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Knowledge level of farmers about natural farming practices in northern transition zone of Karnataka

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Abstract

The present study was conducted in Dharwad and Belgavi districts of Karnataka state during 2021-22. The Knowledge level of farmers about natural farming practices was studied by employing “*Ex-post facto*” research design and by using simple random sampling technique in Dharwad and Belgavi districts constituting a total sample size of 120 farmers. It was depicted that, high percent of farmers were noticed in medium knowledge level category (40.00%). Whereas, high knowledge was observed with 31.67 percent farmers followed by 28.33 percent farmers noticed in low knowledge category. The knowledge of maintaining one indigenous desi cow for 30 acres natural farming was noticed with all the farmers. Majority of farmers possessed the knowledge about the benefits of beejamrutha (93.33%) and gokrupamrutha (78.33%) followed by application of ghanajeevamrutha (78.33%) and jeevamrutha (47.50%). Regarding weed management, all the farmers were knowing about hand weeding and intercultivation. More than two-third of farmers (69.17%) had knowledge that straw mulching with crop residues, grasses, and dry leaves etc. helps in managing weeds. Live mulch through legume intercropping was known to nearly half of farmers (49.17%). With respect to pest and disease management practices, nearly two-third (62.50%) known the benefits of application of sour butter milk (85.83%), neemstra (62.50%), Brahmastra (42.50%) followed by application of dashaparni (38.33%), agniastra (28.33%) and Shunti Astra (21.67%). Majority of farmers possessed the knowledge about intercropping of monocots and dicots / cereals legumes (76.66%) and intercropping of crop-tree association (75.00%).

Keywords: Natural farming, knowledge level, natural farming practices, beejamrutha, jeevamrutha, neemstra and intercropping

Introduction

Natural Farming (NF) or Zero Budget Natural Farming (ZBNF), is considered to be agroecology based diversified farming system emerged as one of the alternative farming practices for improving the farmers' income in the backdrop of declining fertilizer response and farm income. It is considered by FAO as a strategy to ensure greater food security. Initially, a Japanese farmer, Masanobu Fukuoka proposed natural farming, on the philosophy of working with natural cycles and processes of the natural world. The movement of promoting ZBNF in India championed by Shri Subhash Palekar has resulted into widespread adoption at varying levels in many states, especially, Andhra Pradesh, Karnataka, Maharashtra, Himachal Pradesh states (Khadse *et al.* 2018) [2]. Now, it has become a pivot point of discussion among the agricultural scientists, government, farmers, and several other informal groups engaged in agriculture.

The Natural Farming approach is built on the four wheels: (1) Stimulation of microbial activity to make nutrients available to plants and protect against pathogens using a microbial inoculum, “jeevaamrutha”; (2) Protection of young roots from fungal and soil-borne diseases using another microbial culture, “beejamrutha”; (3) Production of stabilized soil organic matter and conservation of top soil by mulching “acchadana”; and (4) Soil aeration “Waaphasa” by improving soil structure, aeration and reducing tillage. By focusing on soil micro-organisms and fauna, and by mulching to increase soil organic matter, it is proposed that ZBNF has potential to greatly improve soil health, and so increase efficiency of nutrient and water use, contributing to improved efficiency of crop production (Smith *et al.*, 2020) [5].

Zero Budget Natural Farming (ZBNF) was first formulated during mid-90s by Maharashtra agriculturalist, Padma Shri, Subhashh Palekar. In July 2018, the National Institution for Transforming India (NITI Aayog) discussed the scope for promoting ZBNF in the entire country along the lines of that in Andhra Pradesh. Himachal Pradesh, Gujarat, Haryana, Karnataka and Kerala have also initiated ZBNF work.

For example, Karnataka has initiated implementation of ZBNF on a pilot basis in an area of 2,000 ha in each of the 10 agro-climatic zones of the state through the respective state agriculture or horticulture universities.

The Central Ministry of Agriculture and Farmers Welfare has recently used the term Bhartiya Prakritik Krishi Paddhati (BPKP) for promotion of natural farming. BPKP has been proposed to be added as a new sub-mission under PKVY scheme. Under PKVY, the Centre has given states the flexibility to adopt any model of traditional or organic farming. BPKP aims to promote natural farming practices in every block of the country.

Materials and Methods

The study was conducted in Dharwad and Belgavi districts of Karnataka in the year 2021-22 by using *Ex-post facto* research design and simple random sampling technique. These districts were purposively selected wherein Natural Farming (NF) project was implemented during 2018-19 and also keeping in view the maximum area under natural farming in northern transition zone of Karnataka. Considering the maximum area covered under natural farming in the selected districts, Dharwad and Hubli talukas in Dharwad district and Belagavi and Hukkeri talukas in Belgavi district were finalized. And from each taluka two hoblis were selected, thus four hoblis from each district was finalized. By employing simple random sampling technique, 15 farmers practicing natural farming benefited under Natural Farming (NF) project which

was implemented during 2018-19 to 2021-22 (in zone-8 of Karnataka) in each hobble were randomly selected to constitute a total sample of 120 farmers. To study the knowledge level of farmers about natural farming practices, a structured interview schedule was prepared by reviewing the previous studies and pretested in the non-sample area for its practicability and relevancy.

Knowledge of the respondents about adoption of natural farming practices is defined as the totality of understood information or accurate information possessed by the farmer. By referring package of practices and also in consultation with experts of Natural Farming (NF) the 50 detailed sub practices were Finalised under the broad categories *viz.*, keeping indigenous desi cow (2), practicing beejamrutha (5), jeevamrutha (4), ghanajeevamrutha (4), Sapta Dhanya Kashayam (4), gokrupamrutha (3), weed management (4), practicing neemstra (4), agniastra (4), Brahmastra (3), sour butter milk (4), Dash Parni (3), Shunti Astra (3), intercropping (2) and erecting contours and bunds (1). The answers to the question were quantified by giving one score to correct answer and zero score to incorrect answer.

Results and Discussion

Knowledge of recommended natural farming practices by the farmers

The data regarding knowledge of recommended natural farming practices were furnished in Table 1 and discussed below.

Table 1: Knowledge of farmers about recommended natural farming practices

(n=120)

Sl. No.	Particulars of recommended natural farming practices	f	%
1.	Maintaining indigenous desi cow		
a.	Maintaining one indigenous desi cow is necessary for practicing natural farming in 30 acres land	120	100.00
b.	Cow dung acts as natural fungicide	91	75.83
2.	Practicing Beejamrutha		
a.	Seed treatment with beejamrutha helps in protecting crop against seed and soil borne diseases	112	93.33
b.	20 litre beejamrutha solution required for treating 100 kg seeds	70	58.33
c.	Addition of 50 g lime in while preparing beejamrutha solution	73	60.83
d.	Addition of small quantity of native soil as source of inoculum	73	60.83
e.	Sprinkling beejamrutha solution on soyabean and groundnut seeds	51	42.50
3.	Practicing Jeevamrutha		
a.	Jeevamrutha convert unavailable form of nutrients to available form	57	47.50
b.	Jeevamrutha is applied @ 200lit/acre	119	99.17
c.	Jeevamrutha is sprayed @ 5.0, 7.5 and 10.0 percent respectively at vegetative, flowering and grain filling stage	114	95.00
d.	Shelf life of Jeevamrutha is 7 days	109	90.83
4.	Practicing Ghanajeevamrutha		
a.	Ghanajeevamrutha is applied @ 200 kg/acre/time	94	78.33
b.	Ghanajeevamrutha is applied twice	45	37.50
c.	Application at the time of sowing (as basal dose) and 30 DAS	70	58.33
d.	Shelf life of Ghanajeevamrutha is 6 months to 1 year	109	90.83
5.	Practicing Sapta Dhanya Kashayam		
a.	Sapta Dhanya Kashayam promotes grain filling and give Lustre to the grain	12	10.00
b.	Application @ 200 lit/acre	11	09.17
c.	Applied at grain filling stage	12	10.00
d.	Shelf life of Sapta Dhanya Kashayam is 2 days	10	08.33
6.	Practicing Gokrupamrutha		
a.	Application of gokrupamrutha helps in establishing beneficial bacterial strains in the soil	94	78.33
b.	Application @ 200 lit/acre	107	89.17
c.	Shelf life of gokrupamrutha is 1 week	102	85.00
7.	Weed Management		
a.	Hand weeding	120	100
b.	Intercultivation	120	100
c.	Straw mulching with crop residues, grasses, and dry leaves etc.	83	69.17
d.	Live mulch through legume intercropping	59	49.17
8.	Pest and Disease Management		

A. Practicing Neemastra			
i	Neemastra is used against sucking pests like aphids, Jassids, thrips and white fly	75	62.50
ii	Sprayed on crops for every month or whenever crop gets infested with pest	120	100.00
iii	Applied @ 200 lit/acre	112	93.33
iv	Shelf life of Neemastra is 6 months	79	65.83
B. Practicing Agniastra			
i	Agniastra is used against defoliators, spodoptera and hairy caterpillar	34	28.33
ii	6 - 8 litre Agniastra extract is diluted in 200 litre of water per acre	55	45.83
iii	Applied once in 15 days for first and second application and once in a week on subsequent application	31	25.83
iv	Shelf life of Agniastra is 6 months	53	44.17
C. Practicing Brahmastra			
i	Brahmastra is used as pesticide which controls the bigger caterpillars (Pod borer and fruit borer)	51	42.50
ii	Spray concentration is 3% (6 litre in 200 litre water per acre)	55	45.83
iii	Shelf life of Brahmastra is 6 months	35	29.17
D. Practicing sour butter milk			
i	Sour butter milk helps for management of foliar fungal diseases such as powdery mildew, leaf spot and damping off	103	85.83
ii	Spray concentration is 3% (5-6 litre in 200 litre water per acre)	108	90.00
iii	Spray twice or thrice in 10 days interval depending on disease incidence	88	73.33
iv	Shelf life of sour butter milk is 5-6 weeks	102	85.00
E. Practicing Dashaparni			
i	Dashaparni controls all types of defoliators and pod borers	46	38.33
ii	6.0 litre of Dashaparni extract mixed in 200 liter water per acre	51	42.50
iii	Shelf life of Dashaparni is 6 months	61	50.83
F. Practicing Shunti astra			
i	Shunti astra protects plants from fungal diseases	26	21.67
ii	Applied @ 200 lit/acre	28	23.33
iii	Shelf life of Shunti astra is 2 days	24	20.00
9. Intercropping			
1.	Intercropping of monocots and dicots/cereals and legumes	92	76.67
2.	Intercropping of crop-tree association i.e fruits/vegetables/green manure trees	90	75.00
10. Erecting contours and bunds			
1.	Contours and bunds conserves soil and preserve rain water	95	79.17

Maintaining indigenous desi cow

The results regarding maintaining indigenous desi cow revealed that cent percent of natural farming practicing farmers possessed complete knowledge that one indigenous desi cow is required for practicing natural farming in 30 acre land and majority (75.83%) had knowledge that cow dung acts as natural fungicide. As the culture of traditional farmers revealed that maintaining indigenous desi cow is the first and foremost resource in farming, since natural farming reflects the age old practice. Thus, supports the present findings.

Practicing beejamrutha

It was noticed that majority of the farmers (93.33%) had knowledge about the benefits of seed treatment. Around 60.00 percent farmers possessed correct knowledge about addition required quantity to be used (58.33%), addition of lime in beejamrutha solution (60.83%) and addition of small quantity of native soil as source of inoculum (60.83%). Since, majority of the natural farming practicing farmers had perceived the importance, well-educated and also participated in the extension programmes organized under Natural Farming (NF) Project hence the favourable distribution of farmers.

Practicing jeevamrutha

The majority of farmers possessed the knowledge of recommended quantity of use (99.17%), the concentration (95.00%) and its shelf life (90.83%) but less than fifty percent (47.50%) had knowledge of the benefits. These findings revealed that farmers realized jeevamrutha as the basic pillar of natural farming, but unable to express its benefits.

Practicing ghanajeevamrutha

It was noticed that majority of farmers possessed knowledge

about rate of application (78.33%) and shelf life (90.83%) of ghanajeevamrutha. Whereas, the knowledge of time of application and number of use was observed with 58.33 percent and 37.50 percent of farmers respectively. The difficulties involved in practicing might be the reasons for possessing less knowledge about the application.

Practicing Sapta Dhanya Kashayam

Very less percent of farmers (10.00%) had knowledge regarding benefits and time of application and also quantity of use and its shelf life. Lack of awareness might be the reason for the said findings.

Practicing Gokrupamrutha

Majority of farmers (89.17%) had knowledge about the application rate and shelf life of gokrupamrutha (85.00%). The benefit of use was also known to 78.33 percent farmers. As the traditional practice the results were greatly witnessed.

Weed management

All the farmers knowing about hand weeding and intercultivation. But, the practice of straw mulching and live mulch through legume intercropping were known to 69.17 percent and 49.17 percent farmers respectively.

Pest and disease management

Practicing neemastra: It was noticed that majority of farmers (93.33%) had knowledge about the application rate and time of application of neemastra (90.00%). Whereas, two-third of farmers knowing about its shelf life and usefulness in controlling sucking pests. The knowledge of benefits of neem and its by-products among farmers as traditional practice being in use, hence the results.

Practicing agniastra

Less than fifty percent of farmers (45.83%) had knowledge about spray concentration of agniastra and shelf life of agniastra (44.17%). Further, the benefits of the practice and its time of application was known to less than 30.00 percent of farmers (28.33 and 25.83 percent of farmers respectively). Lack of awareness and not realizing the importance of the practice might be the reasons for possessing less knowledge of agniastra.

Practicing Brahmastra

It was noticed that around two-fifth portion of farmers had knowledge about benefits of Brahmastra application (42.50%) and spray concentration of Brahmastra (45.83%). Whereas, shelf life of Brahmastra was known to less than 30.00 percent of farmers (29.17%). Not realizing the importance and lack of awareness of the practice might be the reasons for the above findings.

Practicing sour butter milk

The knowledge of sour butter milk practice as presented in Table 2 highlighted that majority of farmers possessed knowledge regarding concentration of sour butter milk use (90.00%), its benefits (85.83%), shelf life (85.00%) and time of application (73.33%). Use of sour butter milk was noticed as the traditional practice among farmers, obviously the knowledge of using sour butter milk was noticed with majority of farmers.

Table 2: Distribution of farmers according to overall knowledge about recommended natural farming practices

(n=120)

Category	Frequency	Percentage
Low (<25.34)	34	28.33
Medium (25.34-32.85)	48	40.00
High (>32.85)	38	31.67

Mean = 29.10

SD = 8.84

Practicing dashaparni

The observation on dashaparni use revealed that only 38.33 percent of farmers had knowledge about benefits of dashaparni, even though 42.50 percent and 50.83 percent farmers were possessing the knowledge of spray concentration and shelf life of dashaparni. Not interested to adopt and lack of interest in the practice might be the reasons for less knowledge about dashaparni use.

Practicing Shunti astra

It was observed that less than one-fourth of farmers were knowing about the benefits (21.67%), the application (23.33%) and shelf life of Shunti Astra (20.00%). Not realizing the importance and difficult to practice might be the reasons for the above findings.

Intercropping

Majority of farmers possessed the knowledge about intercropping of monocots and dicots (76.66%) and intercropping of crop-tree association (75.00%). As the traditional practice majority of farmers ought to possess the knowledge of intercropping.

Erecting contours and bunds

It was noticed that majority of farmers (77.50%) had

knowledge of the benefits of contours and bunds. Farmers have come across the importance of practice under other extension programmes, hence the results.

Overall knowledge of recommended natural farming practices

It could be observed from the Table 2 that, high percent (40.00%) of farmers was noticed in medium knowledge category, followed by distribution high (31.67%) and low knowledge category (28.33%) respectively. The existence of medium level of economic motivation, risk orientation, and innovativeness were the reasons for high percent of farmers distributed in medium knowledge about natural farming practices. The above findings were in accordance with the studies conducted by Thayagarajan and Ramanathan (2001) [6], Singha and Devi (2013) [4], Kumar *et al.* (2014) [3], Jaganathan *et al.* (2016) [1], and Vishnuja and Arunachalam (2020) [7].

Conclusion

The study captured the knowledge level of natural farming practicing farmers about recommended natural farming practices in northern transition zone of Karnataka. It indicated that high percent of farmers were noticed in medium knowledge level category (40.00%). Whereas, high knowledge was observed with 31.67 percent farmers followed by 28.33 percent farmers noticed in low knowledge category. Majority of farmers possessed the knowledge about the benefits of beejamrutha (93.33%) and gokrupamrutha (78.33%) followed by application of jeevamrutha (47.50%), Brahmastra (42.50%), and dashaparni (38.33%). The incidence of low knowledge level of farmers needs greater attention from the extension system to organize training programmes, conduct Farm School (FS), demonstrations and exposure visits.

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