



Adoption of Multi-Nutrient Block Technology under Field Conditions: Pathway of Success for Livestock Farmers in Kashmir Himalayas

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ABSTRACT

Agriculture in Jammu and Kashmir is mainly rain fed and non-mechanized with limited scope for diversification due to typical land topography (mostly terrains) and restricted to a specific period (4-5 months of long harsh winter), thus animal husbandry is widely adopted in the region. However, the current low level of productivity of livestock remains an area of concern due to which the sector continues to be a non-vibrant economy even though having huge prospects. In order to address the problem of low productivity under field conditions, Scientists from Division of Animal Nutrition, FVSc and AH, Shuhama, SKUAST-Kashmir under DAHD-NLM, GoI sponsored project conducted awareness programmes and distributed value-added multi-nutrient blocks to the identified beneficiary dairy and sheep farmers in three district of Kashmir valley. As a result, the farmers got motivated and the impact of the technology adoption by the farmers led to significant improvement in the performance of animals in terms of enhancement of milk yield and composition, improvement in health and reproductive status, increased body weight gain and better economic returns to the farmers.

Situation Analysis

The Jammu and Kashmir is the northern most, hilly and 11th largest erstwhile state of India with the net area sown of only 7% of its total geographical area. The livestock sector alone contributes about 11% to total GDP of the Union Territory in contrast to 4.11% at the national level. However, the poor availability of feed and fodder resources both in terms of quantity and quality (especially during Winter and Spring seasons) result in non-fulfilment of nutritional needs of the livestock affecting their health and contributes to their low productivity. As such, there is a dire need to develop and disseminate technologies to pursue the goal of better health and higher productivity of animals that will not only bridge the demand and supply gap of animal food products but also make the sector a profitable venture to uplift the socio-economic condition of the farmers. Multi-nutrient block (MNB) technology is one of the methods developed in recent years to improve the

nutritional status of ruminant livestock. The MNB is an excellent blend of energy in the form of molasses, nitrogen in the form of urea and minerals as mineral mixture that provides these nutrients necessary for optimum productivity but normally deficit in routine diets provided to animals under field conditions. MNB supplementation is advantageous particularly for livestock reared on poor quality feed resources as is being practised under rural conditions pan India vis-a- vis J&K. They are convenient in terms of packaging, storage, transport and ease of feeding, thus are generally more in acceptable form by livestock farmers as majority of the farmers are marginal or small holders practicing unscientific feeding management ways of rearing livestock.

Plan, Implement and Support

The study was carried out in three districts of Kashmir valley viz. Bandipore in North, Budgam in Centre and Pulwama in South. 5 villages in the vicinity of Krishi Vigyan Kendras of



Survey in the study area before intervention



Collection of samples from livestock before intervention

concerned districts (Aloosa, Mangnipora, Potushai, Gamroo and Nadihal in district Bandipora; Galwanpora, Warapora, Qadipora, Haran, Soibugh in district Budgam; Banderpora, Goripora, Padgampora, Takuna and Malangpora in district Pulwama) were selected based on their involvement of animal husbandry activities. 10 beneficiary farmer families (6 dairy and 4 sheep farmers) from each of the selected village were identified for whom livestock rearing acted as the primary source of livelihood. In total, 150 beneficiary farmers were adopted under the study.

Survey was carried out in the selected areas for animal feed availability and feed practices followed by the identified farmers using pre-tested, structured schedule and personal observation. Samples of feeds/fodders offered to the livestock, milk and blood were collected and analysed to assess the nutritional status of livestock under field conditions before

intervention. Value-added multi-nutrient block (MNB) were prepared, the composition of which was validated by experimental pilot trials using region specific supplements. The MNB were prepared each of weight ~2.70 kg under the Government scheme of National Livestock Mission (NLM), Department of Animal Husbandry & Dairying, Ministry of Fisheries, Animal Husbandry & Dairying, Govt. of India operational in the Division of Animal Nutrition, SKUAST-Kashmir. These value-added MNB were free distributed among the identified beneficiary farmers in two phases of three months each coinciding with the two seasons *viz.* Winter and Spring. In order to create awareness among the selected beneficiaries, six training programmes on importance and methods of feeding MNB to ruminant livestock for higher productivity were also conducted as detailed below:

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Table 1. Training programmes conducted on importance and methods of feeding MNB

Season	District	Number of trainings	Number of participants
Winter	Bandipore	1	50
	Budgam	1	50
	Pulwama	1	50
Spring	Bandipore	1	50
	Budgam	1	50
	Pulwama	1	50
Total		6	300

Table 2: Distribution pattern of value-added MNB among the identified beneficiary livestock farmers

Village	District Bandipora		District Budgam		District Pulwama	
	Winter season	Spring season	Winter season	Spring season	Winter season	Spring season
1	100	100	100	100	100	100
	(10 farmers each received 10 MNB of 2.70 kg weight each)					
2	100	100	100	100	100	100
3	100	100	100	100	100	100
4	100	100	100	100	100	100
5	100	100	100	100	100	100
Total MNB distributed	500	500	500	500	500	500

The details of the value-added MNB distributed among the beneficiary farmers during the study are given in the Table 2.

Thirty (6 cows $\times$ 5 villages) cows in their 2nd or 3rd lactation and hundred (5 ewes $\times$ 4 farmers $\times$ 5 villages) ewes in 2nd to 4th gestation were identified in each district. Animals under the study were offered 300 g to cows and 60 g to ewes of value-added MNB per animal daily above the normal course of feeding practices throughout the two seasons. The animals were reared under normal managerial conditions prevailing under field conditions with *ad libitum* lukewarm drinking water available. Effect of supplementing MNB to livestock on feed intake, production performance, metabolic profile and production economics were assessed.

Output

The study was conducted during Winter (November, 2023 to January, 2024) and Spring (February to April, 2024) when the livestock in Kashmir are under cold stress as the average ambient temperature fluctuates around -5 to 10 °C and 7 to 15 °C, respectively; moreover, most of the animals remain pregnant during the period. These conditions result in higher feed/nutrient requirements for livestock during the seasons. However, this is the time in Kashmir valley when greenery perishes from the scenario, and only locally available poor quality crop residues are left on which animals are completely stall fed. Also, non-availability of concentrate feeds due to blockade of National Highway by inclement weather during the period results in non-fulfilment



Value-added Multi-Nutrient Blocks (MNB) prepared for distribution



Trainings of farmers and distribution of prepared value-added MNBs among the selected beneficiaries

Table 3. Performance of livestock after adoption of value-added MNB supplement technology by farmers (n=90 dairy and n=60 sheep) of three districts of Kashmir

Specie	Parameter	Before intervention	After intervention (Winter)	After intervention (Spring)
Cattle	Dry fodder intake (kg/day)	7.98±0.14	9.23±0.13	8.97±0.13
	Average daily milk yield (Lt/animal))	9.03±0.34	10.64±0.35	10.91±0.34
	Milk fat content (%)	3.42±0.09	4.30±0.06	4.28±0.04
	Milk Solid not fat content (%)	7.65±0.08	8.53±0.04	8.40±0.04
	Body Condition Score	2.62±0.06	2.89±0.04	2.93±0.03
	Plasma urea N (mg/dL)	13.47±0.47	16.61±0.40	17.02±0.36
	Serum Calcium (mg/dL)	8.74±0.16	11.02±0.18	10.55±0.08
	Average Cost-benefit ratio	1:2.71	1:3.31	1:3.86
Sheep	Body weight change (kg)	44.07±0.59	47.67±0.51	51.42±0.46
	Body Condition Score	2.95±0.06	3.13±0.04	3.07±0.03
	Blood urea N (mg/dL)	8.82±0.19	12.36±0.31	12.97±0.24
	Serum Calcium (mg/dL)	10.93±0.20	12.81±0.17	12.84±0.16

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of nutrient requirements deteriorating their health and lowers productivity (drop in milk yield, loss of body condition score, unthriftiness, higher incidence of metabolic and reproductive disorders, etc.). Introduction of value-added MNB technology in 3 districts of Kashmir was well appreciated by the livestock farmers after continuous motivation through trainings and free distributions. The overall beneficial outcomes of the technology convinced the farmers to adopt the technology of feeding MNB to ruminant livestock for overcoming the nutrient deficiencies experienced by animals during these harsh seasons to augment the productivity and increase net farm income returns to the owners.

Outcome

The outcome of the value-added MNB technology adoption by the beneficiary farmers in the selected village led to the overall improvement in health, production and composition of milk from dairy cattle, body weight gain in sheep, body condition score and lower incidence of reproductive disorders in animals. Evaluation of the different

parameters revealed a significant improvement in the performance of the animals provided with value-added MNB supplements (Table 3).

Impact

The positive effects of feeding value-added MNB on animal performance and net farm economic returns motivated the farmers to adopt the technology. The adoption pattern of the technology was evaluated among 150 beneficiaries in 15 selected villages of 3 districts of Kashmir, and the response of adoption of the technology is given in Figure 1. The farmers were ready to purchase MNB for animals not covered under the study and even non-beneficiary farmers got motivated towards adoption of the technology. Based on the adoption results and gaining popularity of the technology, approval was granted by the Competent Authority of the University in favour of the 1st author, Principal Investigator of the project for registering the company under SKUAST- Kashmir Innovation, Incubation and Entrepreneurship (SKIIE) Centre for up-scaling the production of MNB to commercial level.

Figure 1: Response pattern (in percentage) of the distributed value-added MNB among the beneficiary farmers (n=90 dairy and n=60 sheep)

