



# DLFM at a glance



**DIVISION OF LIVESTOCK AND FISHERY MANAGEMENT  
ICAR RESEARCH COMPLEX FOR EASTERN REGION  
(INDIAN COUNCIL OF AGRICULTURAL RESEARCH)  
ICAR PARISAR, PO BIHAR VETERINARY COLLEGE  
PATNA - 800 014, BIHAR**

# DLFM at a glance

## Mandate of the Division

- To undertake strategic and adaptive research for efficient integrated management of natural resources
- To enhance productivity of agricultural production systems comprising of agricultural and horticultural crops, agro-forestry, livestock, avian and fisheries in different agro-ecological zones of the eastern region.

## Thrust areas

The Livestock and Fishery Improvement and Management Programme (now Division of Livestock and Fisheries Management) came into existence in August 2003. Besides research activities, developmental work was undertaken on priority for creation of infrastructural facilities like animal houses, procurement of laboratory equipments & farm development for establishment of livestock and fisheries research at ICAR Parisar.

The Division started with the objective to develop and evaluate technologies for breeding, feeding and health care of livestock, poultry and fishery suitable to the climate of Eastern Region.

- Development of livestock and fish based integrated farming system to support livelihood and generate employment
- Crop-livestock integration through dairy based enterprises
- Development of technologies for improving livestock, poultry and fish health and production
- Fish seed, feed and management of fishponds
- Augmentation of fodder resources to ensure availability of fodder round the year

## Scenario of livestock and fish production in eastern region

The Eastern Region contributes significantly in milk, meat, egg, chicken and fish production, supporting 33% of country's population and covering 22% of total geographical area. This region is the native of diversified cattle, buffalo and goat breeds. However, the low productivity of these animals is resulting in poor economic return. Per capita availability of milk in the region is less than half of the national average during 2005-06 (112.67 g/day in eastern region against national availability of 241 g/day). During 2005-06 the availability of eggs per capita was 29 numbers in the region against 42 for India, with all states remaining below the national average. Though the region holds 28% of total livestock of India yet, share of milk production is only 13.88% of that of all India (2007-08). It has a high potency in meat production, contributing about 34% of meat produced in India. Moreover, the region contributes about 86% of duck egg produced in India. The region also has potentially rich fresh water resources and congenial agro climatic conditions for fishery development. The fish production from eastern region contributes 52.42% of inland fish production. However, there is a wide gap in the demand (4.56 lakhs t) and fish production (3.0 lakhs t) in Bihar state. In general, the region is prone to floods and droughts limiting animal and fish production to the desired level. Low productivity of animals, under utilization of aquatic resources, prevalence of diseases, lack of proper storage & marketing facility and lack of general awareness poses hurdles in overall livestock and fishery development.

## Future demand and supply of livestock products and fishes

State	Projected Population (2020)	Milk requirement (000 tonnes)	Egg requirement (lakh nos)	Meat requirement (000 tonnes)
Assam	3,40,56,000	2,734.69	17,709.12	318.76
Bihar	10,90,07,000	8,753.26	56,683.64	1,020.30
Chhatisgarh	2,72,33,000	2,186.81	14,161.16	254.90
Jharkhand	3,55,09,000	2,851.37	18,464.68	332.36
Orissa	4,39,45,000	3,528.78	22,851.40	411.33
West Bengal	9,70,78,000	7,795.36	50,480.56	908.65
<b>India Total</b>	<b>133,43,51,000</b>	<b>1,07,148.39</b>	<b>6,93,862.52</b>	<b>12,489.52</b>

- RDA of milk is 220g/ head/ day
  - Recommended consumption -52 eggs/year
  - Meat 180 g/ head/ week
- Assuming a vast population is vegetarian, the actual requirement of meat may be much less

Year	Fish Production in 2020 (in million tones)		
	Marine	Inland	Total
2010	2.88 (38.61)	4.58 (61.37)	7.46
2015	2.70 (32.07)	5.72 (67.33)	8.42
2020	2.38 (25.37)	7.00 (74.63)	9.38

### Major research achievements

- The fresh water resources in the villages are meager and untapped. Most of the farmers are unaware of scientific techniques of aquaculture. They stock fish fries at high rate of 14 – 30 thousand/ ha while productivity is observed to be 0.9 – 1.2 t/ ha. The fish yield from developed ponds is also at very low level (2.175 t / ha / yr). The riverine fisheries are dominated by catfishes namely *Channas sp*, *Mystus aor*, *M. seenghala* and *Heteropneustes fossilis* etc. Mustard oil cake and rice bran are the main source of feed for carps whereas banana leaves, wild grasses and berseem are being used for feeding grass carp. Fish ponds in the villages are infested with aquatic weeds like *Hydrilla*, *Eichhornia*, *Azolla* and *Potamogeton*. Lack of technical knowledge about aquaculture; nonavailability of quality fish seed and infestation of ponds by weeds are some of the major constraints in traditional fish production.



### Fishing traps

- A model of duck-fish farming, horti-fish culture, rice/wheat-fish culture and fish culture in service reservoir has been developed to enhance productivity of land and water through multiple uses of water. System of polyculture was followed. Khaki Campbell duck was stocked @ 300 /ha of water area. Ducks started laying eggs at the age of 24 – 26 wks. Average egg production was 160 eggs/bird/yr. Average weight of eggs were 64 g after 90 days of egg laying. The fish yield varied from 3 - 5 t/ha in pond and about 2 t/ ha in trenches



Multiple uses of water showing duck-fish & rice-fish systems

- Monoculture & Polyculture of prawn in ponds, fish trenches cum-raised bed under multiple water use system revealed production of 0.47 t/ha of prawn in monoculture, 0.37 t/ha of prawn and 1.02 t/ha of fish in six months of rearing period in polyculture. The adaptive research on monoculture and polyculture of scampi (*M. rosenbergii*) has paved way for its farming beyond December. The farmers and entrepreneurs will be highly benefited from the new approach of scampi farming in seasonally waterlogged areas of Bihar



- Polyculture of carp fishes under organic farming were carried out. The growth studies revealed that silver carp (*Hypophthalmichthys molitrix*), grass carp (*Cteopharyngodon idella*), catla (*Catla catla*), common carp (*Cyprinus carpio var specularis*), rohu (*Labeo rohita*) and mrigal (*Cirrhinus mrigala*) attained average weight 900gm, 850gm, 450gm, 750gm, 400gm, 750gm per year and gave a production of 3263kg/ha/year.



- The productivity of Makhana based water bodies could be maximized by integrated aquaculture where yield potential of fishes ranged from 2 to 4 quintals/ha in a refuge covering 10% area of net water bodies.



- Keeping in view of the constraints faced by farmers, breeding of carps was done successfully for raising of fries.

- Recommendations for declaring magur (*C. batrachus*) as State Fish of Bihar.

- Trials on the culture of Jayanti Rohu (*L. jayanti*) under polyculture systems in ponds have shown significantly higher growth than that of rohu (*L. rohita*).



- The eco-hatchery operation demonstrated to farmers under FPARP lead to production of enormous spawn. This offers scope for its wider adoption in rural India. This will definitely enhance the fish seed availability vis-à-vis increase in fish production in Bihar.

- Survey of certain districts of Bihar revealed that animal husbandry and fishery practices are similar to other parts of the country. Buffalo is preferred over cow due to better acclimatization and higher fat content of milk whereas crossbred Holstein Friesian and Jersey is preferred over indigenous cattle due to higher milk yield. People from socio-economically weaker section practice Goatery and Piggery and some backyard poultry. Women of landless families, on an average, spend 6-8 hours time on management and care of household animals. Progressive farmer uses concentrate feed for crossbred cows and milking buffaloes. Agricultural by-products are mainly used as feed.



- Generally land for fodder cultivation is negligible in villages because small & marginal farmers are interested in growing only food crops for their consumption and some cash crops for their financial needs. However, a few middle/large farmers are cultivating Sorghum and Berseem for feeding lactating crossbred cows and buffalo. Wheat, paddy and mustard straw and maize stover are the major sources of dry fodder where as mustard, linseed and rapeseed oil cakes are the main sources of proteins for the animals. Under farmers' condition lactation yield of crossbred cow and buffaloes is recorded as 2755.00 ± 207.00 & 1467.86 ± 19.36 liters respectively.



- Foot-and-Mouth disease (FMD) is the most important livestock diseases followed by Hemorrhagic septicemia. Besides surra, anestrus, unexplained infertility, Degnala like disease, mastitis, nonspecific GI disorders, ecto and endo-parasitic infections etc. are also very common. Low milk yield, delayed maturity, repeat breeding, anestrus, poor veterinary services, inadequate market infrastructure



for animal products, scarcity of green fodder specially during lean period (May to June and October to December), high cost of animal feeds are some of the constraints for animal production.

- The reproduction diseases in cattle indicated hair coat skin manifestations of worm infestation and micronutrient deficiency. The skin and hair coat changes were dull, rough, lusterless and alopecic coats in almost 90% of the animals with reproductive problems.
- ELISA procedures were standardized for diagnosis of Brucellosis and IBR. The sera samples collected randomly from the goats and sheep are being analyzed for the presence of antibodies against PPR virus and Blue tongue virus by competitive ELISA and indirect ELISA respectively.
- Makhana processing by-product (bran+outer coat) was analyzed for its chemical composition which showed crude protein, carbohydrate & organic matter as 7.10, 86.64, 94.36 percents in Makhana bran where as corresponding value in outer coat were found as 4.75, 86.88 & 91.79 percents for its utilization in poultry and goat rations respectively. Study revealed that Makhana bran could be incorporated in the diet of poultry broiler up to 6% level without affecting growth and feed conversion efficiency. Dry matter intake and digestibility did not differ significantly up to 50% of replacement of rice bran.
- Technique for collection of semen in goats using artificial vagina has been standardized in Jamunapari breed of goats.
- The weekly average milk yield per cow and monthly average milk yield per cow were decreased by 0.062 and 0.069 kg respectively per % rise of relative humidity. Average daily gain in goat weight reduced by 0.272 g and 8.402 g per % increase of relative humidity and per unit increase of THI respectively. The rectal temperature, respiration rate and pulse rate of goats were increased non – significantly with the unit increase of AT and ET.
- Crop – livestock based farming system models were evaluated in irrigated & rainfed conditions for integration of dairy & goat species respectively. In intensified dairy based production system, 4 crossbred cows can be integrated in acre model with sparing of 40% area for fodder production. Lactation yield of crossbred cows was reported at 2200 kg.
- The Black Bengal breed is most popular for kidding percentage. The survey revealed that twinning and triplets from 3<sup>rd</sup> kidding accounted for 85 %.
- Assessment of livestock water productivity has been initiated in Indo-Gangetic Plains, India. A baseline survey regarding resource availability, cropping pattern, livestock population & production and role of different institutions in crop-livestock-water nexus in all the villages have been studied.



## Organization of seminars/ workshops and training

### Training Programmes organized

Sl. No	Year	No. of trainings organized	Broad subject area
1	2005-06	2	<ul style="list-style-type: none"> <li>• Makhana – cum – fish culture;</li> <li>• Natural Resource Management</li> </ul>
2	2006-07	1	<ul style="list-style-type: none"> <li>• Water Management and Integrated Farming</li> </ul>
3	2007-08	7	<ul style="list-style-type: none"> <li>• Integrated fish farming</li> <li>• Makhana – cum – fish culture</li> <li>• Scaling up of Water Productivity</li> </ul>
4	2008-09	1	<ul style="list-style-type: none"> <li>• Integrated Fish Farming</li> </ul>
5	2009-10	4	<ul style="list-style-type: none"> <li>• Scaling up of Water Productivity</li> </ul>

### Seminars/ Workshops organized

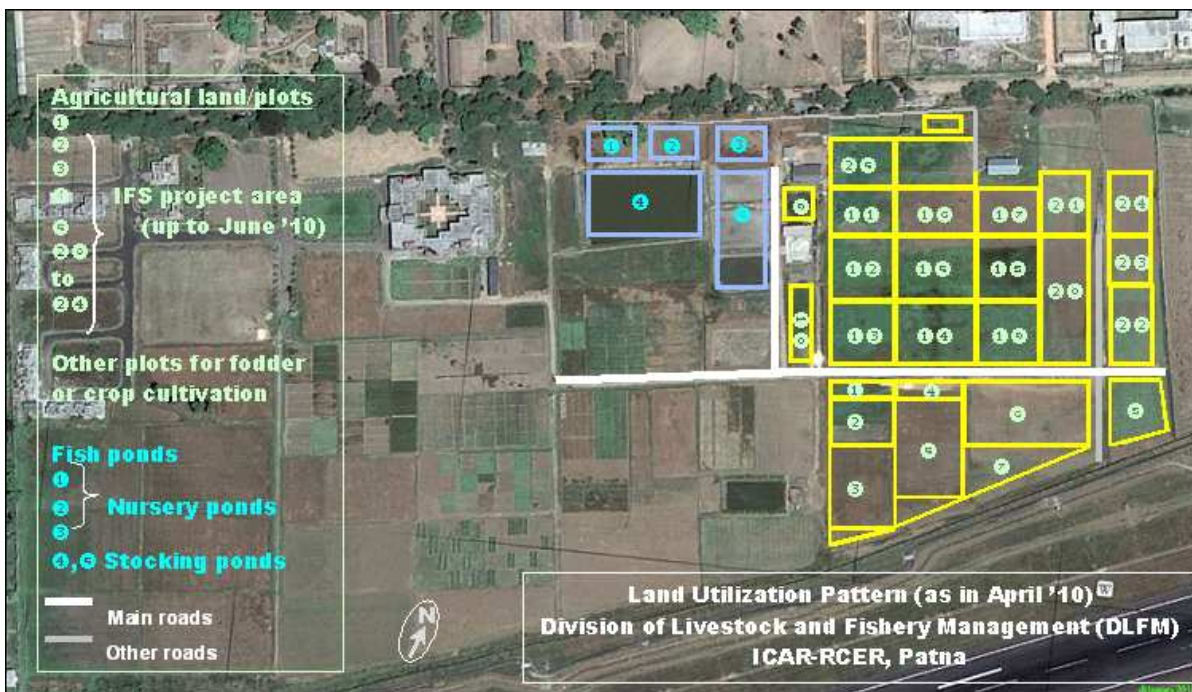
- Workshop on *Role of Livestock and Fishery in Farming System of the Complex* was organized at Patna on the recommendation of the RAC on 27<sup>th</sup> June 2005.

- The *National Fish Farmers' Day* was celebrated on 10<sup>th</sup> July 2006.
- *Fourth Indian Fisheries Science Congress*, April 12-13, 2007.

## Infrastructure and physical facilities

### Land and Buildings:

- ❖ The DLFM presently utilizing a total of 11 acre of land. One cattle shed, one poultry shed, shed for tractor and trailer and compost pits as well as five fish ponds have been constructed as research infrastructure.



### Farm:

- ❖ The livestock farm has one Experimental Dairy Unit and one Goat Unit. Presently in Dairy Unit, 31 crossbred cows are being maintained and Goat unit have 26 Jamunapari and 21 Black Bengal breeds. The livestock have been incorporated in various research programme of the Institute
- ❖ Fodder production activities have been started by introducing perennial forage like Napier grass. Annual forage like Oat, Pea, Cowpea and fodder Mustard was also introduced to meet the fodder availability round the year.

### Laboratories:

Four laboratories namely Animal Health, Animal Reproduction, Fishery and Animal Nutrition and Biochemistry. are functional with minimum basic facilities.

### Staffing pattern:

Sl. No.	Category of staff	Sanctioned strength	No. of staff in position (as on 01.04.2010)	No. of posts vacant
1	Scientific	12	8	4
2	Technical	15	3	12
3	Administrative	2	Nil	2
4	Supportive	12	1	11
	<b>Total</b>	<b>41</b>	<b>12</b>	<b>29</b>

## **Publications**

- A. Research/ Review Publications: 28
- B. Papers/ abstracts presented in seminar/ symposium/ workshop: 38
- C. Technical/ Extension Bulletins: 17