



DAIRY DEVELOPMENT PROGRAMS: BENEFITS AND RISKS FOR SMALLHOLDERS - THE CASE OF ANDHRA PRADESH, INDIA

Andhra Pradesh is one of the agriculturally most advanced states in India but still has high levels of rural poverty. Mixed crop-livestock farming is the predominant farming system practiced by over 80 percent of rural households in the state. Bovines account for about 40 percent of the livestock population and milk is one of the most important products of cattle and buffalo enterprises, contributing over half of the value of total livestock output of the state. Andhra Pradesh's milk is produced by 5 million dairy farmers, most of which own less than 2 hectares and 1 to 4 dairy animals.

Although milk production has shown remarkable growth in Andhra Pradesh over the past decade, the potential role of dairy farming as a means to improve household incomes and create rural employment is far from being fully exploited. For the dairy sector to play a more prominent role in rural development, there is an urgent need to devise dairy development programs that are affordable for and have significant impacts on the key production and financial parameters of the predominantly small farms that are typical for the region.

● Current Situation of Dairy Farmers in Andhra Pradesh

Incomes of dairy households range from 1,000 to 4,000 US\$ per year. The share of off-farm income is relatively high for small farms (80 percent) and decreases with increasing size of farm holding. This clearly indicates that poor, often landless farm households are mostly part-time farmers.

Total returns (cash and quantifiable non-cash benefits) per 100 kg milk range from 18 to 27 US\$. Farmers however incur total costs of 16 to 38 US\$ per 100 kg milk, when family labour (imputed at local wage rates), land and capital are included. This means that only a minority of farms make an entrepreneurial profit. On the other hand, if family labour is excluded from the calculation, all farms achieve a net dairy income of 5 to 10 US\$ per 100 kg milk. Due to the lack of better alternative uses of their production factors, these returns to dairy production are sufficient for these small farms to keep operating.

Returns to labour are inversely correlated to the cost of milk production. While large farms (10 to 15 animals) achieve returns to labour that are much higher than the local agricultural wage rate, on the smaller farms returns to labour are around half of the local wage rate.

Observed variation in performance of smallholder dairy farms, however, indicates that there is significant potential to improve livestock productivity in these production systems by improving breeding, feeding and herd management, thereby increasing the economic viability of the dairy enterprise.

At the farm level, initiatives that provide incentives to farmers to keep more productive animals without compromising their ability to work off-farm will be a necessary precondition to enhance dairy development in the region. This will entail devising dairy development strategies that are labour-saving, require little investment and are of low risk.

● Ex-Ante Assessment of Dairy Development Programs

Although large dairy farms represent a profitable enterprise in Andhra Pradesh, the vast majority of smaller farms are economically unattractive and would disappear as soon as farmers have better alternatives. This critical situation of small-scale farms persists in spite of numerous dairy development activities long in existence in the state. Therefore, the farm-level impact of over 40 potential dairy development interventions covering feeding, breeding, animal health and milk marketing on a typical 3-buffalo farm was assessed through an iterative process that combined detailed household and farm simulation with expert and farmers' opinions and feedback. Several of the most promising interventions were combined to a 'Dairy Development Ladder' to assess whether the dairy competitiveness of small farms can be brought up to that of the larger farms.

The assessment paid particular attention to the risks associated with each of the programs by introducing stochastic variables into the simulations, and thus also provided estimates of probabilities of the programs leading to specified results.



• Likely Program Impacts on Dairy Income

The *ex-ante* assessments reveal that most interventions indeed raise dairy income and returns to labour, decrease the cost of milk production and increase the likelihood of achieving selected thresholds for the above parameters, thereby reducing the risk inherent in dairy farming. For example, improved animal feeding is likely to increase the return to dairy labour by an impressive 145 percent, lifting it above the regional wage level for unskilled labour, while reducing the risk of falling below the current level of returns from 0.45 to around 0.15. This implies that whichever family member stays on the dairy farm, (s)he is likely to obtain a higher notional wage than the family members working off-farm. With such an attractive outcome the question of why not more farmers are adopting better animal feeding practices arises.

The *ex-ante* assessment of the 'Dairy Development Ladder' shows that smallholder dairy farms have the potential to become competitive milk producers, reduce the risk inherent in farming and substantially improve household income. As a consequence of the sequence of interventions the farm develops in a gradual manner, which should present a realistic development path, as it draws on regional expertise and builds on local cases of competitive milk producers.

• The Importance of Risk and Diversification

Several factors may be the reason for the low adoption of dairy improvement programs: (a) the low overall impact on household income; (b) the risk associated with specialization in dairy and (c) the higher requirement for working capital.

The dairy enterprise contributes 0.13 US\$ or 16 percent to the daily per capita household income. Consequently, even the most promising dairy interventions are only expected to increase per capita household income by 27 percent, whilst they require substantial changes in farm management. Genetic improvement of their dairy animals was provided by farmers as an example of how they would have to stop grazing in public land and replace paddy, their main staple food, with green fodder, while still producing for a very unreliable market (milk vendors) or for a non-remunerative milk price (from the cooperative), a risk they do not consider worth taking.

Farmers participating in this study were not only highly risk averse but they were also reluctant to make optimistic assumptions about 'framework' conditions for dairying such as more or better access to water, working capital, health services and a remunerative and reliable milk price. Smallholder farmers universally agreed that without the above conditions in place to diminish or eliminate their risk in adopting new technologies, they would not subscribe to the main dairy development programs on offer, in spite of their obvious potential benefits.

• Implications for Dairy Development Programs

It is well-known that resource-poor farmers are, by necessity, risk avoiders. Therefore, dairy development programs must simultaneously improve the financial performance as well as the risk profile of the targeted farms.

Dairy development programs are not normally conceived to comprehensively address a wide range of factors, which however determine their adoption and success. Undoubtedly, it is questionable whether it would make practical sense for any one program to tackle all of the identified issues, but a promising approach could be to forge strategic partnerships among existing programs which are likely to have strong complementary effects.

The need for one program to partner and build on another is evident in the 'Dairy Development Ladder'. The results indicate that, gradually effective partnerships, among various programs and with the farming community, can effectively lift small dairy producers out of poverty through a competitive dairy farming business, which provides not only an excellent wage level under local conditions, but which is also well-positioned against international competition in a global economy.

Policy Brief based on:

Dairy Development Programs in Andhra Pradesh, India: Impacts and Risks for Small-scale Dairy Farms; PPLPI Working Paper 38, Otto Garcia, Amit Saha, Khalid Mahmood, Asaah Ndambi and Torsten Hemme

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