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Assessing knowledge gaps of para extension workers for improving their capacity in dissemination of farm technology to farmers in Mandi district of Himachal Pradesh, India

V P CHAHAL[1], D S YADAV [2], S K THAKUR[3] and PANKAJ SOOD[4]

ICAR Headquarters, KAB-I, New Delhi 110 012

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ABSTRACT

Public extension systems worldwide including India are facing serious challenges in dissemination of technology due to shortage of technical manpower. The services of trained Para Extension Workers (PEWs) could be used provided they have good knowledge of modern farming methods. Therefore, knowledge gaps assessment is crucial for designing effective and purposeful training programmes for human resource development of such workers. The knowledge gaps need to be identified to increase the working competency of PEWs through training interventions for further improving livelihoods of their fellow farmers. A study was undertaken with structured interview schedule to assess the knowledge gaps of 54 PEWs in Mandi district of Himachal Pradesh. The study revealed that majority of PEWs belonged to middle age group, possessed formal education between matric to higher secondary, less farming experience, medium level of economic motivation and scientific orientation. Majority (68.52%) of PEWs possessed overall medium knowledge level about improved farm technologies and had adequate knowledge in regularly practiced farm practices. However, inadequate knowledge was observed in weed management, plant protection, protected cultivation, drip and sprinkler systems of irrigation technology. To achieve the potential for the uptake and successful implementation of extension programmes, regular capacity development of PEWs is henceforth suggested for improving their knowledge in these lacking areas for wider outreach of latest technologies. Pearson coefficient of correlation of PEWs age, farming experience and scientific orientation were found positively and significantly associated with overall knowledge level, whereas, educational qualifications and economic motivation showed positive but non-significant relationship.

Key words: Knowledge level, Para Extension Workers, Socio-economic characteristics

Extension is an essential pillar of agricultural research and development. Extension workers provide strength to this pillar by giving technical guidance and advice to farmers for acceptance of farm technologies, besides providing feedback to researchers on as-yet unsolved field problems. However, the existing public extension system is not capable of meeting these challenges owing to number of reasons (Hassanullah 1999). Public extension systems worldwide including India are facing serious challenges in dissemination of technology to farmers due to shortage of technical manpower. The declining trend in government expenditure for public extension in several countries has been the prime reason for shift towards alternative approaches in extension. In most developing countries, the farmer-to-extension agent ratio is more than 1 000:1; hence farmers have a hard time exercising demand and holding service providers accountable (Anderson and Feder 2004). So, farmers to farmers extension can play an important role in aggregating farmers demands for extension and in representing farmers in participatory models of extension management so as to make extension more demand driven (Feder *et al*. 2010).

In India, at national level, Department of Agriculture and Co-operation of the Union Ministry of Agriculture has a separate Division of Extension, which lays down major policy guidelines on extension matters. As part of its extension reform process, the Union Government is supporting State Governments through a Centrally Sponsored Scheme for establishing Agricultural Technology Management Agencies (ATMA) at district level. The ATMA scheme has a provision for leveraging upon the skills and knowledge of progressive farmers to take the public extension machinery to villages. Such progressive farmers are designated as Farmer Friends (FF) and work as Para Extension Workers (PEWs) to supplement the main

[1]Principal Scientist (AE) (chahalvp@gmail.com), Division of Agricultural Extension, [2]Extension Specialist (Extension Education) (dsyadavhpau@yahoo.com), Krishi Vigyan Kendra, Sundernagar, District Mandi, Himachal Pradesh; [3]Programme Coordinator (skthpkv@yahoo.com), Krishi Vigyan Kendra, Kullu Himachal Pradesh; [4]Programme Coordinator (pankajplp@rediffmail.com), Krishi Vigyan Kendra, Sundernagar, District Mandi, Himachal Pradesh

extension system.

In Himachal Pradesh, PEWs have been selected in village panchayats with the prime role to maintain liaison between farmers and developmental departments for effective transfer of technology to rural masses at village level. These PEWs require adequate technological backstopping on agriculture and allied enterprises through regular capacity building programmes for improving their professional competency in extension service and effective role in transfer of technology. Therefore, identification of training needs is the first and fundamental task for success of any programme (Lynton and Pareek 1990). As Farmers' Friends are grass root PEWs, therefore, proper assessment of their knowledge gaps is of paramount importance in designing need based training programmes to update their knowledge and skill, besides developing their capacity for effective farm technology dissemination. With this context in view an empirical study was conducted with three specific objectives: i) to study the personal and socio-economic characteristics of PEWs; ii) to assess the knowledge level of PEWs about improved farm technologies; and iii) to study the relationship of selected independent variables on overall knowledge level of PEWs about improved farm technologies.

MATERIALS AND METHODS

The study was purposively conducted in Mandi district of Himachal Pradesh state of India in 2011-12, where in spite of significant research achievements the productivity of crops is far below than potential yields. As the phenomenon had already occurred, therefore, the Ex-post facto research design was used for the study. Thus, inferences about relation among variables were made without direct intervention from concomitant variation of independent and dependent variables (Kerlinger 1973). In Himachal Pradesh, a total of 3125, while in ten blocks of district Mandi 441 PEWs have been selected under ATMA scheme. A sample of 54 PEWs representing all ten blocks of Mandi district was taken randomly for the present study. The data was collected by using a well structured interview schedule. The first part of schedule consisted of questions related to profile of the respondents. The second part of the schedule consisted of 20 knowledge test statements about improved farm technologies. These knowledge test statements were prepared by consulting scientific literature on farm technologies and experts of the concerned fields. Knowledge of PEWs was considered as dependent variable, whereas the age, educational qualification, farming experience, economic motivation and scientific orientation were taken as independent variables. The age, educational qualification, farming experience were measured by schedule developed for the purpose, whereas economic motivation and scientific orientation were measured by scale developed by Supe (1969). The collected data was quantified, categorized and tabulated by using statistical tools like frequency counts, percentage, mean and standard deviations to draw the valid conclusions. The relationship of independent variables on the dependent variable was studied by computing the Pearson coefficient of correlation.

RESULTS AND DISCUSSION

Personal and socio-economic characteristics

The data given in Table 1 indicated that majority of respondents were of middle (33.0%) followed by young (20.37%) and old (18.52%) age group. It could be attributed to the fact that commercial agriculture is a recurrent income generating enterprise and it adds significantly to the family income. More of middle age respondents were found to have taken up farming as primary occupation as reported earlier by Ranuji (2006). In respect of formal education obtained, 40.74 and 38.89% of the respondents possessed matriculate and higher secondary qualification respectively, while only 20.37% of the respondents were bachelor degree/ master degree holders. The reason for high school and higher secondary education level of respondents could be primarily the minimum requirement for selection of farmers' as PEWs being matric. Also the non-availability of government jobs might have motivated respondents to become PEWs. The formal schooling could help the respondents to gather new information required for farm enterprise which in turn might create positive outlook to manage the enterprise. It is a well known fact that an educated person turns to be rational in his thinking and imagination which in turn develops entrepreneurial competencies (Patel 2000). The data also revealed that 44.44 and 42.59% of the respondents had up to 10 years and 11 to 20 years of farming experience, respectively and only 12.96% had high (>20 years) farming experience. The

Table 1 Personal and socio-economic characteristics of respondents (*n*=54)

Particular	Frequency	Percentage	Mean	SD
Age group				
Up to 25 years	11	20.37	33.04	8.58
26-40	years	33	61.11	
> 40 years	10	18.52		
Educational qualification				
Matriculate	22	40.74	18.00	6.08
Senior Secondry	21	38.89		
Graduate/Post graduate	11	20.37		
Farming experience				
Up to 10 years	24	44.44	18.00	9.54
11–20 years	23	42.59		
> 21 years	7	12.96		
Economic motivation				
Low (< 12.29)	11	20.37	14.11	1.82
Medium (12.30–15.93)	41	75.93		
High (> 15.93)	2	3.70		
Scientific orientation				
Low (< 15.18)	9	16.67	16.80	1.62
Medium (15.19–18.41)	45	83.33		
High (> 18.41)	0	0.00		

possible reason for low farming experience could be the young and middle age of the respondents. Unemployment amongst the educated youth also motivated them to begin a profession in agriculture.

The data further revealed that majority (75.93%) of the respondents exhibited medium level of economic motivation. Only 20.37 per cent were possessing low level of economic motivation and very few (3.70%) had high level of economic motivation. The reasons for medium and low economic motivation of respondents might be due to their low economic position, small and marginal land holding and lack of encouragement from family members. Unless one is not economically motivated, he/she cannot make sincere efforts and create interest in the profession and earn profit out of it (Patel 2005). It was also found that majority (83.33 %) of the respondents belonged to medium scientific orientation category which might be due to their education level and training received in the past that motivated them to have application of these improved practices in their farming situations. The other reason for low scientific orientation, however, might be due to their small/ marginal land holding and low income. Earlier, Patel (2005) had also reported the similar type of findings.

Overall knowledge level of respondents about improved farm technologies

Knowledge is important component of behaviour and plays a major role in the covert and overt behaviour of human beings. Once knowledge is acquired, it helps to develop favorable attitude towards improved practices and accordingly motivate the individuals to take action in accepting the technology. The results revealed that majority of the respondents (68.52%) possessed medium followed by high (16.67%) and low (14.81%) knowledge level (Table 2). Although recommendations on improved farm technologies have been made, farmers are yet to reap full advantage of these technologies (Singh *et al.* 1998). The reason for low to medium knowledge of respondents might be due to less exposure to training and extension activities about improved farm technologies. These findings are in conformity with the findings of Chaudhary and Panwar (2005). Further, medium level of economic motivation, scientific orientation and their contacts with local extension workers might have motivated them to know more about the improved methods of agricultural technology. Similar types of findings were also reported by Chandracharan *et al.* (2007) in their respective studies.

Table 2 Overall knowledge level of respondents about improved farm technologies (n = 54)

Knowledge levels	Score range	Para extension workers	
		Number	Percentage
Low	< 7.48	8	14.81
Medium	7.49 –14.18	37	68.52
High	> 14.18	9	16.67

Mean= 10.83, SD = 3.35

Knowledge level of respondents about major areas of improved farm technologies

A critical look at data indicated that 50 to 57.41% of the respondents had adequate knowledge about high yielding varieties (HYVs) of crops, seed rate and sowing methods of cereals, oilseeds and pulses (Table 3). This might be due the awareness among the respondents and that these practices are commonly known and regularly practiced by respondents in their area. Majority of the respondents possessed good knowledge about importance of soil testing (75.93%) and method of soil sampling (72.22%) probably because of the fact that Government of Himachal Pradesh has started a mass campaign for soil testing and established eleven soil testing labs besides four mobile soil testing labs to provide free soil testing facilities to the farmers. With regard to nutrient management, about 50 percent of the respondents had correct knowledge, which might be attributed to the exposure gained by them during past training programmes.

The control of weeds in agro-ecosystems has troubled farmers since the beginning of agriculture. The finding in the present study revealed that only about one-third (35.19%) of the respondents had good knowledge on this important aspect leading to the conclusion that majority of them were lacking in weed management techniques. The possible reason for high knowledge gap by the respondents might be due to the lack of awareness about crop specific herbicides and agro chemicals as earlier reported by Wijeratne and Abeydeera (1994). Prevalence of hand weeding and using the same weeds as green fodder for cattle might be the other reason for non acceptance of herbicides. Similarly, in the area of vegetable production technologies majority of the respondents possessed adequate knowledge, viz. healthy nursery raising techniques (64.81%), use of HYVs (57.41%), seed rate (83.33 %) and sowing methods (85.19 %) as also earlier reported by Bala *et al.* (2006). The higher knowledge of the respondents about these practices might be due to their more involvement in seasonal and off seasonal vegetable cultivation due to congenial climatic conditions and adequate marketing facilities. The knowledge about protected cultivation was very poor because protected cultivation is a recent precision farming agri-enterprise which requires some specific knowledge and skill as also reported earlier by Yadav *et al.* (2011).

Plant protection is another challenging area for the successful cultivation of crops but only 38.89 and 37.04% of respondents had the knowledge about disease and insect pest identification symptoms and management, respectively. Very few of them (9.26%), however, had the knowledge about integrated disease/pest management. The reason might be due to their less exposure to training programme on plant protection aspect and prevalence of new biotic stresses and their management strategies. These findings are similar to the findings of Yadav *et al.* (2011). The study indicated good knowledge amongst respondents in the area of agro-forestry (88.89%) and agri-horticulture (83.33%) because of the fact that agro forestry and agri horticulture farming systems are much prevalent in the district.

Table 3 Knowledge level of respondents about major areas of improved farm technologies (*n=54*)

Major areas of technologies	PEWs with correct knowledge	
	Number	Percentage
High yielding varieties, seed rate & sowing methods		
Use of high yielding varieties of cereals, oilseeds and pulses	27	50.00
Seed rate, sowing methods & spacing	31	57.41
Soil testing		
Importance of soil testing	41	75.93
Method of soil sampling	39	72.22
Nutrient management		
Manure and fertilizer dose calculation	28	51.85
Time and method of application of manures and fertilizers	25	46.30
Weed management		
Knowledge about crop specific weedicides	19	35.19
Weedicide dose calculation and time of application	19	35.19
Vegetable production		
Healthy nursery raising	35	64.81
Use of high yielding varieties	31	57.41
Seed rate	45	83.33
Sowing method and spacing	46	85.19
Vegetable cultivation under protected condition	10	18.52
Plant protection		
Disease identification symptoms and management	21	38.89
Insect pest identification symptoms and management	20	37.04
Integrated pest and disease management	5	9.26
Alternate land use system		
Agro forestry	48	88.89
Agri- horticulture	45	83.33
Irrigation		
Drip irrigation	20	37.04
Sprinkler irrigation	30	55.56

More than half of the sampled respondents had correct knowledge of sprinkler method of irrigation, while about one–third were found to have good knowledge of drip irrigation (Table 3). The insufficient knowledge of respondents in this area might be attributed to their less exposure to information sources, less contact with extension personnel and lack of awareness in the study area (Jitarwal *et al.* 2007). Himachal Pradesh is a state where water is a limiting resource, rains are uneven and topography is undulating, therefore, it is the need of the hour to adopt such water conservation technologies.

The above discussion implies that adequate knowledge was observed in those farm practices which were regularly practiced by the respondents, where as respondents' possessed inadequate knowledge on new or complex farm practices. The existing extension educational efforts, therefore, required to be strengthened and streamlined to improve the technical know- how of the PEWs to enable them for farmer to farmer extension and contribute in sustainable agricultural development in the district.

Effect of independent variables on overall knowledge level of respondents

The selected characteristics of respondents, viz. age, farming experience and scientific orientation had positive and significant relationship with overall knowledge level at 0.05 level of probability (Table 4). Hence, the null hypothesis was rejected for these characteristics. The reason might be that majority of respondents belonged to young and middle age group and generally these people are energetic and always eager for new information. According to present investigation, respondents were having comparatively less farming experience but due to having undergone trainings, they possessed sound technical knowledge in some areas which probably helped them to manage farm activities efficiently. Therefore, it is logical to expect the significant relationship between length of experience and knowledge level of respondents. It is not surprising to observe this positive and significant relationship, as increasing experience would help them in minimizing the expenditure required to manage the farm enterprises and increasing the income level. These findings are in accordance with the findings of Mundhwa and Padheria (1998).

Scientific orientation was also found to be significantly related with the knowledge level of respondents as the respondents with higher scientific orientation would try to gather more information for increased production. The results are in conformity with the findings of Borkar *et al.* (2000). Remaining characteristics such as education and economic motivation did not establish any significant relationship with the overall knowledge level.

Table 4 Relationship between selected independent variables and overall knowledge level of respondents

Particulars	'r' value	't' calculated
Age vs. overall knowledge level	0.320	2.44*
Educational qualification vs. overall knowledge level	0.192	1.41
Farming experience vs. overall knowledge level	0.355	2.74*
Economic motivation vs. overall knowledge level	0.135	0.98
Scientific orientation vs. overall knowledge level	0.382	2.98*

*Significant at 0.05 level of significance

Modern agriculture involves greater use of technology and has great potential for bringing about socio-economic transformation among the farmers in rural areas. The services of trained PEWs could be used provided they have good knowledge of modern farming methods. Overall, the PEWs were found to have medium level of knowledge

about improved farm technologies and practices, whereas in the new and more knowledge intensive and complex thematic areas like protected cultivation, plant protection, weed management, irrigation technology and nutrient management technology they possessed inadequate knowledge. The findings suggest that there is an urgent need to update the knowledge of PEWs by organizing knowledge intensive and skill oriented training programmes on such areas so that they can effectively transfer the improved farm technology to other fellow farmers. Based on the findings and discussions it is implied that PEWs need practical training on protected cultivation, weed management, irrigation technology, integrated nutrient management and integrated pest management on regular basis. For capacity development of PEWs, the expertise of Krishi Vigyan Kendras should be utilized.

REFERENCES

Anderson J R and Feder G. 2004. Agricultural extension: Good intentions and hard realities. *World Bank Research Observer* **19**(1): 41–60.

Bala B, Sharma S D and Sharma R K. 2006. Knowledge and adoption level of improved technology among rural women owing to extension programmes. *Agricultural Economics Research Review* **19**: 301–10.

Borkar M M, Chothe G D and Lanjewar A D. 2000. Characteristics of farmers influencing their knowledge about use of bio-fertilizers. *Maharashtra Journal of Extension Education* **19**:59–63.

Chandracharan V, Sadaqath S, Hirevenkanagoudar and Chandargi D M. 2007. Adoption of watershed practices by the respondents of Saluja watershed. *Karanatka Journal of Agricultural Sciences* **20** (1): 176–7.

Chaudhary H and Panwar J S. 2005. Gender based knowledge analysis of milk producers about advanced dairy production technology. *Indian Journal of Social Research* **46**(3): 183–90.

Feder G, Anderson J R, Biner and Deininger R K. 2010. Promises and realities of community- based agricultural extension. IFPRI Discussion Paper 00959, Department Strategy and Governance Division, International Food Policy Research Institute, Washington, DC.

Hassanullah. 1999. Agricultural extension service of the 21st century – needs and challenges. (In) *Regional Symposium of Agricultural Extension Education*, 18-21 April, 1999, Mymensingh, Bangladesh.

Jitarwal R C and Sharma N K. 2007. Impact of drip irrigation technology among farmers in Jaipur region of Rajasthan. *Indian Research Journal of Extension Education* **7**(2&3): 88–9.

Kerlinger F N. 1973. Foundation of behavioural research. Holt Rine Hart and Winstons Inc., New York.

Lynton R and Pareek U 1990. *Training for Development,* 2nd edition. Sage Publication, New Delhi.

Mundhwa A B and Padheria M. 1998. A study on entrepreneurial behaviour of dairy women among their different variables categories. *Gujarat Agricultural University Research Journal* **23**(2): 72–6.

Patel B S. 2005. 'A study of peasantry modernization in integrated tribal development project area of Dahod district of Gujarat state.' Ph D thesis, Anand Agricultural University, Anand.

Patel K S. 2000. Current scenario of milch animal production in the country. (In) *Recent Advances in Animal Production,* pp 1–6. GVC, Gujarat Agricultural University, S K Nagar, India.

Ranuji C R. 2006. 'A study on entrepreneurial behaviour of dairy farmers'. Ph D thesis, University of Agricultural Sciences, Dharwad.

Singh V, Rana S S and Kharwara P C. 1998. A study on the extent of adoption of latest agricultural technology by the farmers of Himachal Pradesh and constraints thereof. (*In*) *International Symposium on sustainable Agriculture in Hill areas: Economic viability of hill agriculture status and opportunities*. Sharma H R, Kumar V and Kapoor A C (Eds). 29-31 October 1998 Palampur, pp 217–23.

Supe S V. 1969. 'Factors related to different degrees of rationality in decision making among farmers.' Ph D thesis, IARI, New Delhi, India.

Wijeratne M and Abeydeera I R N. 1994. Knowledge gap on agrochemical use in rice farming. *International Rice Research Notes* **19**(4): 26–7.

Yadav D S, Singh A, Choudhary A K, Rahi S and Singh A. 2011. Growing coloured capsicum under protected conditions: Training need of Agricultural Extension Officers. *Agricultural Extension Review* **23** (1): 22–6.