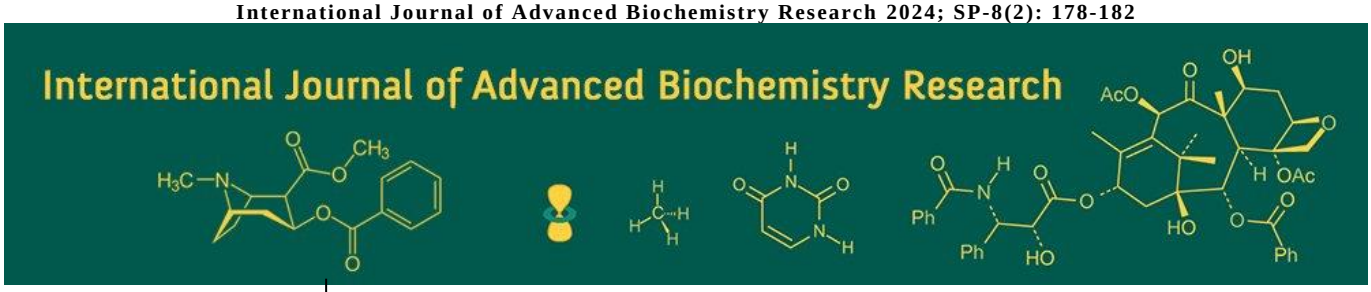

ISSN Print: 2617-4693
ISSN Online: 2617-4707
IJABR 2024; SP-8(2): 178-182
www.biochemjournal.com
Received: 04-11-2023
Accepted: 06-12-2023

Puspendra Kumar Singh
Indian Veterinary Research Institute, Izatnagar, Uttar Pradesh, India

Rupasi Tiwari
Indian Veterinary Research Institute, Izatnagar, Uttar Pradesh, India

Sangeeta Singh
Indian Veterinary Research Institute, Izatnagar, Uttar Pradesh, India

Pankaj Kumar
Indian Veterinary Research Institute, Izatnagar, Uttar Pradesh, India

Saroj Kumar Rajak
Indian Veterinary Research Institute, Izatnagar, Uttar Pradesh, India

Corresponding Author:
Puspendra Kumar Singh
Indian Veterinary Research Institute, Izatnagar, Uttar Pradesh, India

Agriculture information needs of the farmers in Uttar Pradesh

Puspendra Kumar Singh, Rupasi Tiwari, Sangeeta Singh, Pankaj Kumar and Saroj Kumar Rajak

DOI: https://doi.org/10.33545/26174693.2024.v8.i2Sc.533

Abstract
mKisan services was started by the Government of India in the year 2013. Through this service all the agencies involved from generation of agricultural information, their delivery to farmers and buyers can interact. To be the interaction fruitful through m Kisan services, needs of farmers should be known to these agencies. Weighted mean score was used to prioritize the different agriculture information needs of the farmers of Uttar Pradesh. Results revealed that sowing operations (2.20) with highest information need and have 73.22% of information deficiency, trailed by management aspects (2.16), pre-sowing activities (2.15), post sowing activities, weed and pest management (2.04), maintaining and retaining soil fertility (2.03), harvesting and storage (2.00) and irrigation practices (1.43) with 71.95, 71.67, 68.00, 67.67, 66.69 and 47.67% of overall information deficiency in the farmers, respectively. In sowing operations domain, major needs were related to high yielding varieties and its seed availability (2.30) and seed preparation practices (2.18). Information about input availability (2.28) and crop insurance (2.27) and marketing of produce (2.15) also found of great concern in management aspects. Farmers have higher information need about soil nutrient deficiency based on soil testing values (2.35) in the domain of pre-sowing activities. In post sowing activities, weed and pest management, information about use of herbicides and pesticides (2.26) and symptoms of different prevalent diseases and abiotic stress (2.13) were much needed. In maintaining and retaining soil fertility domain, information needs for fertilizers scheduling at different growth stage (2.22) and, organic and green manures (2.13) revealed the highest value. In harvesting and storage domain, information needs about methods to control storage losses (2.24) and modernization in harvesting operation (2.11) were with top priority. Significant variation was found among the different aspect of agriculture information need throughout the different agro-climatic zones of Uttar Pradesh, revealing uneven distribution of information in the state. Agriculture information deficiency were found highest in North Eastern Plain Zone and Bundelkhand Zone in Uttar Pradesh.

Keywords: Information needs, information deficiency, wheat production, agro climatic zones of U.P., mKisan advisory services

Introduction
Uttar Pradesh is one of the agriculture-based economy with highest population in the country. Agricultural activities are the main source of livelihood for 74.80 per cent rural household (NSSO, 2014) [12]. The cultivated area is 16.68 million ha out of total reporting area of 24.2 million ha in the state. There is 153% reported cropping intensity in the state. This state is characterised by average land holding of only 0.83 ha per farmer and farming community is dominated by small and marginal farmers. The 20.00% of the total food grain production and 11% of India's net sown area is contributed by the state. The state produces 20.00% of Paddy, 21.00% of Sugarcane, 38.00% of Wheat, 4.00% of Groundnut, 17.50% of Rape-seed, 8.00% Fruits and 16.00% of total India's vegetables. Therefore, agriculture alone of the state play an important role in national economy. According to GOUP, (2010) [6] the average cereal productivity is 25.51 q/ha while average food grains productivity is 23.66 q/ha in the state. The productivity of food grains also varies across the agro-climatic zones Bundelkhand zone (14.58 q/ha) to Western plain zone (31.53 q/ha). Similarly, in case of cereals it varies from 19.19 q/ha (in Vindhyan zone) to 32.39 q/ha (in Western plain zone). It was also found that higher productivity of cereals like wheat is mainly confined to states contributed to green revolution like Punjab, Haryana and Western parts of Uttar

Pradesh and there is need to increase production by enhancing productivity in other parts of Uttar Pradesh (Ahmad and Roy, 2015) [1]. It was estimated that 60 per cent of the farmers do not have access to any source of agricultural information, resulting in poor adoption of recommended practices (NSSO, 2005) [11]. mKisan services was started by the Government of India in the year 2013. From agricultural information generation, their delivery, farmers to buyers, all the agencies involved can interact with each other through this service. But very less farmers (16.4 per cent) of total farmers have been registered under this service in the state (mKisan, 2017) [9].

Keeping the importance of this pan India advisory service, in view it is essential to recognize what is the information need or deficiency existing at the level of farmers for various agriculture practices.

Research Methodology

Five agro climatic zones of Uttar Pradesh were considered for the study. Five agro climatic zones out of the nine agro climatic zones in Uttar Pradesh in term of their overall food grain productivity were carefully chosen as sample area. One district from each agro climatic zone was selected randomly. A total of 45 farmers (Utilizing mKisan services since last two years and involve in cultivation of wheat) were selected, randomly from each district. Thus, the total 225 farmers were selected as sample size for the study.

Agriculture information need is operationalized as the Agriculture information felt essential by the farmers for various agriculture related practices. Assessment of agriculture information need has done at two stages. Comprehensive review of literature for identification of items for information need for agriculture practices was done at primarily level with expert discussion. Categorization of these items was done in different areas and their relevant modules. These domains were prioritized calculating weighted mean score. Prioritization of these component practices were done on the basis of their mean score, obtained as primary response of farmers for their degree of need for various component of agriculture practices as 'Less Needed', 'Needed' and 'Most Needed'. Preference of farmers information need for the different agriculture practices domains was estimated through weighted mean of scores of different component practices for different zone. which is as follows:

$$\text{WMS}=\frac{W_1X_1+W_2X_2+\cdots W_nX_n}{W_1+W_2+\cdots W_n}$$

WMS: Score for weighted mean
W: Expert weight for the practice
X: Score for component practice by n^{th} farmer
n: Numbers of respondents
Per cent information need deficiency

$$\text{Per cent information need deficiency} = \frac{\text{Score obtained}}{\text{Maximum Score}}\ x\ 100$$

One way ANOVA and Tukey HSD post hoc analysis was applied for analysis of differences for different information needs in the farmers of different agro-climatic zones.

Results and Discussion

For information needs assessment among farmers seven agricultural practices were considered in the study. In Table 1.2, the pooled mean score for practices are presented. It revealed that sowing operations (2.20) have highest agriculture information need with 73.22% of information deficiency, followed by management aspects (2.16), pre sowing activities (2.15), post sowing activities, weed and pest management (2.04), maintaining and retaining soil fertility (2.03), harvesting and storage (2.00) and irrigation practices (1.43) with 71.95, 71.67, 68.00, 67.67, 66.69 and 47.67% of information deficiency in the farmers, respectively.

Sowing operations: Results (Table 1.2) revealed that among the different sowing operations, high yielding varieties and its seed availability were observed as highest (76.73%) information deficient element followed by seed preparation practices (72.53%) and improved methods for sowing or crop establishment techniques (71.53%). Agriculture information need preferences of these practices were can also be recognized through overall mean score of theses practices. It was also established that agriculture information needs of new improved methods for sowing or crop establishment techniques has presented significant dissimilarity among the farmers in different agro-climatic zones. Importance of high yielding verities seeds can be understood by the fact that with fertilizers and pesticides it has been the important pillar of modern agriculture for sustainable increase in agricultural production. Higher information need of the farmers about high yielding varieties and its seed availability, their availability, improved methods of sowing or crop establishment techniques were reported by Bachhave, (2012) [4], Babu *et al.*, (2011) [3] and Ansari and Sunetha, (2014) [2]. Expense on high yielding variety seeds was considered as an important factor for sustaining productivity of crop (wheat) and improving system production (Sarkar *et al.*, 2013) [13]. However in India seed replacement rate for wheat is low (p<30%) and essential measures should be taken to increase it (Niti Aayog, 2015) [10].

Management practices: Agriculture information needs related to management practices were measured by in view of five aspects of agriculture and outcomes were shown in Table 1.2. Results shown that the overall information need for input availability was perceived highest (2.28) in the farmers, followed by crop insurance (2.27), marketing of produce (2.15) and weather information (2.12) and estimated information deficiency of 76.00, 75.60, 71.67, 70.67 and 67.67%, respectively. Information need about crop insurance has shown significant variation across the different zones. Babu *et al.*, (2011) [3] also reported high farmers information need about input availability, crop insurance, weather information and market price. Similarly, Bachhave, (2012) [4] and Mittal and Mehar, (2013) [14] also found higher information need about input availability among farmers.

Pre-sowing activities: Among the different component in pre-sowing activities, information about soil nutrient deficiency based on soil test value (2.35) with information deficiency of 78.33% and it identified as highest prioritised component, trailed by information for tillage practices (1.99) with information deficiency level of 66.33% (Table 1.2). Soil nutrient deficiency based on soil test value, act as a measure to use of economical combination of different

nutrients which not only reduce input cost but also help in soil conservation. Niti Aayog, (2015) [10] also said that the optimal fertilizer utilization level varies according to water availability, soil type and yield. Khazuria *et al.*, (2016) [7] also reported that most of the farmers perceived the reduction in the cost of cultivation after soil testing.

Post-sowing activities, weed and pest-management practices: agriculture information needs among farmers for post-sowing activities, weed and pest-management practices were measured with five agriculture aspects and in Table 1.2 results were presented. Results depict that the overall information need for use of herbicide and pesticides was found highest (2.26) among the farmers, followed by symptoms of different prevalent diseases and abiotic stress (2.13), prevention and control of diseases and deficiencies (2.12), recommended weed control practices (2.10) and spatial crop diversity (1.71) with their information deficiency level of 75.33, 71.00, 70.67, 70.00 and 57.00%, respectively. Information need about techniques for symptoms of different prevalent diseases and spatial crop diversity have found major difference across the different zones. Losses in crop production in India due to pest including all biotic stresses such as weeds, diseases, nematodes, insect-pests and rodents range 15- 25%. In monetary terms, it ranges from 0.9 to 1.4 lakh crore rupees annually (Niti Aayog, 2015) [10]. Bachhave, (2012) [4], Babu *et al.*, (2011) [3] and Ansari and Sunetha, (2014) [2] also observed that farmers have high information need about post-sowing activities, weed and pest management practices.

Maintaining and retaining soil fertility: Mean score analysis shows that information about fertilizers scheduling at different growth stage was maximum needed (2.22) among farmers followed by organic and green manure (2.13), fallow period (1.99) and crop rotations (1.87) with their overall information deficiency level of 73.93, 71.00, 66.33 and 62.33%, respectively. Use of fertilizers at different growth stage increase the crop productivity while organic and green manure, fallow period and crop rotations help in maintain soil natural structure. Bachhave, (2012) [4], Babu *et al.*, (2011) [3] and Ansari and Sunetha, (2014) [2] also found farmers with higher information need for fertilizer scheduling.

Harvesting and storage: Results revealed that among different components of this practice, methods to control storage loss were found highly information deficient component (74.67%) having mean score of 2.24 followed by modernization in harvesting operations (70.33%), time of harvesting (59.00%) and different methods of storage (56.00%) with their respective mean score 2.11, 1.77 and 1.68. Findings were in line with Babu *et al.*, (2011) [3] and Ansari and Sunetha, (2014) [2].

Irrigation practices: The results shown that information need of farmers were highest for economical use of water (2.15) followed by methods of irrigations (1.94) and time of irrigation (1.90) with information deficiency of 71.60, 64.67 and 63.33%, respectively. Information need about economical use of water has shown significant variation in different agro-climatic zones. In all aspect water is a key element and its availability is a limiting input into agriculture. Fertilizer and good quality seeds fail to show their full potential if crop are not properly irrigated. India moving towards water scarce country with 1544 m^3 per capita availability of water. In comparison to major agricultural countries like USA, Brazil, China farmers of India to produce one unit of major food crops, using 2 to 4 times more water. Farmers in India were mainly depend on flood irrigation, results severe ground water depletion. Water conservation and increasing production by per unit of water utilization can be achieved through adoption of water saving technologies such as sprinkler and drip irrigation system. Drip irrigation with fertigation technology increase both water and fertilizer use efficiency. Ridge and furrow method of sowing, sub-surface irrigation, raised bed planting, precision farming like innovative agronomic practices offers economic use of water (Niti Aayog, 2015) [10].

Variation in different agro-climatic zones with respect to agriculture information needs among the farmers: Results of Tukey HSD post hoc analysis is presented in Table 1.2. It was observed that among the sowing operations, information needs about seed preparation practices in North Eastern Zone (2.21) and Bundelkhand Zone (2.40) farmers were significantly high than farmers of Western Zone (1.98). Information needs about this practice was also significantly high for the farmers of Bundelkhand Zone (2.40) in comparison to Mid- Western Zone (2.02). Information need about crop insurance was also significantly higher for the farmers of Bundelkhand Zone (2.47) as compared to farmers of Western Zone (2.05). Among the pre sowing activity, information need of the farmers about soil nutrient deficiency based on soil test value was significantly high in North Eastern Zone (2.56) and Bundelkhand Zone (2.59) to Mid- Western Zone (2.11) and Western Zone. (2.06).

Similarly among the post-sowing activities, weed and pest management practices information needs of farmers for symptoms of different prevalent diseases and deficiencies was significantly high in the North Eastern Zone (2.31) in comparison to Western Zone. (1.87). Likewise, information need among the farmers of Bundelkhand Zone (2.36) was significantly high for this practice in comparison to farmers of Mid- Western Zone (1.92) and Western Zone (1.87). Significantly high information need about spatial crop diversity was reported among the farmers of Bundelkhand Zone (1.98) to Mid- Western Zone (1.51) and Western Zone (1.49). Results also revealed that among the irrigation practices, significantly higher information need was found for techniques for economical use of water in the farmers of Bundelkhand Zone (2.42) in comparison to Western Zone (2.00).

Farmers of North Eastern Zone and Bundelkhand Zone have higher information need for the different aspect of practices related to agriculture as compare to farmers of Mid-Western Zone and Western Zone. This result should be interpreted in light of the fact that most of districts of Bundelkhand region and Eastern region are considered as backward region of Uttar Pradesh (BRGF, 2014). These regions are characterized with low agricultural productivity in comparison to western region of the state (GOUP, 2010) [6]. Eastern Uttar Pradesh is characterised by low cropping intensity while Bundelkhand with chronic water stressed area and erratic rain fall (Niti Aayog, 2015) [10].

Farmers residing in different agro climatic zones of Uttar Pradesh have wide-ranging information needs for different component of agriculture related practices. Though, information about sowing operations, management practices and pre sowing activities have perceived high need in all the agro-climatic zones. Therefore, urgent requirement to provide advisory services about different aspect of agriculture as per information needs of farmers. Especially those regions which are identified as highly information deficient as Bundelkhand Zone and North Eastern Zone. Therefore focussed approach and more deliberate effort need to be implemented to satisfying the agriculture based information need of these farmers and it have on main concern of the developmental organization.

Table 1: Mean Score and percent deficiency of information needs for agriculture practices among the farmers of different agro-climatic zones of Uttar Pradesh

Agriculture practices	North Eastern Zone (n=45)	Bundelkhand Zone (n=45)	Central Plain Zone (n=45)	Mid- Western Zone (n=45)	Western Zone (n=45)	F Value	Pooled (N=225)
	Mean score	Mean score	Mean score	Mean score	Mean score		Mean score
1. Pre-sowing activity	2.28 (76.00)	2.32 (77.33)	2.19 (73.00)	2.01 (67.00)	1.95 (65.00)	1.394	2.15 (71.67)
Soil nutrient deficiency based on soil testing value	2.56[de] (85.33)	2.59 [de] (86.33)	2.44 (81.33)	2.11 [ab] (70.33)	2.06 [ab] (68.67)	0.270*	2.35 (78.33)
Tillage practices	2.06 (68.67)	2.11 (70.33)	2.00 (66.67)	1.93 (64.33)	1.87 (62.33)	0.131	1.99 (66.33)
2. Sowing operations	2.30 (76.67)	2.37 (78.99)	2.21 (73.63)	2.09 (69.68)	2.01 (67.16)	1.533	2.20 (73.22)
High yielding varieties and its seed availability	2.43 (81.00)	2.47 (82.33)	2.28 (76.00)	2.21 (73.67)	2.12 (70.76)	4.027	2.30 (76.73)
Seed preparation practices	2.21 (73.67)	2.29 (76.33)	2.16 (72.00)	2.13 (71.00)	2.09 (69.67)	0.542	2.18 (72.53)
Improved methods for sowing or crop establishment techniques	2.28[e] (76.00)	2.37[e] (79.00)	2.21 (73.67)	1.98 (66.00)	1.89[ab](63.00)	0.209*	2.15 (71.53)
3. Maintaining and retaining soil fertility	2.04 (68.00)	2.15 (71.67)	1.98 (66.00)	1.93 (64.33)	2.03 (67.67)	1.289	2.03 (67.67)
Organic and green manure	2.09 (69.67)	2.16 (72.00)	2.07 (69.00)	2.04 (68.00)	2.28 (76.00)	0.666	2.13 (71.00)
Fertilizer scheduling at different growth stage	2.25 (74.96)	2.27 (75.67)	2.22 (73.93)	2.19 (73.00)	2.17 (72.33)	1.781	2.22 (73.93)
Crop rotations	1.89 (63.00)	2.06 (68.67)	1.78 (59.33)	1.67 (55.67)	1.93 (64.33)	1.342	1.87 (62.33)
Fallow period	2.03 (67.67)	2.16 (72.00)	1.97 (65.67)	1.93 (64.33)	1.86 (62.00)	0.075	1.99 (66.33)
4. Irrigation practices	1.44 (48.05)	1.54 (51.20)	1.41 (46.98)	1.34 (44.59)	1.28 (42.63)	0.251	1.40 (46.69)
Time of irrigation	1.99 (66.33)	2.04 (68.00)	1.93 (64.33)	1.81 (60.33)	1.75 (58.33)	4.468	1.90 (63.33)
Methods of irrigation	2.03 (67.67)	2.10 (70.00)	1.98 (66.00)	1.86 (62.00)	1.71 (57.00)	3.555	1.94 (64.67)
Economical use of water	2.15 (71.67)	2.42 (80.67)	2.12 (70.76)	2.05 (68.33)	2.00 (66.67)	2.405*	2.15 (71.60)
5. Post-sowing activities, weeds and pest management	2.14 (71.39)	2.20 (73.33)	2.05 (68.33)	1.91 (63.67)	1.87 (62.33)	1.118	2.04 (68.00)
Recommended weed control practices	2.13 (71.00)	2.19 (73.00)	2.10 (70.00)	2.06 (68.67)	2.00 (66.67)	1.627	2.10 (70.00)
Symptoms of different prevalent diseases and abiotic stress	2.31 [e] (77.00)	2.36 [de] (78.67)	2.17 (72.33)	1.92 [b] (64.00)	1.87 [ab] (62.33)	0.479*	2.13(71.00)
Prevention and control of diseases and deficiencies	2.23 (74.33)	2.26 (75.33)	2.20 (73.33)	1.99 (66.33)	1.94 (64.67)	0.778	2.12 (70.76)
Use of herbicide and pesticides	2.31 (77.00)	2.34 (78.00)	2.27 (75.67)	2.22 (73.93)	2.16 (72.00)	0.735	2.26 (75.33)
Spatial crop diversity	1.87(62.33)	1.98 [de] (66.00)	1.69 (56.33)	1.51 [b] (50.33)	1.49 [b] (49.67)	0.151*	1.71 (57.00)
5. Harvesting & Storage	2.08 (65.56)	2.18 (72.66)	2.00 (66.69)	1.89 (62.96)	1.86 (61.89)	0.481	2.00 (67.69)
Time of harvesting	1.89 (63.00)	1.98 (66.00)	1.76 (58.67)	1.63 (54.33)	1.59 (53.00)	2.741	1.77 (59.00)
Modernization in harvesting operations	2.16 (72.00)	2.33 (77.67)	2.09 (69.67)	2.04 (68.00)	1.91 (63.67)	1.807	2.11 (70.33)
Different methods of storage	2.00 (66.67)	2.05 (68.33)	1.92 (64)	1.67 (55.67)	1.76 (58.67)	2.624	1.68 (56.00)
Methods to control storage loss	2.28 (76.00)	2.34 (78.00)	2.23 (74.33)	2.18 (72.66)	2.16 (72.00)	0.317	2.24 (74.67)
6. Management aspect	2.21 (73.81)	2.31 (76.95)	2.21 (73.81)	2.07 (68.95)	2.00 (66.69)	1.472	2.16 (71.95)
Input availability	2.32 (77.33)	2.41 (80.33)	2.29 (76.33)	2.24 (74.67)	2.15 (71.67)	0.293	2.28 (76.00)
Crop insurance	2.26 (75.33)	2.47[e] (82.33)	2.44 (81.33)	2.12 (70.76)	2.05[b] (68.33)	0.935*	2.27 (75.60)
Govt. Schemes	2.11(70.33)	2.19 (73.00)	2.04 (68.00)	1.93 (64.33)	1.87 (62.33)	0.131	2.03 (67.67)
Marketing of produce	2.21 (73.56)	2.25 (74.96)	2.17 (72.33)	2.09 (69.67)	2.04 (68.00)	0.088	2.15 (71.67)
Weather information	2.22 (73.93)	2.26 (75.33)	2.13 (71.00)	2.05 (68.33)	1.96 (65.29)	0.143	2.12 (70.76)
A. Animal husbandry practices	2.22(73.93)	2.27(75.56)	2.27(75.56)	2.08(65.56)	1.99(66.33)	8.382	2.16 (72.00)
B. Agriculture practices	2.08(65.56)	2.16(72.00)	2.02(67.41)	1.90(63.33)	1.88(62.76)	13.620	2.01 (67.00)

Figures in parenthesis represent percent information deficiency; * represent significance level at 5%

Acknowledgement

For their support during the research work IVRI, Izatnagar (Bareilly) and University Grant Commission, New Delhi are gratefully acknowledged by the authors.

References

1. Ahmad H, Roy R. State agricultural profile of Uttar Pradesh (2014-15). Agro-Economic Research Centre, University of Allahabad, Uttar Pradesh; c2015.
2. Ansari MA, Sunetha S. Agriculture information needs of farm women: A study in the state of North India. African Journal of Agricultural Research. 2014;9(19):1454-1460.
3. Babu SC, Glendenning CJ, Asenso-Okyere K, Govindarajan SK. Farmers' information needs and search behaviours: Case study in Tamil Nadu, India. International Food Policy Research Institute; c2011.

4. Bachhav NB. Information needs of rural farmers: a study from Maharashtra, India: A survey. Library Philosophy and Practice; c2012. Retrieved from http://digitalcommons.unl.edu on 5th January 2018.
5. BRGF. Backward Regions Grant Fund Programme Guidelines. Ministry of Panchayati Raj. Government of India, New Delhi; c2014. Retrieved from https://panchayat.gov.in on 5th January 2018.
6. GOUP. Annual plan, 2010-2011. Planning Department, Government of Uttar Pradesh, Lucknow; c2010. Retrieved from http://planning.up.nic.in on 5th January 2018.
7. Khajuria S, Raina V, Bhushan B. Sources of information and perception of farmers towards soil testing techniques. Advances in Social Research. 2016;2(1):45-47.
8. Dhakal SR, Mandal RA, Mathema AB. Soil nutrients and carbon increment dynamics in broadleaf and chirpine forests of community forests Bhaktapur, Nepal. Int. J Geogr Geol. Environ 2021;3(2):35-46.
9. Kisan. Brief Overview of the mKisan Portal. Department of Agriculture & Cooperation and Farmers Welfare, Government of India, New Delhi, India; c2017. Retrieved from http://mkisan.gov.in on 5th January 2018.
10. NITI Aayog. Raising agricultural productivity and making farming remunerative for farmers. NITI Aayog, Government of India, New Delhi; c2015.
11. NSSO (National Sample Survey Organisation). Situation assessment survey of farmers. NSS 59th Round (January - December 2003). NSSO, Government of India, New Delhi; c2005.
12. NSSO (National Sample Survey Organisation). Key indicators of the situation of agricultural households in India. NSS 70th Round (January-December 2013). NSSO, Government of India; c2014.
13. Sarkar N, Dutta SK, Biswas SK. Use of HYV seeds and modern implements and its impact on cropping intensity- a case study in the district of Burdwan of West Bengal. IOSR Journal of Agriculture and Veterinary Science. 2013;2(3):40-46.
14. Mittal S, Mehar M. Agricultural information networks, information needs and risk management strategies: a survey of farmers in Indo-Gangetic plains of India. Socioeconomics Working Paper 10. Mexico, D.F.: CIMMYT; c2013.