development are needed to meet the increasing demand for food and employment and to reduce the degradation of the environment. Ruminants are probably the most efficient converters of plants biomass into muscles in that their digestive systems can utilize cellulose and fibrous materials. The Food and Agricultural Organization (FAO) of the United Nations defined the sustainable agriculture and rural development as "The management and conservation of the natural resource base and the orientation of technological and institutional change in such a manner as to ensure the attainment and continued satisfaction of human needs for present and future generations". Such sustainable development (in the agriculture, forestry and fisheries sector) conserves land, water, plant and animal genetic resources, is environmentally non-degrading, technically appropriate, economically viable and socially acceptable.

The contribution of the livestock sector in national economy is to the tune of about 26% of the value of total output from the agricultural sector. The sale of livestock products can account for as much as 80% of the regular cash income of small holders. This income is reinvested in crop production or spent on food, clothing, school fees, and medical expenses or used for survival in times of crop failure. The role of livestock is often multipurpose, a source of subsistence (milk, meat, wool, eggs, hides), draught power, manure, additional income, investment, security and social status. In small scale intensive systems, livestock utilizes marginal lands and/or crop residues that can not be used for human nutrition. Manure is used for improving soil fertility of agricultural lands, as fuel (dried or biogas) or as feed in fishponds. Livestock development is further linked to rural agro-industrial development through the demand for feed supply, product processing and marketing services.

The land holding pattern in India is such that 30% of the land holdings belong to the small and marginal farmers who constitute 70% of livestock farmers and raise 80% of the total livestock of the country to supplement their income for livelihood. Milk and meat production per animal tend to remain low, although total production has increased, mainly due to increased animal numbers. The increase in number of animals was not accompanied by an improved availability of feed resources, resulting in over grazing and erosion, reduced health and performance.

It is worth mentioning here that the commitment to stimulate the development of the rural livestock sector has been lacking, resulting in inadequate producers' organizations, limited access of farmers to markets and credit, underdeveloped infrastructure, low and fluctuating producers prices. The sustainability of many production systems in developing countries is threatened by the net export of minerals from the system and by the reduction in soil organic matter content due to high cropping intensity. The recycling of manure as fertilizer and soil organic matter supplier should be stressed.

In India, breeding programmes for the last three decades, such as importing of exotic dairy breeds, milk recording, artificial insemination and progeny testing have been tried as important components of livestock development strategies. They made little success, particularly when applied to small mixed-farming systems. Genetic diversity is the key to the selection and breeding of animals for adaptability and production in a wide range of environments. Many indigenous breeds have special adaptive traits, for example disease resistance, climatic tolerance, ability to use poor quality feed. It is important that these indigenous breeds, including the minor species, are preserved for their genetic variation specific to their environment.

Major portion of land has been used for production of cereals and consequently fodder cultivation was grossly neglected. On a conservative estimate, 6000 million coconuts are available in India per annum. In Goa alone 24,200 ha of land is under coconut cultivation and annual production is around 16 million nuts. The husk is used for coir production. About 4.5% by weight of the husk is available as coir dust which is otherwise used as fuel. Cashew is grown in an area of 6.59 lakhs ha in India. The apple after the extraction of juice is discarded as waste. Considering the annual cashew nut yield of 4.5 lakh tons, a substantial amount of cashew apple waste, equivalent to the nut yield, is available. Huge amount of brewery waste is generated from local breweries by use of grains like barley, wheat and rice through fermentation to produce liquor. Brewery waste, termed as brewery dried grain (BDG) after sun drying, contains good amount of crude protein as per the analysis carried out at ICAR Research Complex for Goa. Hence, it has tremendous potential for use as feed stuff for livestock and poultry.

Some of the common agro wastes available in the tropical coastal region viz., coir dust, cashew apple waste, pineapple waste and *karad* hay can be used effectively as animal feed. Chemical analysis indicated that the coir-dust, cashew apple waste and *karad* hay contain substantially high quantity of lignin which is undigestible. Experiments at ICAR Research Complex for Goa showed that natural resources like coir dust, cashew apple waste and *karad* hay can be used at a level of 10 % in rabbit feeding after fungal enrichment to reduce the cost of feed considerably and suggested the potential use in other livestock species as well. In addition to this coir dust can be used as a deep litter material for broiler rearing to reduce the total cost of rearing.

The control of animal diseases still has a high priority in livestock production, mainly because infectious diseases can cause heavy losses. The concern for food quality requires adequate attention. Food protection including meat hygiene is one of the most important priorities of the health and agriculture sectors practically in all countries.

India is emerging as a major exporter of meat and meat products. There has been an increasing trend in the export of meat and meat products from India in recent years. However, the export from India which account for about 2% of the world meat trade does not commensurate with its large livestock population.

Strategies for livestock development must incorporate the role of women in livestock activities, such as small livestock rearing, on-farm processing and marketing of livestock products. Women should have equal access to credit schemes. Latest technological interventions and development programmes should lead to rewarding increases in the work load of women.

Biotechnological techniques which can develop recombinant microbes to digest straws, neutralize lignin and its byproducts and release carbohydrates through a solid state fermentation process, if developed, would change the energy availability for livestock feeding.

Dairy systems may offer the greatest scope for social and economic development in many countries. In order to generate rural employment and added value in the rural area, the emphasis should be on small scale processing for the rural population and on producer shared processing and marketing, oriented towards production of value added products for the urban areas. The institute in collaboration with International Society for Extension Education, Nagpur is organizing an International seminar in Goa on "Strategies for improving livelihood security of rural poor" during 24-27 September, 2008 to address the issues of sustainability and livelihood security.

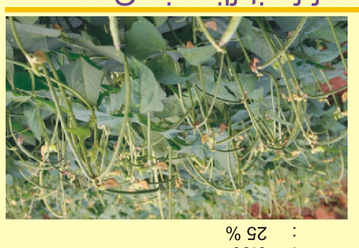
V.S. Korikanthimath

RESEARCH HIGHLIGHTS

Nadora Bardez-4, a new selection of local cowpea

Collection of over 50 local cowpea germplasm accessions in Goa region and their evaluation under residual soil moisture situations in rice fallows both at Institute and in farmers field during last four years resulted in selection of a local cowpea accession with the following traits:

Duration	:	100 days	
Growth habit	:	Bushy to moderately viny	
Days to 50 % flower	:	63 days	
Branching	:	2 / plant	
Pod colour	:	Greenish white	
Pod surface texture	:	Smooth	
Pod bearing nature	:	Cluster bearing	Mean pod number
	:	6-10 / plant	
Mean pod length	:	18.3-22.2 cm.	
Mean number of seeds	:	10-14 / pod	
Seed : Pod ratio	:	0.78	
100 seed weight	:	23.7-24.0 g	
Seed colour	:	Light brown to dark brown Mean	
seed yield	:	1007 kg / ha	
Mean hulm yield	:	2.65 t / ha	
Mean volume expansion	:	245 %	
Organo-leptic score	:	5.60	
Protein content	:	25 %	



Geographical distribution and species diversity of fruit flies in Goa

Methyl Eugenol and Cue Lure traps set in three different ecological habitats of Goa viz. coastal (15°29′53″ N; 73°54′59″ E), undulating mid land (15°27′16″ N; 73°59′49″ E) and mountainous upland (15°21′37″ N; 74°14′39″ E) approximately, 10, 25 and 50 km respectively from the Arabian sea revealed that both the orchard and melon flies were most abundant in the coastal region, followed by the midland and uplands. Among the orchard flies, *Bactrocera dorsalis* was the most abundant species followed by *B. caryae*, *B. zonata*, *B. affinis*, and *B. correcta*, while in the melon fly group *Bactocera cucurbitae* was the most dominant species followed by *B. tau*, *B. gavisa*, *B. caudata*, and *B. nigrotibialis*.

MAJOR EVENTS

Training programme on Value addition and specialty fish/prawn products organized

A three days sensitization training programme on "Value added and specialty fish/prawn products" organized in collaboration with the Central Institute of Fisheries Technology, Kochi, Krishi Vigyan Kendras of North and South Goa, Departments of Agriculture and Fisheries and Brackishwater Fish Farmers Development Agency (BFDA), Government of Goa, during 11-13 March, 2008 at ICAR Research Complex for Goa, Goa for the progressive farmers, entrepreneurs and trainers to popularize the value added and specialty fish products. As consequence of this and the earlier programmes conducted on fish value addition, BFDA in association with the Institute have started a series of village level value addition programme utilizing locally available low value fish by small scale operators and Self Help Groups, in different Talukas of Goa.

Indo-German Collaborative Project on Biotechnology

Under Indo-German Collaboration in Biotechnology a project on "Indo-German consortium for Epidemiology and comparative genomics of *Listeria*" has been sponsored by department of Biotechnology, Govt. of India. The project includes the study of genetic diversity of *Listeria* in India and development of a database of listerial isolates. The proposal has been implemented in collaboration with Institute of Medical Microbiology, Justus-Liebig University, Giessen, Germany. The participating scientists are Dr. S. B. Barbuddhe, Sr. Scientist along with Dr. E. B. Chakurkar, Sr. Scientist, Dr. B. K. Swain, Sr. Scientist and Shri. J. Ashok Kumar, Scientist SS from Indian side and Prof. T. Chakraborty and his colleagues from German side.

Training programme on Entrepreneurship and Skill Developmental Programme (ESDP) organized

The Institute organized an ESDP in Biotechnology (Bio-fertilizers and Bio-pesticides) during 26 March 2008 to 22 April 2008. The programme was sponsored by MSME-DI, Goa. The ESDP programme was inaugurated by Director ICAR RC for Goa on 26-3-2008. Dr. J.R. Faleiro welcomed the gathering. The Director emphasized the importance of bio-fertilizers and bio-pesticides in agriculture in the present scenario. Shri. Narayanan Kutty, Director, MSME-DI, Goa in his address highlighted the need of entrepreneurship in biotechnology and requested the participants to make use of the training in setting up units for the production of bio-fertilizers and bio-pesticides.

In the four weeks programme, both lectures and practical demonstrations on various aspects of producing bio-pesticides and bio-fertilizers were conducted, covering a wide range of 20 topics on various technical aspects. In addition, presentations on entrepreneurship development, including financial assistance were made by qualified resource persons. In all, 33 participants including 17 women from different parts of Goa attended the training.

Eleven resource persons from different areas of specialization delivered lectures on technical aspects and six resource persons covered the sessions on different areas of entrepreneurship development, including financial assistance, presentations on various technical aspects, covering a wide range of 20 topics on bio-fertilizers and bio-pesticides, demonstrations on entrepreneurship development, and practical training programme on Value addition and specialty fish/prawn products organized.

Studies on nutritional requirements of ornamental fishes

Nutritional requirements of ornamental fishes is an important aspect considering the growth and potential of ornamental fish trade through out the world. Economic nutritionally balanced feed utilizing locally available ingredients is felt need. Studies were conducted for formulating diets for guppy, *Poecilia reticulate*, with squid meal, lean prawn meal, mussel meal and surimi by-product as a dietary protein sources. Studies indicated that the sword tail, *Xiphophorus hilleri* requires 40% protein and 6% lipid. Animal sources proved better than plant sources of lipid in diets for blue gourami, *Trichogaster trichopterus* fingerlings. As surimi by-product oil is cheaper and giving equally good growth performance, it can replace the costly cod liver oil as energy source in formulation of ornamental fish diet. Studies on growth and gonadal maturity of blue gourami, *Trichogaster trichopterus* broodstock showed that the weight gain and specific growth rate of male and female gourami were highest in fish fed diet containing 150.0 mg/kg vitamin E and infusoria could replace costly *Artemia* and gave better larval growth than formulated feed.

entrepreneurship. The topics covered include, importance of bio-fertilizers and bio-pesticides in agriculture, their production technologies in detail with cost of production, vermin-culture, quality control, IPR issues and patenting, preparation of project proposals for seeking finance, setting up and registration of industry, promotional schemes, marketing, accounting and taxation.

The valedictory function was held on 22-04-2008 and Director (I/C), ICAR RC presided over the function. Shri. S.P. Tendulkar, Director of Agriculture, Govt. of Goa, was the chief guest. In his address the chief guest stressed the importance of organic farming in the state of Goa and the need to manufacture and supply inputs (Bio-fertilizers and Bio-pesticides), needed for taking up sustainable and eco-friendly agriculture in the state. Shri. Tendulkar also highlighted the financial assistance available from the Department of Agriculture in setting up such eco-friendly agro units, besides the subsidy given on cost of procuring such products by the farmers. In his address, Director (in-charge), ICAR RC requested the farming community to use bio-fertilizers and bio-pesticides as there is an increasing demand for organic foods. In his address, Shri. Narayanan Kutty, Director, MSME-DI, Goa encouraged the participants to come forward to set up production units for which he assured the necessary support. During the valedictory function the chief guest presented participation certificates to the trainees, while Dr. R. Ramesh, Course Director proposed

PARTICIPATION IN SEMINAR / SYMPOSIA / WORKSHOPS

V S Korikanthimath
- International Seminar on Natural Area Tourism: Impacts, Planning and Management at International Centre, Goa during 14-15 February, 2008.
- Regional Committee Meeting held at CICR Nagpur during 29 February - 1 March, 2008.

S Subramanian
- Fishermen interaction workshop and installation of Digital Display Board meeting held at Malwan, during 21-22nd January, 2008.
- International Seminar on Natural Area Tourism: Impacts, Planning and Management held at International Centre, Goa during 14-15th February, 2008.
- Workshop-cum-training programme on Alternative to Brackishwater Shrimp Culture held at Panaji, Goa on 27 March, 2008 .

J R Faleiro
- International seminar on Natural area tourism: Impacts, Planning and Management held at International Centre, Goa, during 14-15 February, 2008.

E B Chakurkar
- National symposium on Zoonoses and Biotechnological applications held at Department of Microbiology and Biotechnology, Nagpur Veterinary College, MAFSU, Nagpur, during 4-5 February, 2008.

S B Barbuddhe
- National symposium on Zoonoses and Biotechnological applications held at Department of Microbiology and Biotechnology, Nagpur Veterinary College, MAFSU, Nagpur, during 4-5 February, 2008.
- International seminar on Natural area Tourism : Impacts, Planning and Management held at International Centre, Goa, during 14-15 February, 2008.

B K Swain
- One day Seminar on "Sustainable Poultry Production: Commercial and Rural Approach" held at Project Directorate on Poultry, Hyderabad on 3 March, 2008.

K N Mohanta
- Network Meeting of Fishery Scientists of Agriculture Institutes of ICAR held at CIFRI, Barrackpore on 2 February, 2008.
- International Seminar on Natural Area Tourism: Impacts, Planning and Management at International Centre, Goa during 14-15 February, 2008.
- Workshop-cum-training programme on Alternative to Brackishwater Shrimp Culture held at Panaji, Goa on 27 March,.2008.

R Ramesh
- National seminar on Recent advances in the Discovery and use of bioactive molecules held at National Institute of Oceanography, Goa, during 7-8, March 2008.

M Thangam
- XXVI Annual group meeting of AICRP on Vegetable crops held at OUAT, Bhubaneswar during 23-27 February, 2008.

J Ashok Kumar
- 10th Consultancy Congress at held at Consultancy Development Centre, New Delhi during 15 -16 January, 2008.
- International conference on emerging technologies and applications in engineering, technology and sciences held at Rajkot, Gujrat during 13 -14 January, 2008.

PERSONALIA

FAO Assignment

Dr. J. R. Faleiro, Principal Scientist (Entomology) was selected as consultant (Specialist) for red palm weevil by Food and Agricultural Organisation of the UN for its project on date palm with the Ministry of Agriculture in Saudi Arabia.
Dr Faleiro successfully completed the first 30 day mission of the consultancy from 8-1-2008 to 7-2-2008 at the National Date Palm Research Centre, Al Hassa, Saudi Arabia. During the mission Dr. Faleiro assessed the damage due to red palm weevil on date palm in the Al Hassa oasis of Saudi Arabia, besides formulating research programmes pertaining to red palm weevil and training Saudi Arabian officials on the management of this pest.

Promotions

Shri Mahesh Parsekar, T-3 was promoted to T-4 w.e.f. 01-01-2008.
Shri Vilas P. Gaonkar, SS Gr-I promoted to SS Gr-II w.e.f. 05-01-2008.
Shri Gokuldas P. Gauns, SS Gr-I promoted to SS Gr-II w.e.f. 08-01-2008.
Shri Prabhakar B. Gaonkar, SS Gr-I promoted to SS Gr-II w.e.f. 08-01-2008.
Shri Sitaram G. Kunkolekar, SS Gr-I promoted to SS Gr-II w.e.f. 09-01-2008.
Shri Prakash Parwar, SS Gr-I promoted to SS Gr-II w.e.f. 10-01-2008.

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