Mysore J. Agric. Sci., 54 (4) : 31-36 (2020)

Effectiveness of Training on Land Resource Inventory in Terms of Knowledge, Satisfaction, Willingness to Adopt and Interest in Future Training

M. J. Chandre Gowda, Rajendra Hegde and D. V. Srinivasa Reddy

Principal Scientist (Agricultural Extension), ICAR - Agricultural Technology Application Research Institute (ATARI), Bengaluru

e-Mail : maravalalu@yahoo.com

Abstract

The Watershed Development Department and ICAR-National Bureau of Soil Survey and Land Use Planning (NBSS & LUP) have developed site specific Land Resource Inventories (LRI) for the selected taluks in 11 districts of Karnataka. The LRI serves as a basic database and enables identification of farm-specific land related problems and potentials, suggest appropriate conservation measures, delineate suitability of the area for various uses. Watershed Development Department collaborated with ICAR - Agricultural Technology Application Research Institute (ATARI), Bengaluru to organize capacity development programmes to farmers at the micro watershed / village level through Krishi Vigyan Kendras in these districts. The learning level evaluation of the training indicated that suitable horticulture/ forestry species and appropriate soil and water conservation measures were learnt by most of the farmers. Less than half of the farmers only could learn about the suitable agricultural crops to their soils. The knowledge gain in five out of seven LRI components was not directly associated with overall satisfaction, but the knowledge on suitable agricultural crops was highly associated. Knowledge on all the seven LRI components was significantly associated with the willingness to adopt LRI contents. Knowledge of fertility status, soil slope and soil types were significantly associated with farmers interest to participate in future capacity building programmes.

Keywords: Effectiveness of training, Land resource inventory, Satisfaction willingness, Future training

Karnataka has about 78.32 lakh holdings owning an area of 121.61 lakh ha, which accounts for about 5.69 per cent and 7.29 per cent respectively in India (2018). Marginal holdings contributed for 49.14 per cent owning 15.22 per cent of the total area. Uneconomical holdings could be one of the reasons for lesser contribution of the state (3.5%) to the national food grain production. However, another important reason could be that the area under irrigation was about 27.3 per cent, as against the national status of 53.1 per cent (Anonymous, 2018), exposing nearly three fourth of the area to the vagaries of monsoon and uncertainties of rainfed farming. But the share of net area sown is much higher in the state (55.62 per cent) than the national average of 47 per cent, which may be due to expansion of cultivation on pasture and grazing lands and wastelands (Deshpande, 2004). Inappropriate soil, water, and crop management practices over a period of time has led to degradation of land resources in rainfed areas (Anonymous, 2006).

In this backdrop, watershed development has been a big boon to improve the productivity and sustainability of rainfed farming in Karnataka. The Watershed Development Department and ICAR-National Bureau of Soil Survey and Land Use Planning (NBSS & LUP) have developed site specific Land Resource Inventories (LRI) for the selected taluks in 11 districts of Karnataka, under the World Bank funded Watershed Development Project-II (Sujala-3 Project). The LRI enables identification of farm-specific land related problems and potentials, suggest appropriate conservation measures, delineate suitability of the area for various uses and finally prescribe viable and sustainable land use options suitable for each and every land holding (Hegde *et al.,* 2018). LRI also provides scientific inputs for crop diversification, productivity enhancement, restoration of degraded and waste lands and greening of waste lands. LRI serves as a basic database for monitoring and evaluating the implementation of watershed and other NRM

programs. Benchmark sites can be revisited to evaluate the success or otherwise of NRM projects implemented by various departments. The database is of use in planning livelihood security options in the region for the landless population also.

The contents of the LRI maps are new and hence its utility to farming community largely depends on capacity building of farmers to understand the contents and to learn about the approaches to use these contents. Realizing this need, the Watershed Development Department, Government of Karnataka collaborated with ICAR - Agricultural Technology Application Research Institute (ATARI), Bengaluru to organize capacity development programmes to farmers at the micro watershed/village level. Training bridges the gap between current and expected performance and enhances the skill, knowledge, competency level (Rodriguez and Walters, 2017). Training evaluation, when done systematically and purposefully, provides crucial insights into the entire training cycle-the pre-training, training and post-training processes. Capacity building of the intended users, the farmers in this case, on the new technologies / practices, the land resource inventories in the present study, is of strategic importance. Looking into the importance of the capacity building activities, the present study was undertaken with the following objectives;

1. To assess the effectiveness of training on the components of LRI based on knowledge gain

2. To ascertain the extent of association between knowledge gain with that of satisfaction, willingness to adopt and interest in future training

METHODOLOGY

The Sujala-3 project is implemented in 11 districts, spread across all the dry zones of the state. The Krishi Vigyan Kendras (KVKs) located in these districts were involved in the capacity building activities. The KVK Subject Matter Specialists were first trained as master trainers on the LRI components by ICAR-NBSS & LUP, Bengaluru. In turn, the master trainers organized village level capacity building of farmers on soil and site characteristics, hydrology, digital maps, thematic maps, land suitability of major crops covered, crop production technology and soil and water conservation practices suitable to different land areas. These peripatetic training enabled the trainers to move closer to the trainees real-life situations and impart the learning in the backdrop of learner's context. The expertise of local officials of the Watershed Development Department was appropriately used while preparing for the training as well as during the capacity building exercise. All the participating farmers were given the opportunity to learn and understand the contents in different maps and was explained the site-specific characteristics of their land resources with the help of LRI cards pertaining to their farms. The present study was based on the feedback collected from the farmers trained in Gadag, Davanagere, Tumakuru and Chamarajanagara districts, randomly selected for the training effectiveness analysis. Each batch of training included 30 to 40 farmers. All the participating farmers were distributed with the questionnaire developed by the project monitoring team of the Watershed Development Department, Government of Karnataka. However, only those farmers whose responses were complete on all aspects were considered for the study purpose. Complete responses were received from 128 farmers, which included 50 farmers from Mahalingapura and Yalishiruru villages of Gadag taluk, 42 farmers of Kesarahalli, Kadakola and Bennehalli villages of Harapanahalli taluk, 23 farmers of Holakallu and Tavarekere villages of Tumakuru taluk and 13 farmers of Kellamballi village of Chamarajanagara taluk.

The training evaluation has four levels - Reaction, Learning, Behaviour and Result (Kirkpatrick and Kirkpatrick, 2006). In the present study, training evaluation has been limited to the first two levels. The training effectiveness was measured in terms of gain in knowledge, overall satisfaction, willingness to adopt and interest in future training on LRI. Knowledge on seven components of LRI was assessed on 'Know' or 'Don't Know' format and the response marked under 'Know' was awarded with a score of 1 and 0 score for 'Don't Know'. The four major categories of knowledge based on a taxonomy of learning

outcomes (Anderson *et al.,* 2001) are factual, conceptual, procedural and metacognitive. Factual and conceptual categories constitute the 'know-what', whereas, procedural and metacognitive constitute the 'know-how'. The present study aimed at assessing the factual and conceptual knowledge. Feedback on overall satisfaction was collected on 'Satisfied' or 'Not satisfied' form with a score of 1 and 0, respectively. Willingness to adopt LRI contents was measured in terms of 'Yes' or 'No' response and was scored 1 and 0, respectively. Farmer's interest to attend future training was recorded on 'Yes' or 'No' response, with a score of 1 and 0, respectively. The data is analysed using frequency, percentage, X^2 goodness of fit (Siegel and Castellan, 1988) and logit analysis (SPSS version 20).

Results and Discussion

Frequency distribution of the respondents in terms of knowledge of the seven components of the LRI with respect to the effectiveness of training in terms of overall satisfaction is presented in Table 1. Among the seven LRI knowledge areas, suitable horticulture/ forestry species was the most commonly learnt component as indicated by 119 out of 128 responding yes to the question. The knowledge of soil and water conservation measures that were discussed were also learnt by most (106 farmers). Identification of the location of their land parcel in the LRI Atlas, the details related to soil slope and soil types were learnt by more than 71 per cent of the farmers. As per the data presented, less than half of the farmers responded knowledgeable about the suitable agricultural crops to their soils (61 farmers). Deciphering the soil fertility status reflected in the LRI Atlas was also difficult for 49 farmers. Planning and organizing for broader spectrum of farmer empowerment including knowledge disseminations is crucial for the success of training programmes (Oreszczyn and Carr, 2010).

Table 1

Knowledge on LRI Components and its association with satisfaction on training

Knowledge on LRI Components		Overall satisfaction	
		Yes (104)	No (24)
Ability to locate their land in LRI atlas	Yes (92)	78	14
	No (36)	26	10
	X^2 value	2.68	
Ability to understand fertility status in LRI atlas	Yes (79)	66	13
	No (49)	38	11
	X^2 value	0.71	
Ability to understand the soil slope in LRI atlas	Yes (92)	74	18
	No (36)	30	6
	X^2 value	0.14	
Ability to notice soil types in LRI atlas	Yes (91)	74	17
	No (37)	30	7
	X^2 value	0.01	
Awareness on suitable agricultural crops to their soils	Yes (61)	58	3
	No (67)	46	21
	X^2 value	14.64***	
Knowledge on horticulture/ forestry species for the watershed area	Yes (119)	99	20
	No (9)	5	4
	X^2 value	4.20*	
Knowledge on Soil & water conservation measures	Yes (106)	86	20
	No (22)	18	4
	X^2 value	0.01	

*Significant at 0.05 level, ***Significant at 0.001 level

Although, a majority of farmers expressed overall satisfaction (104 satisfied with the capacity building), the component-wise association indicated a different picture. The knowledge gain in five out of seven LRI components was not directly associated with overall satisfaction. The gain in knowledge on suitable agricultural crops to their drylands was highly associated with the expression of satisfaction in capacity building. It is justified by the fact that this was the most difficult component to understand as reflected by the fact that more than 50 per cent of the respondents were not confident about the correct details. So, those who could understand this component properly were also extremely satisfied with the capacity building.

The logit regression of the data (Table 2) was used to probe more into the influence of knowledge gain with the overall satisfaction. It further proved the importance of building knowledge on suitable crops to drylands to

TABLE 2

Logit analysis of factors influencing farmer's satisfaction on training

Factors	β	Wald	Significance
Ability to locate their land in LRI atlas	0.421	0.370	0.543
Ability to understand fertility status in LRI atlas	0.242	0.101	0.750
Ability to understand the soil slope in LRI atlas	-2.329	2.777	0.096
Ability to notice soil types in LRI atlas	0.171	0.020	0.886
Awareness on suitable agricultural crops to their soils	2.637	12.567	0.000 **
Knowledge on horticulture/ forestry species for the watershed area	3.495	6.496	0.011 **
Knowledge on Soil and water conservation measures	-2.230	3.801	0.050 *
Constant	0.185	0.052	0.819

*Significant at 0.05 level, **Significant at 0.01 level

make farmers satisfied with the training on LRI components. Farmer's satisfaction on LRI trainings was found to have positive and highly significant relationship with the awareness on suitable crop information with the wald value of 12.567. The logit regression also revealed the significance of one more component, the knowledge of soil and water conservation measures having significant association with farmer's satisfaction in the capacity building on land resource inventories.

The knowledge and adoption are very closely related concepts. Knowledge is the first stage in the innovation decision process concern by Rogers (1983). Knowledge leads to an understanding of the perceived usefulness or perceived case of use of the new practices. The results indicate the strong association between the knowledge of LRI components and willingness to adopt the components. Knowledge on all the seven LRI components was significantly associated with the willingness to adopt (Table 3) out of which the three components - the knowledge on

TABLE 3

Knowledge on LRI components and its association with the willingness to adopt

Knowledge on LRI Components		Willing to adopt	
		Yes (120)	No (8)
Ability to locate their land in LRI atlas	Yes (92)	90	2
	No (36)	30	6
	X^2 value	9.28**	
Ability to understand fertility status in LRI atlas	Yes (79)	79	0
	No (49)	41	8
	X^2 value	13.76***	
Ability to understand the soil slope in LRI atlas	Yes (92)	92	0
	No (36)	28	8
	X^2 value	21.81***	
Ability to notice soil types in LRI atlas	Yes (91)	91	0
	No (37)	29	8
	X^2 value	20.99***	
Awareness on suitable agricultural crops to their soils	Yes (61)	61	0
	No (67)	59	8
	X^2 value	7.77**	
Knowledge on horticulture/ forestry species for the watershed area	Yes (119)	113	6
	No (9)	7	2
	X^2 value	4.21*	
Knowledge on Soil & water conservation measures	Yes (106)	102	4
	No (22)	18	4
	X^2 value	6.45*	

soil fertility status, soil slope and soil types had very high level of association with willingness to adopt land resource inventory contents. The knowledge on suitable agricultural crops and the activity to locate their land parcel on the LRI Atlas were also significantly associated at 0.01 per cent level.

The Technology Acceptance Model (TAM) proposed by Davis (1989) has indicated the presence of different stages before the actual use of the technology. It includes a favourable attitude (A) towards using the technology and the behavioural intent (BI) to use the technology. The willingness to adopt expressed by the respondents in the present study reflect the behavioural intent to use the LRI contents. It may be because of the perceived usefulness of LRI contents and the perceived ease of using the contents of LRI. It strongly

reflects on the effectiveness of the capacity building activities on land resource inventory.

Knowledge gained during the training may provide a sense of accomplishment and an urge to learn more as indicated by the fact that only a negligible proportion of participants did not want to attend future training. 121 out of 128 farmers expressed interest to learn more by attending similar training in future. Developing interest about the new components among the learners (farmers) is the second step in the extension teaching process (Ray, 1996). It follows the first step of creating of attention about the new components, the LRI components in this case, through training and capacity building. Interest about the new components is likely to be followed by a desire to act, may be to acquire additional knowledge by participating in more extension education activities, as reflected in the data given in Table 4.

With an exception to awareness on suitable agricultural crops and knowledge on soil and water conservation measures, the other five components were probably easier to understand and thus would have aroused the desire to learn more and act on these components. Knowledge of fertility status, soil slope and soil types would have created much excitement among the farmers to express desire to participate in the more such programmes. Learning is a continuous process and is fundamental to achieve better.

Measurement of training effectiveness is the professional responsibility of every trainer and training system. Factual and conceptual knowledge of the Land Resource Inventory reflected the 'learning' level, whereas the participants feedback on overall satisfaction, willingness to adopt and interest to participate in future training were the 'reaction' level of training evaluation. Suitable horticulture/forestry species and appropriate soil and water conservation measures were the most commonly learnt LRI contents. Deciphering the soil fertility status in the LRI atlas and the knowledge of suitable agricultural crops to their dryland soils were the difficult contents to learn. Capacity building on these two areas need more emphasis not only during training, but also while preparing relevant training material. The knowledge gain on LRI components was not directly associated with overall satisfaction. This needs to be studied in greater detail on the other expectations of the farmers while participating in such programmes.

TABLE 4

Knowledge on LRI Components and its association with the interest in future training

Knowledge on LRI Components		Intrest in future training	
		Yes (121)	No (7)
Ability to locate their land in LRI atlas	Yes (92)	90	2
	No (36)	31	5
	X^2 value	6 .87**	
Ability to understand fertility status in LRI atlas	Yes (79)	79	0
	No (49)	42	7
	X^2 value	11.94***	
Ability to understand the soil slope in LRI atlas	Yes (92)	91	1
	No (36)	30	6
	X^2 value	12.15***	
Ability to notice soil types in LRI atlas	Yes (91)	91	1
	No (37)	31	6
	X^2 value	11.77***	
Awareness on suitable agricultural crops to their soils	Yes (61)	60	1
	No (67)	61	6
	X^2 value	3.31	
Knowledge on horticulture/ forestry species for the watershed area	Yes (119)	114	5
	No (9)	7	2
	X^2 value	5.26*	
Knowledge on Soil & water conservation measures	Yes (106)	102	4
	No (22)	19	3
	X^2 value	3.43	

*Significant at 0.05 level, **Significant at 0.01 level, ***Significant at 0.001 level

The results indicating the strong association between knowledge on LRI components and farmers' willingness to adopt LRI contents justify the need for intensifying capacity building activities. This is further corroborated by the fact that most farmers have expressed interest in participating in similar capacity building activities. Empowered farmers on scientific and holistic management of soil and its resources could change the way the rainfed farming is practiced, with

suitable soil and water management practices and the right choice of agricultural, horticulture and forest crops to each class of soil types. The results not only justify the current financial and human resources being allocated for farmer's capacity building but in fact demand for enhanced allocations in the future.

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(*Received :* August, 2020 *Accepted :* November, 2020)