

RESEARCH ARTICLE

Agri-Inputs Consumption Patterns, Access, and Delivery Mechanism in India

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ABSTRACT

The Government of India has initiated several programs to provide timely inputs to farmers with special subsidies on regular inputs such as seed material, fertilizers, irrigation, animal purchase, etc. These inputs are supplied through various mechanisms such as government departments, agricultural universities, KVKs, NGOs, local shop owners, producer's associations etc. Studying the agri-inputs available and their supplying mechanisms in India provides clarity on the status of farmers and the number of farmers who benefited from different services provided by GOI. A survey questionnaire was developed to collect data from the 14 states with a sample size of 409 farmer respondents and was administered to the Foundation course for Agricultural Research Service (FOCARS)-82 batch, who were undergoing field experience training (FET) at ICAR-NAARM, Rajendranagar, Hyderabad, Telangana State. The survey revealed that most farmers felt satisfied with the quality of seed, followed by agrochemicals and chemical fertilizers. Among all the assets, farmers spent the most money on purchasing animal feed (INR 46047.05) followed by planting material- saplings (INR 34445.07) and adult draught animals (INR 31805.07). The maximum number of respondents specified that storage facility for grains, electricity, and byproducts were sufficiently available. More money is spent on purchasing the recurrent associated input, i.e., irrigation sprinkler/drip, followed by irrigation wells. The Maximum number of farmers has access to Common Property Resources (CPRs) such as pasture land, irrigation sources, threshing floors, water harvesting structures, producer's associations, self-help groups, and primary cooperative society. About 269 farmers availed-credit facilities; among them, 103 farmers took a credit of >10,000-50,000, which was majorly used for input purchase (240 farmers responded). About 132 farmers said they receive subsidies on seed/propagating material, fertilizer/agrochemicals, and irrigation. Most farmers received quality seed/propagating material from the local shop owners, followed by neighboring farmers, govt. departments and private companies. Very few are using/visiting Agricultural Universities, KVKs, cooperatives, NGOs, Agri-clinics, producers' associations, and village panchayats for seed purposes. In terms of credit suppliers, farmers listed public sector banks first, followed by cooperative society credit cards and moneylender. Farmers with medium-sized land holdings have a better chance of availing subsidies compared to small-category farmers. Most small landholders need more opportunities to access agricultural credit. An adequate supply of timely inputs and support of low-cost credit from institutional sources is of great importance to small and marginal, farmers who contribute almost 60 per cent of total food grain production in India. The output of this study would become a benchmark for future assessments and decision-making in the field of agri-inputs.

Key words: Recurrent assets; Credit; Subsidy; Input suppliers; Farmer respondent.

Agriculture, along with its allied sectors, has proven to be India's largest source of livelihood. Seventy percent of rural households still primarily depend on agriculture for their livelihood (Jhansi and Khalal 2022; Nagamani et al., 2023), with 82 per cent of farmers being small and marginal. About 54.6 per cent of the workforce is engaged in

agricultural and allied sector activities, accounting for 17.1 per cent of the country's Gross Value Added (GVA). As per the Land Use Statistics 2014-15, the country's total geographical area is 328.7 million hectares, of which 140.1 million hectares are the reported net sown area, and 198.4 million hectares are the gross cropped area with a cropping intensity of 142 per cent. The net

area sown is 43 per cent of the total geographical area, whereas the net irrigated area is 68.4 million hectares (DARE, 2021). Agriculture accounts for "only" ~16 per cent of GDP but is the most important sector for employment. Various possibilities of substituting production factors play a prominent role in managing the production potential in agriculture. (Kusz and Misiak, 2017).

As per 4th Advance Estimates for 2019-20, total food grain production in the country is estimated at 296.65 million tonnes. The production during 2019-20 is also higher by 26.87 million tonnes than the average food grain production in the previous five years (2014-15 to 2018-19). However, when it comes to the production and productivity of any crops, the farming community of the Indian subcontinent is facing various hurdles, such as the availability of farm machinery, quality seeds, subsidized fertilizers and manures, agriculture marketing, logistic difficulties, and inadequate scientific advice. Despite all these factors, our farmers are still achieving success in food security for the nation (Balakrishna et al., 2021). Small and marginal landholdings (< 2.0ha) contribute to 86 per cent of total operational land holdings and cover 47 per cent of the total operated area. According to recent statistics, the total farm power availability in Indian agriculture was 2.24 kW/ha in 2016-17. It had a share of 1.324, 0.018, 0.021, 0.460, 0.193, 0.091 and 0.130 kW/ha from tractors, power tillers, combined harvesters, diesel engines, electric motors, humans and draught animals, respectively. The overall mechanization levels for rice, wheat, maize, sorghum, pulses, oilseeds, cotton, and sugarcane crops were 45, 63, 40, 26, 34, 34, 26 and 24 per cent, respectively. The availability of farm machinery and the percent of farm mechanization is yet to gain momentum in the country (Mehta et al., 2019).

Inadequate availability and lack of knowledge on using manures and fertilizers among the farming community is another crucial bottleneck for crop production in the country. Unbalanced or suboptimal fertilizer application profoundly influences soil fertility and quality (Sharma et al., 2014). On the other hand, organic amendments have an overall cumulative effect over time but have a more significant impact in the long term. Other important issues include the lower nutrient input rate and the non-synchronization between nutrient supply and crop need during crucial growth phases need to be addressed (Sacco et al.,

2015; Hazra et al., 2018). Another concern for farming is the fraction of farmers, particularly the smallholders and poor and rural farmers, who need access to excellent quality seeds mainly due to the sky-high price of those seeds (Murphy, 2010). Marketing the farming produce is always a gamble with the prices. Agricultural marketing in rural areas is still in disarray; without viable marketing channels, farmers can rely on local merchants and intermediaries to dispose of their agricultural product, which is sold at a loss. In most instances, farmers are compelled by socioeconomic circumstances to engage in distressed sales of their products (Chakraborty, 2018).

Access to timely credit or finance is a critical determinant of the profitability of agriculture. In agrarian history, one of the most critical questions is the need for farmers' credit. Because Indian farmers are poor and financially dependent on other sources, the credit requirement is highly related to the expenditure pattern of the farmers. Poor Indian farmers require more and more credit to engage in agricultural production. In turn, they are trapped in debt (Kumari, 2020). The agriculture credit flow for 2020-21 was ₹15,75,398 crores against the target of ₹15,00,000 crores for the year. The agriculture credit flow target for 2021-22 has been fixed at ₹16,50,000 crores, and till 30th September, 2021, against this target, a sum of ₹7,36,589.05 crores has been disbursed. As of 30 December, 2022, banks had issued Kisan Credit Cards (KCC) to 3.89 crore eligible farmers with a KCC limit of ₹4,51,672 crores. The target for the flow of credit to agriculture for 2022-23 has been fixed at ₹18.5 lakh crore (Economic survey, 2023).

Through its various wings in agriculture, the Government of India (GOI) takes necessary action and measures to improve the structure of Indian agriculture through various welfare programmes for the farmers. Implementing subsidy-based programmes for small and marginal farmers of India is a critical factor for agriculture crop production and productivity growth. GOI also started providing subsidies for seed/ propagating material, fertilizer/agrochemicals, irrigation, animal purchase etc., through various programmes. The input suppliers such as government departments, agricultural universities, KVKs, NGOs, local shop owners, producer's associations etc., also play a significant role in providing timely input to the farmers. However, marketing farm products at remunerative prices in the modern agriculture era

without being affected by the malpractices of the middlemen is immense havoc to the farmers in India. To overcome such constraints, the GOI has initiated various programmes for farmers through various delivery mechanisms. One such initiative recognizes Agriculture Produce Market Committee (APMC) as the eligible entity under Agriculture Infrastructure Fund (AIF).

Under this scenario, the present investigation examined the assumption of the influence of existing farm infrastructure on access to farm inputs, equipment, finance, and marketing facilities, as well as input delivery mechanisms like SAUs, KVK, and other ICAR institutes. Therefore, the objectives of the present investigation were (i) to examine the existing farm resources, market infrastructure, credit facilities, and willingness to enhance skill and knowledge and (ii) to assess the effect of agri-input delivery mechanisms on the fixed assets resources of farmers.

METHODOLOGY

A quantitative approach was employed for data collection and analysis in the present investigation. First, data were collected and analyzed to infer the outcomes of agri-inputs and service delivery mechanisms. During this 21-day study in March and June 2008, the primary data were collected from 409 farmers in 24 villages in 14 states.

A survey questionnaire was developed, validated and administered through agricultural scientists as part of their 21-day field experience training in the 82nd and 83rd batches of the Foundation Course for Agricultural Research Service (FOCARS) at the National Academy of Agricultural Research Management (NAARM), Hyderabad. NAARM is a training organization of Indian Council of Agricultural Research (ICAR) under Department of Agricultural Research and Education, Ministry of Agriculture and Farmers Welfare, Government of India. Training batches were asked to collect the questionnaire data from the farmers from different states of India, as shown in Figure 1. The questionnaire was intended to collect multiple pieces of information from the farmers about the agri-input delivery mechanisms. The first section collected the basic information about the farmer (average family size, educational qualifications, farmer category, main farming activity), as detailed in Table 1. The second section was about the quick exploratory survey about farm inputs comprising the details of fixed assets available; details of recurrent assets available; details of recurrent

Table 1. General information about the respondent

Average family size-	2.42
Educational qualifications	Illiterate - 37 Primary -85 High school -156 Sr. Secondary and Higher- 109
Category of farmers	Small- 130 Medium- 182 Large- 43
Main farming activity	Cropping-285 Horticulture-64 Animal and Fisheries-41
Type of own land (Acres)	Average Irrigated- 8.51 Average Dryland- 4.62

associated inputs; access, control & cost of common property resources (CPRS); a number of labour man-days used last year; credit information taken last year; purpose for which credit taken; subsidies received last year; willingness to enhance skill and willingness to enhance knowledge. The third section was about the quick exploratory survey about agri-input delivery mechanisms, including inputs received last year, top providers of inputs (other than credit), top providers of credit and top free providers of inputs. The survey was then analyzed and interpreted statistically.

The data collected from the respondent farmers using the questionnaire were analyzed using descriptive statistics in Microsoft excel sheet 2016. Since most of the questions are nominal (qualitative), the frequencies were calculated. The average values were also calculated for quantitative variables, wherever appropriate. The Chi-square test and Binary Logistic Regression analysis were performed using "R" Software.

RESULTS AND DISCUSSION

Recurrent direct farming inputs available: The recurrent direct farming inputs such as quality seed, planting material- sapling, organic manure, chemical fertilizer, bio-fertilizers, agrochemicals- pesticide, growth hormones, adult milch animals, adult drought animals, animal feed, fodder, veterinary medicines were selected and surveyed in the present investigation to study its availability to the farmer (Table 2). Most farmers (who responded for sufficiency of inputs in the last year) mentioned that agrochemicals (75.6%) were sufficient followed by quality seed (66.3%) and chemical fertilizers (63%) and organic manure (57.3%). On the other hand, we noticed that majority

Table 2. Details of recurrent direct farming inputs available to the respondent

Input	Sufficiency of inputs in the last year	Total money spent in one year (Av. in Rs.)
Quality seed (Kg)	Sufficient - 237	12077.04
	Not sufficient -120	
	NA - 52	
Planting material etc. (No.)	Sufficient - 86	34445.07
	Not sufficient -52	
	NA -269	
Organic manure (Kg)	Sufficient - 179	12743.16
	Not sufficient -133	
	NA - 97	
Chemical fertilizer (Kg)	Sufficient - 208	15212.63
	Not sufficient -122	
	NA - 79	
Biofertilizer (Kg)	Sufficient -53	6039.21
	Not sufficient -72	
	NA -284	
Agrochemicals, pesticide etc. (Liters)	Sufficient - 221	8302.12
	Not sufficient -71	
	NA -117	
Adult milch animals (No.)	Sufficient - 161	21017.32
	Not sufficient -56	
	NA - 192	
Adult drought animals (No.)	Sufficient - 85	31805.07
	Not sufficient -51	
	NA -273	
Animal feed (Kg)	Sufficient - 158	46047.05
	Not sufficient -93	
	NA - 158	
Fodder (Kg)	Sufficient - 149	23035.69
	Not sufficient -93	
	NA - 167	
Veterinary medicines (Kg)	Sufficient - 145	1921.48
	Not sufficient -55	
	NA -209	
Total money spent on inputs last year (Average of all farmers)		75598.11
NA- Not applicable		

of the farmers (out of 409 total respondents) have not responded on planting material-sapling (65.7%), biofertilizers (69.4%), adult drought animals (66.7%) and veterinary medicines (51.1%). This indicates the lack of availability of these inputs to the farmers. However, among all these assets, farmers are spending more money on purchasing animal feed followed by planting material- sapling and adult drought animals at the cost of INR 46047.05, 34445.07 and 31805.07,

Table 3. Details of recurrent associated farming inputs available to the respondent

Input	Availability last year	Total money spent in one year (Av. in Rs.)
Storage facility for grains (Qt.)	Sufficient - 199	3356.23
	Not sufficient -128	
	NA - 82	
Storage facility for byproducts (Qt.)	Sufficient - 119	1623
	Not sufficient -107	
	NA -183	
Electricity (Hrs.)	Sufficient - 133	9852.01
	Not sufficient -176	
	NA -100	
Market yard (no.)	Sufficient - 93	15648.33
	Not sufficient -130	
	NA -186	
Irrigation- tube-well (No.)	Sufficient - 93	17078.88
	Not sufficient -106	
	NA -210	
Irrigation- canal (Hrs.)	Sufficient - 44	3545.64
	Not sufficient -118	
	NA - 247	
Irrigation- well (No.)	Sufficient - 95	30820
	Not sufficient -112	
	NA - 202	
Irrigation- bore-well (No.)	Sufficient - 81	14242.11
	Not sufficient -96	
	NA - 232	
Irrigation-sprinkler/ Drip etc (Mt.)	Sufficient - 26	49321.43
	Not sufficient -100	
	NA -283	
Total money spent on associated inputs last year (Average of all farmers)		25950.29
NA- Not applicable		

respectively (Table 2). The total money spent on inputs last year was INR 75598.11.

Recurrent associated farming inputs: We have surveyed the recurrent associated farming inputs such as storage facilities for grains, storage, facility for byproducts, electricity, market yard, irrigation-tube-well, irrigation-canal, irrigation-well, irrigation-bore-well, and irrigation sprinkler/drip (Table 3). The majority of respondents (farmers) specified that storage facility for grains (60.8%), storage facility for byproducts (52.6%) and electricity (43%) were sufficiently available (Table 3). The rest of the inputs received fewer responses from farmers. We noticed that out of 409 farmers, about 49.3 to 69.1 per cent farmers did not respond to irrigation-related inputs

Table 4. Access, control & cost of common property resources

CPR	Availability in village	Access to respondents	Is it beneficial to you?	Did you pay money?
Pasture land	Yes- 152 No-218	Yes- 137 No-74	Yes- 127 No-61	Yes- 8 No-145
Irrigation source	Yes- 226 No-150	Yes- 189 No-64	Yes- 195 No-35	Yes- 69 No-121
Threshing floor	Yes- 125 No-214	Yes- 99 No-77	Yes- 97 No-62	Yes- 16 No-107
Water harvesting structures	Yes- 116 No-224	Yes- 90 No-73	Yes- 108 No-32	Yes- 22 No-87
Animal shed	Yes- 47 No-285	Yes- 37 No-65	Yes- 53 No-33	Yes- 7 No-55
Fish pond	Yes- 63 No-262	Yes- 41 No-87	Yes- 43 No-65	Yes- 9 No-62
Other fishery resources	Yes- 38 No-274	Yes- 27 No-69	Yes- 37 No-48	Yes- 2 No-57
Community orchard	Yes- 15 No-291	Yes- 2 No-74	Yes- 26 No-39	Yes- 40 No-369
Community fodder bank	Yes- 8 No-305	Yes- 5 No-64	Yes- 31 No-37	No-36
Community granary	Yes- 5 No-303	Yes- 2 No-63	Yes- 18 No-35	No-31
Community seed bank	Yes- 20 No-301	Yes- 24 No-59	Yes- 41 No-33	Yes- 18 No-36
Producers Association	Yes- 102 No-214	Yes- 85 No-66	Yes- 99 No-39	Yes- 40 No-71
Self Help Group	Yes- 275 No-84	Yes- 193 No-82	Yes- 182 No-57	Yes- 99 No-92
Watershed Development Committee	Yes- 32 No-293	Yes- 19 No-82	Yes- 26 No-52	Yes- 4 No-48
Van Sarankshan Sameti	Yes- 5 No-301	Yes- 4 No-70	Yes- 19 No-43	Yes- 2 No-36
Primary Cooperative Society	Yes- 190 No-153	Yes- 179 No-47	Yes- 193 No-22	Yes- 107 No-74

that indicates they have no access to these facilities. More money was spent on purchasing an irrigation sprinkler/ drip system, followed by irrigation wells and irrigation tube wells at INR 49321.43, 30820, and 17078.88, respectively (Table 3).

Access, control & cost of Common Property Resources: A maximum number of farmers answered that they have availability of Common Property Resources (CPRs) such as pasture land (41%), irrigation source (60.1%), threshing floor (36.8%), water harvesting structures (34.1%), producer's associations (32.2%), self-help groups (76.6%) and primary cooperative societies (55.3%) (Table 4).

They also have individual access, which is highly beneficial for them. Fewer farmers are paying money for access to these resources, but many farmers (107) are paying for a primary cooperative society and self-help groups (99). In this study, we have further noticed that animal shed, fish ponds, other fishery resources, community orchards, community fodder banks, community granaries, community seed banks, watershed development committee and van sarankshan sameti were meagerly available and accessible or beneficial to few farmers. Specifically, the community assets such as community orchards (4.9%), community fodder banks (2.5%), community granaries (1.6%), community seed banks (6.2%) were meagerly available in the villages, as recorded in this study.

Credit information and subsidies: Almost 103 farmers (25.8%) have taken credit (Figure 2) of > Rs. 10,000-50,000 followed by 64 (>1,00,000 Rs.) and 46 (5000-10,000), followed by 44 who took credit between

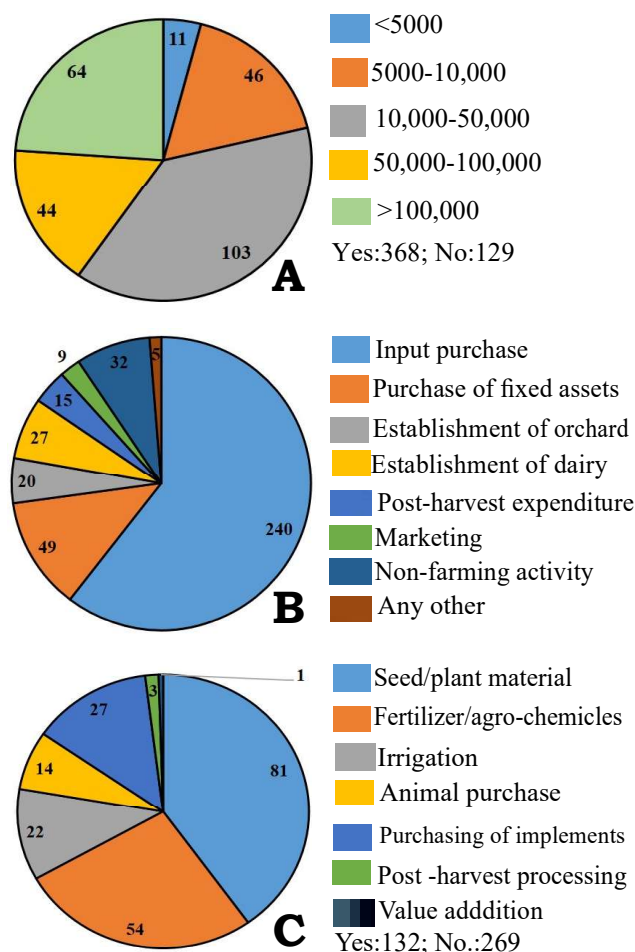


Figure 1. Credit information and subsidies: A) Have you taken any credit last year? B) Purpose for which credit was taken; C) Have you received any subsidy last year?

Table 5. During last year, what kind of inputs have been received by you from the respective input supplier?

Input suppliers	Inputs received by farmers in percentage with codes (multiple codes)									
	1	2	3	4	5	6	7	8	9	10
Government department	24	6	4	8	0	0	6	4	9	5
Agril. University	8	2	1	11	1	1	0	12	0	1
KVK	8	3	0	10	1	1	0	0	15	1
Cooperatives	20	24	2	1	0	0	4	33	2	0
NGO	6	1	1	5	1	0	0	2	3	1
Agri-clinics	3	2	0	1	0	0	0	0	0	0
Private company	24	19	1	4	1	5	7	3	2	0
Local shop owners	49	67	2	6	0	0	2	6	0	1
Neighbor farmers	29	6	7	14	0	1	7	10	0	1
Producers' association	7	4	0	3	0	0	6	1	3	0
Village panchayat	1	0	0	0	0	0	0	0	0	1

Input code : Quality seed/propagating material-1; Fertilizer & Chemical-2; Animal-3; Production practices-4; Value addition-5; Processing-6; Marketing infrastructure-7; Credit-8; Training-9

>50,000-100,000. Very few farmers (11) have taken credit of <5000. In total, 269 farmers (67.5%) have taken the credit last year. The majority of the farmers (60%) used the credit to purchase inputs. Around 49 farmers used it to purchase fixed assets such as land/machines; 32 used it for non-farming activity; 20 used the credit for the establishment of orchards/nurseries, and about 27 farmers used it for the establishment of dairy/ purchase of the animal (Figure 2). Only around 15 and 9 farmers used the credit for post-harvest expenditure and marketing, respectively. Regarding subsidies received, about 81 farmers received a subsidy for seed/ propagating material; 54 farmers received one for fertilizer/agrochemicals; 22 farmers received one for irrigation; 27 farmers received one for the purchase of farm implements including drip irrigation etc.; 14 farmers received for purchase of animals (Figure 2). Only few farmers received a subsidy for post-harvest processing (3) and value addition (1). In total, about 32.9 per cent of the farmers received subsidies.

Inputs received from the different input suppliers: Among the 409 respondents, most farmers (49%) received quality seed/propagating material from local shop owners, followed by 29 per cent from neighbour farmers, 24 per cent from government departments, and about 24 per cent from a private company (Table 6). Few farmers are use/visit Agri. Universities, Krishi Vigyan Kendra (KVKs), cooperatives, NGOs, Agri-clinics, producers' associations, and village panchayat for seed purposes. For fertilizer and chemicals, the majority of farmers (67%) visit local shop owners, followed by 24 per cent from cooperatives and 19

per cent from private companies. About 7 per cent of farmers reported purchasing animals from local farmers (Table 6). For production practices, around 14 per cent of farmers visit neighbour farmers, while 8 per cent and 11 per cent of farmers visit government departments and agricultural universities, respectively. Few farmers visit any of these suppliers for value addition and processing. Around 7 per cent of farmers visit neighbour farmers, 7 per cent visit private companies, and 6 per cent visit government departments for marketing infrastructure input. The majority of farmers (33%) visit cooperatives for accessing credit-followed by 12 per cent of farmers visiting agricultural universities. For training, 15 per cent of farmers visit KVKs, and 9 per cent visit the government departments.

Top providers of inputs, credits, and top free providers of inputs: Among all the input suppliers studied, farmers were also asked to rank the top input providers (Table 7). Farmers put local shop owners in the first rank among the top input providers list, followed by cooperatives and private companies. In the case of the credit suppliers, farmers listed public sector banks first, followed by cooperative society credit cards and money lenders. Only a few (140 out of 409 farmers) pointed out that government departments and agricultural universities provide inputs freely (Table 7). But most of the farmers noticed they needed to receive inputs free of cost.

Willingness to enhance skill and knowledge: Interestingly, we have noticed that about 368 farmers (89.9%) showed deep interest in enhancing their skills and knowledge (Figure 3). About 334 farmers wish

Table 6. Top providers of inputs (other than credit), credits, and top free providers of inputs

Last year, which were the top two input suppliers for you?		Code											
		1	2	3	4	5	6	7	8	9	10	11	12
Supplier number one		41	20	5	69	8	2	61	145	20	6	8	2
Supplier number two		29	13	19	48	9	5	43	94	49	9	15	13
Govt. dept-1, Agric. Univ-2, KVK-3, Cooperatives-4, NGO-5, Agri-clinic-6, Private company-7, Local shop owners-8, Neighbor farmers-9, Producers' association-10, Any other-specify-11, None-12													
During last year, which were the top two sources of credit for you?		Code											
		1	2	3	4	5	6	7	8	9			
Source of credit number one		9	91	3	69	33	74	2	26	39			
Source of credit number two		16	55	9	39	25	56	2	19	42			
Private Bank-1; Public sector Bank-2; Private financing schemes-3; Money lender-4; Kisan, Credit Card (KCC)-5; Co-operative society credit card-6; Government-7; Any other-specify-8; None-9													
Last year, which were the top two providers for free inputs for you?		Code											
		1	2	3	4	5	6	7	8	9	10	11	12
Provider number one		55	36	23	8	4	0	3	9	13	2	11	147
Provider number two		27	22	11	10	7	1	7	2	23	3	1	130
Govt. dept-1, Agric. Univ-2, KVK-3 Cooperatives-4 NGO-5 Agri-clinic-6 Private company-7 Local shop owners-8 Neighbor farmers-9 Producers' association-10 Any other-specify-11; None-12													

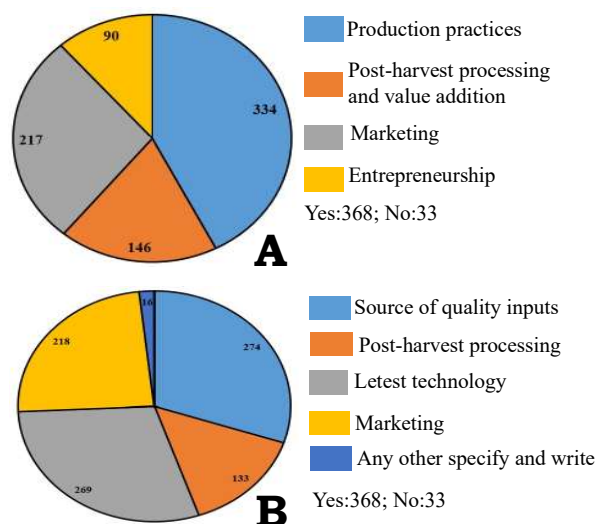


Figure 2. Willingness to enhance skill and knowledge: A) Do you wish to enhance your skill? If yes. In which area? B) Do you wish to enhance your knowledge? If yes. In which area?

to enhance their skills in production practices, 146 in post-harvest processing and Value addition, 217 in marketing and about 90 in entrepreneurship. About 274 farmers wish to enhance their knowledge in the area (Table 8) of sources of quality inputs; 133 in post-harvest processing, 269 in the latest technology and about 218 in marketing.

Results of Chi-square test and Binary Logistic Regression: The chi-square test for association was carried out to check if there is any association between availing subsidies last year and the background of the farmers (Table 8). Among all the variables

Table 7. Chi-square test

Variable	χ^2 value	p-value
Age	3.774	0.582
Size of the Family	1.435	0.838
Educational Qualification	6.022	0.304
Farmer Category	6.933	0.031*
Main Farming Activity	2.876	0.237

* Significant at 5% level of significance

Table 8. Binary Logistic Regression

Variable	Odds Ratio	95% CI for OR	Estimate	SE	p-value
Intercept	0.405	(0.268, 0.597)	-0.905	0.203	0
Farmer category (Vs Small)					
Medium	1.965	(1.19, 3.287)	0.676	0.259	0.009
Large	1.611	(0.742, 3.442)	0.477	0.389	0.22

capturing the background information of the farmers, only the “farmer category” (based on the size of the holding) showed a significant association. Further, binary logistic regression (Table 9) was performed to quantify the influence of farmer category on the behaviour of availing subsidies. The results from binary logistic regression suggests that farmers with medium-category land holding have 1.965 times more chance of availing subsidy when compared to small-category farmers.

There are several questions in the structured questionnaire designed to capture the views and

ground-level conditions regarding the influence of recurrent assets on the finance resources utilization and their availability to the farming community. Results from the present study obtained during the interaction with the respondents gave us an idea that most farmers are investing their significant financial resources in purchasing animal feed, followed by irrigation in the areas selected for sampling.

The two components, *i.e.*, fixed assets and input delivery mechanism, have an intertwined relationship in influencing the economic status of the farming community. In this regard, various components of the input delivery mechanisms, such as Government departments, Agricultural Universities, cooperatives, private companies, non-government organizations (NGOs), local shop owners etc., are significantly contributing to various extents for the farmer needs. Although the Government has invested most of the resources in order to enhance the efficiency of input deliverables, unfortunately, in the present study, it was observed that the majority of the respondents (farmers) is relying for farm inputs on Local shop owners, neighbor farmers, private companies and online departments (Department of Agriculture) of concerned states and they are relatively better in supplying input deliverables to the farmers. The state agricultural universities (SAUs), KVKs, and Agricultural Technology Information centers (ATIC) services are still far away for the farming community; however, most government officials dismissed many of these complaints as sour grapes. Our observations in the present investigation agree with the reports stating that there might be various determinants for access to agricultural extension services for adopting technical inputs such as lack of awareness etc. (*Dutta et al., 2021*). Almost all the socioeconomic variables significantly impact the 'Access' but appeared to have little relevance with the 'Adoption'. Sometimes, caste, of course, appears to be necessary; for instance, while the ST and SC castes seem to be on the same plane, OBCs and 'Others' have an advantage of 'Access' on account of favourable socio-cultural-economic milieu and existence of strong social networks (*Anderson, 2011*). However, the caste and social networks will not always be a barrier to accessing and adopting input deliverables, since a study in the Central Nepal region found that the rate of adoption of soil conservation technology by lower and middle castes was higher than that of upper caste farmers (*Tiwari et al., 2008*).

Further, a study in Rewa district of Madhya Pradesh found no significant association between caste and accessing and adopting input deliverables (*Singh and Beena 2019*). In the present study, we did not find any evidence to support the notion of a caste system; it is merely a probable speculation for our findings. A male-headed household has a higher chance of having 'Access' to input delivery mechanisms than a female-headed household. It is probably due to sociocultural norms since males are mainly responsible for managing the livelihood sources in the study region. One of the recent studies (*Jena and Kumari, 2023*) in the state Bihar, India revealed that about 10 per cent of the women are involved in farming as laborers, and about 2.5 per cent of women have cultivation as their primary occupation. This trend was not an exception in women-centric societies of North-Eastern India, such as Charilam block of Sepahijala District of Tripura, gender differences in the agricultural empowerment of farm households across tribal households, women were found to be more empowered than their male counterparts (*Kalai and Devarani 2018*). Another study in Andhra Pradesh, India, showed that most women are involved in dairy activity, revealing about 81.33 per cent of women were participating in decision-making regarding purchase/sale of animals (*Krishna et al., 2022*).

Credit is one of the critical inputs for agricultural development and sustainable growth. It capitalizes on farmers to undertake new investments, adopts new technologies, and revitalize their socioeconomic status, which also plays a significant role in poverty alleviation (*Kumar et al., 2010*). In the present study, we found that most farmers used credit to purchase mostly fixed assets such as land development and machinery in sampled areas. However, in our survey study, most farmers come under the small to medium farmer scale, and most depended on crop cultivation (very few depended on horticulture, animal husbandry and fishery); only half had irrigation facilities and the remaining half depended on rainfall. Almost 60 per cent of the total food grain in India is produced by small and marginal farmers (*Agricultural Census 2015–16*). Unfortunately, they have faced several constraints in credit availability, proper transport, market facility, etc., for many years (*Rakesh et al., 2022*). Therefore, providing small and marginal farmers with an adequate supply of timely inputs and low-cost credit from institutional sources is crucial.

In this study, we noticed that very few farmers received subsidy on animal purchase. This indicates the lack of encouragement for small and marginal farmers to engage in dairy, poultry, or fishery production. Suitable interventions and awareness about subsidy on dairy farms are crucial to promote and encourage the dairy farmers (Meena *et al.*, 2022). Additionally, in this study, the chi-square test and binary logistic regression analysis showed a significant association of availing subsidy with the category of farmer based on the size of the holding. The analysis confirmed that the farmers with medium-category land holding have more chance of availing subsidy compared to small-category farmers. Elias *et al.* (2015) studied the limited and marginal farmers' access to agricultural credit through a survey in the Dharwad district of Karnataka. Their study revealed that most minor landholders have less opportunity for access to agricultural credit. It is driven by five variables: land size, education level, irrigation facilities, income level and gender. Yehuala (2008) also indicated that access to formal credit use is dependent on total cultivated land holding. Adegbite (2011) revealed that the farmers' income significantly affects credit access.

In this study, almost 90 per cent of the farmers were educated, and about 35 per cent passed high school. Agricultural credit is highly dependent on the literacy level of the farmer. The contribution of education is vital to communicate with bank staff cordially, understanding the bank procedures and filling essential documents (Elias *et al.*, 2015). Interestingly, about 89.9 per cent of farmers showed deep interest in enhancing their skills and knowledge. The majority of the farmers would like to improve their skills in production practices, post-harvest processing and, value addition, marketing. Also, most of them wish to enhance their knowledge in finding sources of quality inputs, post-harvest processing and the latest technologies. The literacy status of the farmers can increase the probability of being a borrower by a factor of 20 (Shehla and Saf, 2007).

CONCLUSION

The agricultural performance engrosses many production factors, agricultural credit and input delivery mechanisms. Yield gaps, high costs of cultivation, and environmental damage by agricultural practices in India can mainly be attributed to farmers' limited access to agricultural information. The majority of the farmers rely for farm inputs on local shop owners,

neighboring farmers, private companies and online departments. The SAUs and KVK services still need to be closer to the farming community. Inequity in the distribution of financial resources across different categories, particularly to a larger share of animal feed of farmers, also persists in the present study. However, the majority of the farmers depended on cultivating food grains. Small and marginal farmers produce almost 60 per cent of the total food grain in India. Most small landholders need more opportunities for access to agricultural credit. An adequate supply of timely input and support of low-cost credit from institutional sources is essential for small and marginal farmers. Nevertheless, education plays a significant role in access to credit facilities. Based on the outcomes obtained from this survey, we recommend some points to further enhance the support for the Indian agriculture community.

- Training programs on skill development, production practices, post-harvest processing, value addition, marketing, etc., must be widely conducted.
- Knowledge of the right quality inputs, post-harvest processing and the latest technologies should be disseminated through appropriate mechanisms such as agriculture fair and workshops etc.
- Despite implementing Rashtriya Gokul Mission under the umbrella of the Government of India in all states of India, there is still a huge gap in the supply of subsidy-based animal feeds, which needs to be ameliorated by strengthening the ongoing schemes in the concerned states.
- Policies must be redirected to government-sponsored and guaranteed agricultural financing schemes that could favour the significant growers of food crops (small and marginal farmers) in India.
- The output of this study would become a benchmark for the future assessments and decision-making in the field of agri-inputs.

CONFLICTS OF INTEREST

The authors have no conflicts of interest.

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