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Future aspirations and planning of dairy farmers in India: Horizon 2020

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ABSTRACT

Indian milk production has shown remarkable performance during last four decades. Although the demand for milk is increasing at faster pace in consonance with increasing per capita income, changing dietary pattern, rapid urbanization and burgeoning population, some milk producers do not find milk production as sufficiently remunerative. Keeping these facts in view, a study was conducted to document the present status and future aspirations of dairy farmers in India by 2020. Haryana, Maharashtra and Odisha states were purposively selected from highly, moderately and least dairy progressive states by stratified random sampling, respectively. The total sample size was 900 containing 300 dairy farmers from each state. Study revealed that there is a likelihood of increase in average herd size in all the three states, although number of dairy farmers are likely to decrease. In Haryana, buffalo based system will remain dominating, large scale crossbred and pure indigenous farms will arise. In Maharashtra, farmers showed more inclination towards the crossbred cattle as 44.52% wanted to increase crossbred and 30.14% wanted to carry forward the same. Indigenous cattle will be reared only in extensive system of management. Buffalo based farms will come up in the future. In Odisha, though farmers are interested in crossbred, the dairy farming is highly constrained by lack of skill, input availability especially fodder. Managerial practices in Haryana showed more inclination towards input intensive, in Maharashtra farmers are moving towards intensive system and adoption of improved housing, feeding, finance are likely to appear in Maharashtra. To achieve the future demand, efforts are required to improve the skills of farmers in low progressive states, proper breeding strategies for increasing milk potential of animals, use of local available resources and competitiveness among the farmers.

Key words: Dairy farmers, Future aspirations, Haryana, Maharashtra, Odisha

Indian dairy sector has achieved more than 9-fold increase in milk production, from 17 million tonnes in 1950–51 to 155.5 million tonnes during 2015–16 (DAHDF 2017). Although per-capita availability (337 g/day) is currently more than the requirement of 280 g/day, the projected demand for milk is high, i.e. 200 to 210 million tonnes of milk by 2021–22. The demand will increase attributing to the increasing per capita income, changing dietary pattern, rapid urbanization and burgeoning population (Shah and Dave 2010). Regional disparities remain a cause of concern in Indian livestock sector (Kale *et al.* 2016). Large share of milk in India is being produced by small holders. Unless milk production increases at the pace required, there is a possibility of a widening gap in supply of milk, which could lead to a dependence on imports. Indian dairy sector is witnessing structural transformation as many farmers are diverting towards off-farm livelihood sources. There is a drop in number of farmers in the country by a staggering 9 million during 2001 and 2011 (Census 2011), hence the domestic production could be increased in terms of quantity and quality with adoption of Good Dairy Farming Practices (FAO 2011). Therefore, it is apt to study the current status and future aspiration of dairy farmers in India for strategic planning of milk production to meet future demand.

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MATERIALS AND METHODS

To study the present status and future aspiration and planning of the dairy farmers in India, 16 states were classified into three categories namely, highly, moderately and least dairy progressive states based on 'Dairy Progressiveness Index' (Kale *et al.* 2016). A short time frame of next five years from 2016 to 2020 was fixed for study keeping in view optimum period for farm planning of farmers. Study was conducted in three states namely Haryana, Maharashtra and Odisha from highly, moderately and least dairy progressive states by stratified random sampling, respectively. From Haryana, Hissar, Kurukshetra and Kaithal; from Maharashtra, Pune, Wardha and Raigad; from Odisha, Puri, Khurda and Nayagarh were selected based on average milk yield of bovine animals, i.e. high, medium and low milk yield, respectively. From each district, one block and two villages from each block were selected,

randomly. Thus a total of 18 villages were covered under study. From each village, 50 dairy farmers were selected for the study. Thus, total sample size was 900 respondents. A pretested structured interview schedule was developed and data were collected by face to face interview of the respondents. The results were analyzed using descriptive statistics and decision tree diagram.

RESULTS AND DISCUSSION

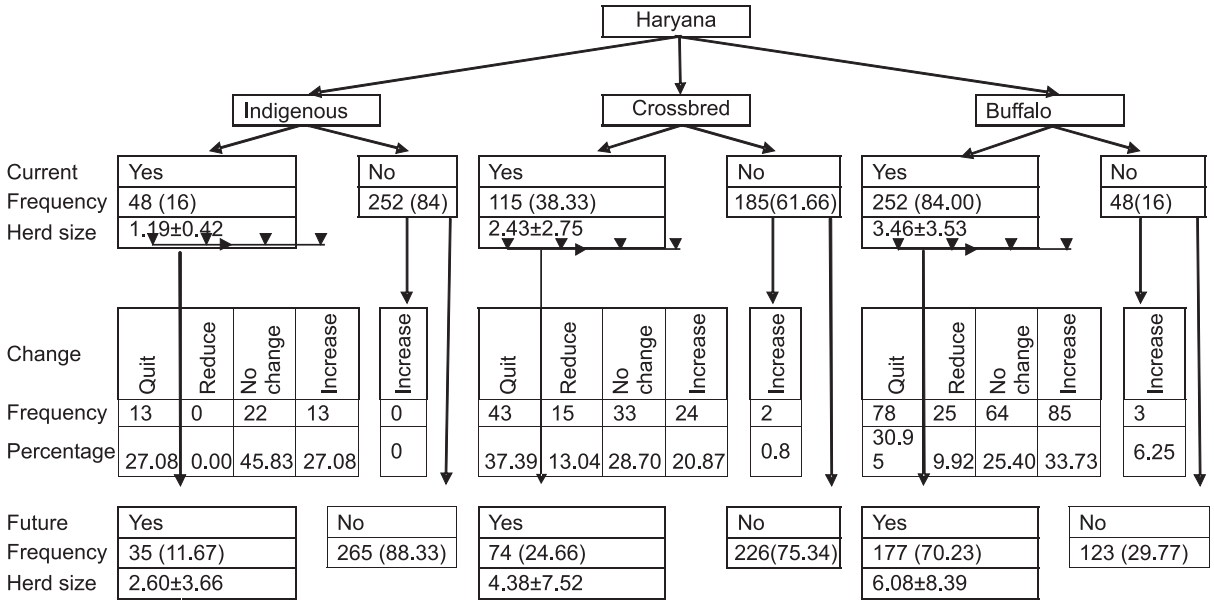
Present status and future plan of farmers on rearing of dairy animals

Haryana: Being home track for '*Murrah'* breed of buffalo also called back gold of Haryana, most of the respondents (84.00%) possessed buffalos followed by crossbred (38.33%) and indigenous cattle (16.00%). Farmers' views on future plan (Fig. 1), indicated that in case of buffaloes, 30.95% farmers were likely to quit while 9.92% were willing to reduce number of buffaloes. Most of the buffalo owners stated that they are involved in off-farm businesses and unwillingness of family members, especially, young generation to do this labour intensive job. Around one third of the respondents (33.73%) wanted to expand the buffalo herd size, considering it as the major source of income. A quarter of respondents (25.40%) wished to carry forward the buffalo based dairy enterprise with current herd size. About 6.25% farmers who did not possess buffaloes intended to start buffalo based dairy farm. Though the buffalo rearers were likely to reduce from 84.00% to 70.23%, the average size of milch animals in herd is likely to increase from 3.46 to 6.08 animals. It indicated that the comparative large sized buffalo farms are likely to emerge.

Around 38.33% respondents from Haryana were rearing crossbred cows. Out of these 115 crossbred rearers, more than one third (38.33%) of the respondents showed their willingness to give-up the crossbred cattle whereas almost 13% wanted to reduce number of crossbred from the present herd size. Reasons revealed from the farmers' feedback were mainly repeat breeding, increasing cost of production and economic loss due to diseases and low price of the milk. Around 28% of the crossbred rearers were willing to keep *status quo* situation in future whereas 20.87% farmers had vision to increase the crossbred in next five years. Only 1% of non rearer of crossbred showed interest to involve in crossbred dairy farm in the future by cognizing the high milk potential of crossbred cattle. Though, the crossbred rearers were likely to decline from 38.33 to 24.66%, the average size of milch animals in herd which is likely to increase from 2.43 to 4.38% animals in near future. It indicated the decrease in small holders and increase in comparative large sized crossbred farms.

Only 16% farmers were rearing indigenous cattle. Out of these indigenous cattle rearers, a little more than a quarter (27.08%) intended to discontinue indigenous cattle for milk production. However, same portion of the respondents (27.08%) were willing to increase the size of the herd with milch indigenous cattle. Nearly half of the respondents (45.83%) wished to maintain *status quo*. It was also observed during the field survey, farmers mainly wanted to rear indigenous cattle either for home consumption with local or non-descript cattle whereas for commercial large farm they were willing to have pure breeds especially *Sahiwal* and *Tharparkar*, considering their milk production potential and demand for milk of indigenous cattle.

Maharashtra: Unlike Haryana, more than half of the sample respondents (55.67%) were rearing indigenous cattle in Maharashtra. Out of these indigenous cattle rearers,



Figures in parentheses are percentage, and average herd size is mentioned in row indicted by mean and standard deviation

Fig. 1. Determining present status and future plan of sample farmers of Haryana on rearing of dairy animals

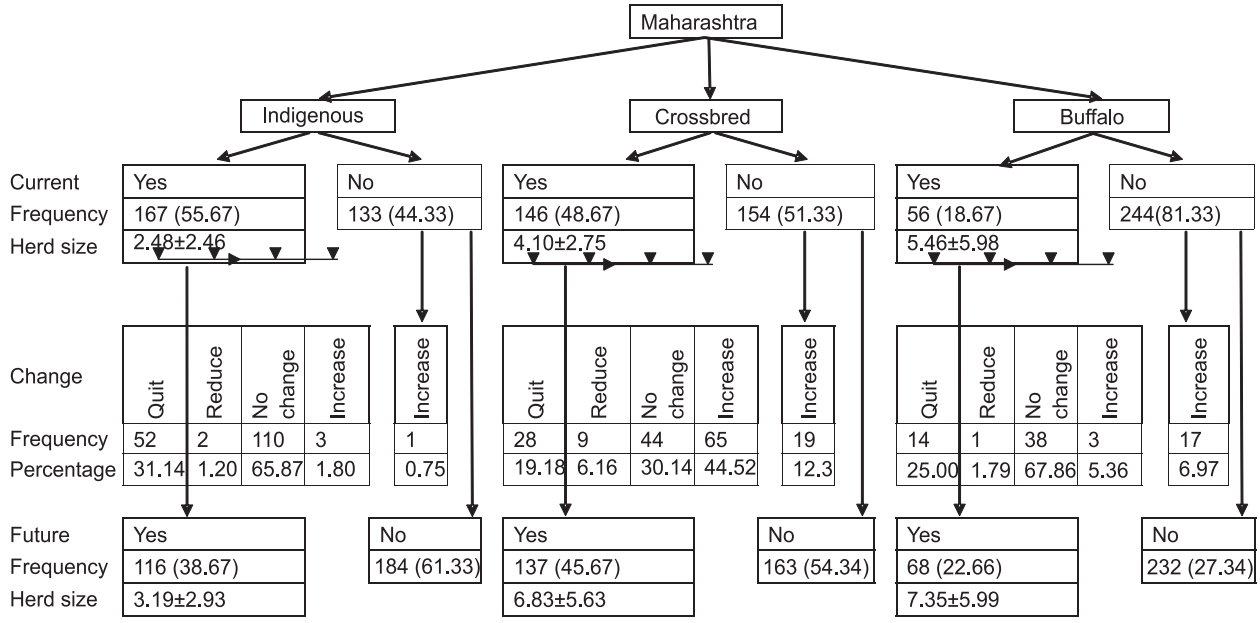


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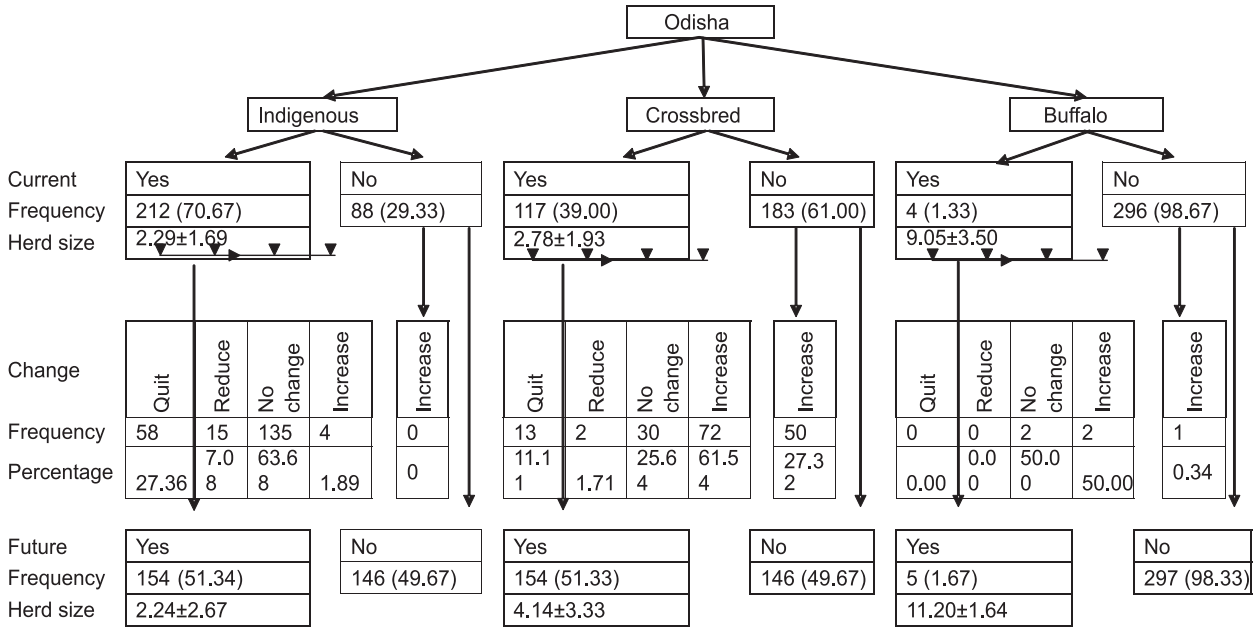
Fig 2. Determining present status and future plan of sample farmers on rearing of dairy animals in Maharashtra

around two third (65.87%) could not foresee change in the size of milch indigenous cattle. Out of the sample household, indigenous cattle were reared mainly in Wardha and Raigad districts due to the availability of pasture land and forest land for grazing. In this region, especially in Wardha community, grazing is practised. One or two hired labourers were engaged for grazing of large herd of all the indigenous cattle from different households of the village. Cattle and buffalo holders were given license to graze their animals in forest and community land by local authorities. Thus the cost of rearing of animals is low. Therefore, most of the farmers are not willing to make major changes in the herd size. Whereas, nearly one third of respondents wanted to quit and because of low level of profit from the indigenous breed (*Gaulao* is the local breed in Wardha district) and its main utility is for draft purpose breeds. Increased mechanization led to low demand for draft purpose animals. It was observed that farmers preferred to rear crossbred than indigenous animals wherever they get the chances of growing of green fodder. Few respondents showed their willingness for large sized indigenous purebred farms, especially, *Gir* in Wardha and *Sahiwal* in Pune district by considering their milk potential and demand for milk. As the mean and standard deviation from present 2.48+(2.46) to future 3.19+(2.93) has increased without major increase in number of indigenous cattle rearers, it indicates the likely emergence of few large scale farms.

In Maharashtra, nearly half of the respondents (48.67%) possessed crossbred cattle. Fig. 2 shows more inclination of the farmers towards the crossbred cattle as 44.52% were found to exhibit keen interest to increase crossbred and 30.14% wished to carry forward the same. Around 12.30% of non crossbred rearers exhibited their interest towards crossbred cattle due to high milk potential of crossbred cattle and availability of organized market. A total of 18.67% sampled household possessed buffaloes. The *Pandharpuri* breed was mainly reared in Pune and Raigarh districts and *Nagpuri* breed in Wardha district. Quarter of them (25%) wanted to quit buffaloes due to long dry period and infertility problem. More than two third of the respondents (67.86%) wished to remain with current buffalo herd size due to comparatively better yield of buffalo than indigenous cattle and local demand for buffalo milk which fetch higher profit. About 5.26% buffalo rearers and 6.25% farmers who do not possess buffalos also inclined to start buffalo based dairy farm in future.

Odisha: The population of the milch animals was dominated by cattle over buffaloes in Odisha (Fig. 3). Most of the farmers (70.67%) possessed indigenous cattle while 39% of them were rearing crossbred cattle. Future intention of the farmers shows shift from indigenous to crossbred. About 27.36% respondents were willing to quit indigenous dairy cattle and 7.08% wanted to reduce while large portion (63.68%) wanted to keep same herd size. In contrast to indigenous cattle, 61.54% crossbred rearers wanted to increase the size of milch herd and more than a quarter of non crossbred holders were interested to have crossbred in the near future. Low milk potential of local cattle is main reason for reduced interest of the farmers. But the climatic condition, unavailability of green fodder and dominance of the unorganized marketing were still the limiting factors for growth and sustainability of crossbred cattle. Mean value of the size of crossbred milch cattle showed significant increase which will not find in indigenous cattle. It was observed that farmers may not be interested for buffalo rearing.



Figures in parentheses are percentage, and average herd size is mentioned in row indicted by mean and standard deviation

Fig. 3. Determining present status and future plan of sample farmers on rearing of dairy animals in Odisha

Present status and future plan of farmers on selected managerial parameters in dairy farming

Labour: Trend from use of family labour to hired labour was predominantly found in Haryana and Maharashtra, as shift from hired labour was likely to increase from 22.33 to 35.71% in Haryana and 25.67 to 32.89% in Maharashtra. In Odisha, significant change was not foreseen. Due to intensive nature of farming, emergence of large farms and unwillingness of family members to work in dairy farm, the dependency on hired labour seems to be increasing in Haryana and Maharashtra. Due to extensive nature and practice of community grazing dairy will not be much labour intensive in Odisha.

Cattle shed: At present, in Haryana, Maharashtra and Odisha about 68, 44.67 and 11.33% of the respondents owned *pucca* cattle shed which are likely to increase at 91.43, 55.70 and 28.15%, respectively (Table 1). In Odisha, due to small scale production and constraint of capital, farmers are less likely to convert cattle shade into *pucca* type.

Dairy loan: It is revealed from the Table 1 that only 17, 14 and 4.67% of the respondents from Haryana, Maharashtra and Odisha availed institutional loan for dairy farm and 43.81, 32.02 and 16.81%, respectively showed their willingness for institutional credit.

Marketing channel: Present status of the marketing channels used by farmers revealed that in Maharashtra, organized private sector dairies were dominating (44.00%) followed by Haryana (31.67%) but milk sold through organized private sector dairies was low in Odisha (9.67%). It might be due to small scale of production at farm level could not motivate the private dairies to increase marketing infrastructure. In unorganized sector, obviously, milk sell to vendors is dominating over consumers and hotels or *halwai* in all the states. Vendor system is dominating in Odisha (58.67%) followed by Haryana (39.00%) and Maharashtra (39.00%). Keen observation of Table 1 suggests future inclination of the farmers towards organized sector.

Mechanization: Only 3.33% sampled households in Haryana followed by 2.67% in Maharashtra and 0.67% in Odisha were found to use milking machine. In the near future more farmers wanted to adopt milking machines from Maharashtra (11.40%) followed by Haryana (9.52). In Odisha, farmers were not willing to adopt because of low milk yield potential of animals. The adoption of chaff cutter was high in Haryana (68.67%) and likely to increase to 83.81%. In Maharashtra, only 5% of farmers adopted chaff cutter and likely to increase by 24.12%. In Odisha, negligible number of farmers possessed chaff cutter (0.67) and not likely to increase in future also. The reason for lower level of mechanization may be small scale nature of dairy farming, lack of adequate fodder, high cost of machinery and equipments and lack of incentives from government.

Dung utilization: In India, farming is traditionally mixed farming; therefore dung is used for manure and dung cakes for fuel in all the states. Very few farmers were selling the manure. The adoption of biogas is also very low in all the states and not likely to increase in future also.

Insurance: More number of respondents from Haryana (16.67%) insured their milch animals followed by Maharashtra (16.33%) and Odisha (2.67%). The reason is availability of animal insurance scheme from the government and institutional loan but lack of awareness and difficulty in claim settlement.

Table 1. Present status and future plan of the farmers for selected managerial parameters in dairy farming

Parameter		Haryana		Maharashtra		Odisha	
		Present (N=238)	Future (N=300)	Present (N=210)	Future (N=300)	Present (N=228)	Future (N=300)
Family labour		77.67	64.29	74.33	67.11	32.00	31.09
Pucca cattle shed		68.00	91.43	44.67	55.70	11.33	28.15
Dairy loan		17.00	43.81	14.00	32.02	04.67	16.81
Marketing channel	a) Cooperatives	17.67	21.43	18.67	21.05	17.33	18.91
	b) Private dairies	31.67	32.38	44.00	48.68	9.67	15.97
	c) Vendor	39.00	34.29	25.00	16.67	58.67	46.64
	d) Consumers	10.00	9.52	10.00	10.53	11.67	14.71
	e) Hotels/Halwai	1.67	2.38	2.33	3.07	2.67	3.78
Mechanization	a) Milking machine	3.33	9.52	2.67	11.40	0.67	0.84
	b) Chaff cutter	68.67	83.81	5.00	24.12	0.67	1.26
Dung utilization	a) Manure for field	82.00	83.81	89.00	88.60	86.67	83.61
	b) Sale of manure	18.33	16.19	6.00	6.58	23.00	24.37
	c) Biogas	0.33	0.48	5.00	6.58	0.33	0.42
	d) Dung cake	99.00	93.33	93.33	88.60	91.33	92.44
Insurance		16.67	20.95	16.33	14.47	2.67	2.52
Feed management	a) Stall feeding	100.00	100.00	46.67	53.51	39.67	51.68
	b) Grazing	0.00	0.00	53.33	46.49	60.33	48.32
	c) Concentrate	99.33	100.00	55.33	80.70	36.33	46.22
	d) Supplement	29.33	35.24	29.67	36.84	6.00	8.40
Value addition in milk		4.00	8.57	2.67	9.21	14.67	18.49
Breeding	a) AI	37.33	50.95	34.67	50.44	28.00	36.97
	b) Natural service	22.00	18.57	43.00	28.95	42.33	29.83
	c) Both	40.67	30.48	22.33	20.61	29.67	33.19
Fodder production		86	86.19	39.33	47.80	3.66	0.46

Note: There is difference in present and future respondents because 30, 24 and 20.67% respondents from Haryana. Maharashtra and Odisha decided to quit dairy farming. Therefore, these respondents were not considered for the futuristic planning in dairy management.

Feed management of dairy animal: Feeding system of dairy animals in Haryana was intensive, i.e. stall feeding whereas in Maharashtra and Odisha it was mix of both intensive as well as extensive. But because of depletion of grazing land and forest areas, in future it will be more inclined towards the intensive system. The adoption of concentrate feeding in Haryana is near to % and likely to be adopted by all the respondents in future. In Maharashtra, more than half of the respondents fed concentrate to milch animals and it is likely to go up to 80.70%. While, in Odisha it was low and likely to go up from 36.33 to 46.22%. The adoption of supplementary mineral mixture was found similar in Haryana (29.33%) and Maharashtra (29.67%) and likely to increase at similar pace at 35.24% and 36.84%, respectively. But in Odisha, the adoption of supplementary mineral mixture was found low (6.00) and not likely to increase at high rate (8.40). In case of the mineral mixture, most of the farmers were willing to use only when it is available from government or marketing agencies at subsidized rate.

Business unit: Most of the respondents were involved in the milk production in all the states whereas 14.67% respondents from Odisha were engaged in value addition to milk followed by Haryana (4.00) and Maharashtra (2.67). In Odisha as the unorganized marketing system was dominating, more farmers in the nearby areas of cities and town were engaged in value addition to the milk. Particularly, Behara community in Odisha was selling *chhena* and paneer in city. More number of training programmes must be arranged on value addition in milk for farmers.

Breeding: It was found that the adoption of Artificial Insemination (AI) was more in Haryana (37.33%) followed by Maharashtra (34.67%) and Odisha (28.00%). It is likely to increase in similar fashion in Maharashtra (50.95%) followed by Haryana (50.44%) and Odisha (36.97%). The reason for lower adoption of AI in Maharashtra and Odisha, might be extensive nature of animal rearing. The quality and timely AI services affect conception rate and ultimately adoption of AI.

Fodder improvement: About 86% of the sampled respondents cultivated fodder crops in Haryana followed by Maharashtra (39.33%) and will slightly increase in future. Fodder cultivation in Odisha was negligible and not likely to change attributed to lack of irrigation and dependency on grazing. The awareness on silage, *azolla* and hydroponics is increasing in Maharashtra and adoption is likely to increase in future.

The future decisions of the farmers will primarily rely on demand for milk and milk products as well as profitability in dairy farming. In progressive states like Haryana, buffalo based system will continue to remain

dominating farms with large scale crossbred and pure indigenous breeds. In Maharashtra, farmers exhibited more inclination towards the crossbred cattle in intensive system. Indigenous cattle will be reared only in extensive system of management. In Odisha, though farmers are interested in crossbred, the dairy farming is highly constrained by lack of skill, input availability especially fodder. Managerial practices in Haryana will show more inclination towards input intensive while in Maharashtra farmers are moving towards intensive system. Adoption of improved housing, feeding, and financial support is likely to appear in Maharashtra. Under the extensive system of management in Maharashtra and Odisha, farmers can produce milk with low cost and in this situation, farmers are ignorant for adoption of improved dairy management practices. Mass scale of adoption of dairy innovations need to be promoted through effective extension delivery especially focusing on improved management practices such as housing management, breeding and feeding management, risk management via insurance, value addition. Strengthening organized marketing, proper breeding strategies, use of local feed and fodder resources and skill development in dairy sector should be given priority as it is one of the major source of livelihood for 70 million livestock holders.

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