

## Progress through Technology

India has made immense progress in developing technologies for improving farm livelihoods. In spite of the technical advances in agriculture, livestock and natural resources, many socio-economically disadvantaged rural communities are dependent on traditional farming practices. To empower them technologically, BAIF's strategy has been to combine traditional wisdom with modern technology while implementing development projects. Its programme of on-station and on-farm research aims to enhance farm productivity and sustainability. Research strengthens BAIF's programme outreach comprising of 5.8 million farmers availing animal husbandry services, 68,000 ha of degraded land brought under agroforestry and improved agriculture, 390,000 ha of treated watershed and more than 10,000 self-help groups empowering rural people.

Bringing in new knowledge and innovative approaches being a high priority, BAIF identifies suitable technologies sourced within and outside the country and tests them under diverse environmental and social conditions before introducing to small farmers. Validation of traditional skills and knowledge of farmers is also a thematic area of BAIF research. Although applied research is the primary focus, studies on basic aspects that may lead to knowledge generation for eventual field application are also

appropriately integrated into the programme. Studies on climate change and biodiversity have been initiated on priority.

## Animal Science

Research for improved livestock production was initiated more than three decades ago and it has provided the much-needed technical solutions to BAIF's premier activity of cattle development.



*Genetic improvement of native breeds*

- ◆ Topics such as standardisation of design for buffalo and goat semen freezing, conception rate and calving interval were researched on priority during the formative years of the organisation.
- ◆ The rapid expansion of livestock farming into non-traditional areas, combined with the introduction of animals having higher milk production potential, necessitated research on the adaptability of crossbreds of different exotic blood levels to local conditions.
- ◆ Studies on economic viability of native milch breeds of cattle and buffaloes were

undertaken, before promoting these breeds in their native tracts.

- ◆ In order to address the constraint of fodder in these operational areas, research on fodder crops was initiated. This eventually resulted in the Central Research Station of BAIF becoming one of the research centres of the All India Coordinated Research Project (AICRP) on Forage Crops, a research network of the Indian Council of Agricultural Research. A fodder variety of pearl millet (BAIF Bajra-1) and a B x N Hybrid (BNH-10), developed by BAIF under this AICRP, have been released nationally.

- ◆ BAIF is a member of the AICRPs on Animal Nutrition and Animal Genetics since their inception to carry out coordinated research studies.

- ◆ Studies on animal nutrition and health were initiated to develop a suitable service delivery package for small farmers. The emerging importance of other farm animals towards achieving comprehensive rural development saw the inclusion of goat in BAIF's research programme.



BAIF Bajra-1

- ◆ Advanced research has also been initiated on embryo transfer, molecular genetics and genomics, and use of sexed semen.

## Crop Science

As the farming practices adopted by participants in BAIF projects were generally traditional in nature, the opportunities for testing modern technologies and evolving new methods have been enormous.



Fodder legume improvement trial

- ◆ Research on sustainable agriculture has been concentrating on field testing of improved crop varieties, management options for crops and soil, and strategies for minimising external inputs. Introduction of improved crop varieties together with appropriate management practices are being investigated both in tree-based systems and in monocrops.

- ◆ With the promotion of tree-based farming as the *wadi* model, comprising of fruit trees, annual crops and forestry species, the research focus has been on all the component species. Among the key areas of fruit tree investigation are integrated nutrient and pest management, and tree-annual crop interaction.

- ◆ Studies on ecological sustainability, resource use efficiency and external input

application include biological inputs, recycling of biomass, wild food resources and underutilised crop species.

- ◆ Research on multipurpose trees began in the early 1980s in collaboration with several international networks. Participation in their coordinated trials enabled BAIF to obtain and evaluate elite germplasm of multipurpose species for tree-based farming.
- ◆ To address agrobiodiversity, conservation of indigenous germplasm of crops such as rice, sorghum and minor millets has been undertaken.
- ◆ Studies on biofuel crops are also conducted to identify suitable germplasm for resource-limited conditions.

## Natural Resources

Sustainable management of natural resources, water and land in particular, is a basic component in BAIF's development endeavour and the primary avenue for addressing this is watershed development.

- ◆ Research is conducted to strengthen the overall programme. Considering the importance of water in the semi-arid tropics, water balance studies have been carried out to assess the favourable changes resulting from watershed development.
- ◆ The impact of watershed development on livestock, livelihood and quality of life of the people has been investigated.
- ◆ Study on the integration of drinking water supply, sanitation and watershed development in seven micro-watersheds in five states of India has given a deep

insight into the water-related issues of rural communities.



*Automatic Weather Station*

- ◆ Studies on the effect of domestic wastewater use on agriculture and people, effect of rainwater harvesting on the water quality and group irrigation systems have also been undertaken. The research-oriented approach has improved the programme and made it holistic.
- ◆ Studies on natural resources are often combined with development activities on operational scale sites for the findings to be accurate. Studies like community-managed silvipastures and a combination of traditional water harvesting and storage methods in arid areas and crop-goat production systems help in measuring the impact.
- ◆ Application of a landscape approach to combine natural resources and livelihoods helped understand the relationships in highly integrated real-life systems. Similarly, in hilly areas, the method of diversion-based irrigation system has been investigated.

## Social Science

Understanding the factors determining livelihood and quality of life is the aim of social

science research where qualitative and quantitative methods are used to examine issues and impact of development programmes.

- ◆ Studies on functioning of people's organisations, microfinance among self-help groups, influence of culture and traditions on health seeking behaviour and health status among communities have helped plan appropriate programmes.
- ◆ Studies on the role of traditional healers and trained health guides in making services available locally have further provided leads for research on medicinal plants for human and livestock use.



*Involvement of farmers in on-farm research*

## **Collaborations and Linkages**

In its endeavour to improve farm productivity in an environment-friendly manner, BAIF has established strong linkages with both ends of the technology spectrum,

from knowledge generating institutions to end-user rural communities. Among the research recognitions, BAIF is privileged to have the following as collaborators or sponsors:

- ◆ Indian Council of Agricultural Research, Ministry of Agriculture, Government of India;
- ◆ Ministry of Science and Technology, Government of India;
- ◆ French National Institute for Agricultural Research (INRA);
- ◆ Savitribai Phule Pune University;
- ◆ Veer Narmad South Gujarat University in Surat;
- ◆ Shivaji University in Kolhapur;
- ◆ Maharashtra Animal & Fishery Sciences University in Nagpur.

The research linkage at the level of rural communities encompasses on-farm technology validation, customisation to suit local situations and demonstration for wider dissemination. As solutions to field requirements may not be always readily available, research is carried out with internal funding or as a component of development projects. The mechanism to promote internal research includes a centrally-based Research Coordination Committee and an organisation-wide Research Focus Group. A new initiative known as Innovation and Knowledge Hub will reinforce the technology development and transfer strategy of BAIF further by resource concentration, thematic focus and intensive community participation.

**Contributions to BAIF for scientific research are exempt from Income Tax under Section 35(1)(ii)**



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