

## Assessment of Training needs of Women in Irrigation Farming in the North West Province, South Africa

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**Abstract:** The study assessed the training needs of women in irrigation schemes in the North West Province. Primarily data were collected from 83 women selected using simple random sampling. A list of 23 competencies categorized into Pre and Post Planting, Irrigation management and Marketing was prepared. Descriptive statistics such as frequency distribution, percentages, the mean and standard deviation were employed. Training on the appropriate application of herbicides and fungicides along with selecting appropriate planting methods for various crops (81%) were the most prominent and important needs under pre- and post-planting. The results revealed that 74% of the respondents suggest training on recommendation suitable profile and water conservation measures for specific farmland as the most important need under irrigation management. With regard to marketing, it was revealed that training needs on knowledge of marketing contracts emerged the most important with 81%. The linear multiple regression results showed that the independent variables were significantly related to the F value of 39.802,  $P \leq 0.05$ . The study concludes that extension agencies and agents should design regular training programmes for women farmers in the area of deficiencies identified and strengthen water user associations such that their problems could be addressed.

**Keywords:** competency analysis; education; irrigation farming; need assessment; training needs

**JEL Classification:** Q1; Q15

### 1. Introduction

According to Njoko and Mudhara (2017); Bacha *et al.*, (2011); Van Averbek *et al.*, (2011), smallholder irrigation is an important rural development factor, creating employment opportunities, generating income and enhancing food security in Africa in general, and in South Africa (SA) in particular. On the other hand, the agriculture sector, being the largest water user, is under pressure to release water to other sectors (Kanyoka *et al.*, 2008). The growing water scarcity continues to put pressure on

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farmers to use water more efficiently. A growing area of interest in SA is that of finding balanced and effective resource management strategies for allocating water among the key sectors (Speelman, 2009; Yokwe, 2009).

Women contribution in many developing countries economy has often been not considered and undervalued (Yikeni and Oguntade, 2012). Most emerging countries have a larger percentage of women who are contributing more in the agricultural sector but recent confirmations suggest the productivity is pressurized by lack of relevant skills training (Collet and Gale 2009). Women are faced with a serious challenge in accessing training and education which contributed to high illiteracy level. Adesoji (2006) indicated that for any farming enterprise to be successful, adequate skills and knowledge from the farmers is essential. The space between how a particular task is being performed and how it should be undertaken emphasizes the necessity for training.

Human advancement and improved performance in any given situation require training. It delivers a logical improvement of knowledge and skills which in return assist trainees to perform effectively and efficiently in their assigned duties (Sajeev *et al.*, 2012). Training is a skill's empowerment process on which acquiring of new skills or gathering of knowledge is intended to improve an individual's abilities towards work or tasks assigned to complete. Most researchers consider training as a systematic process aimed at conveying knowledge, skills and changing the attitude of people towards learning. Sahu *et al.*, (2011) state that a well-planned training aimed at disseminating information on knowledge gap and training needs will help improve the capacity of farmers. Ghuman *et al.*, (2010) classified training into different types, business function training, technical skill training, performance-management training, interpersonal skills, problem-solving/decision-making training, mandatory training, and the personal training which enables an individual to manage life in a better manner.

Ferreira and Abbad (2013) indicated that training needs assessment is a process that has a strategic role because it provides clear guidelines as to which professional skill deficiencies must be remedied and what the profile of future trainees should be. Training needs emanates from underdeveloped skills, insufficient knowledge or inappropriate work attitudes. Dahiya and Jha (2011) stated that a needs assessment should be designed to identify and prioritize needs, while a needs analysis should break and identify needs into its component parts and determine solution requirements. Gould *et al.*, (2004) consider training needs analysis as the initial step in a cyclical process, which contributes to the overall training and educational strategy of staff in an organization or a professional group. The cycle commences with a systematic consultation to identify the learning needs of the population considered, followed by course planning, delivery, and evaluation.

### 1.1. Training Needs

A training need is a shortage of skills or abilities, which could be reduced or eliminated by means of training and development. Training needs hinder employees in the fulfillment of their job responsibilities or prevent an organization from achieving its objectives. They may be caused by lack of skills, knowledge or understanding, or arise from a change in the workplace.

### 1.2. Education

Education is a social foundation and the process of accomplishing knowledge and skills that people are projected to have in any society. It develops the critical thought of an individual and promotes the process of learning accepted facts. Education inspires one to be competent and encourages intellectual inquisitiveness which will lead to lifetime learning (Türkkahraman, 2012).

Rousan (2007) stated that the role of women in agricultural activities grant them a vast opportunity of accessing proper training and education but the current status of efforts that are projected into making sure that the programmes are addressing challenges faced by women farmers are far from being recognized. This implies that implementers must properly understand the needs of farmers in order to practice an efficacious training exercise. Regardless of the fact that several studies (Mech, *et al.*, 2010, Yikeni & Oguntade 2012, Sahu, *et al.*, 2011) have been conducted on training needs of women farmers in the agricultural sector, this study found it necessary to investigate the training needs of women in irrigation farming in the North West province, South Africa. Based on the foregoing, the study was set to achieve these objectives.

## 2. Purpose and Objectives

The main objective of the study was to analyze training needs among women involved in irrigation farming in the North West Province. The specific objectives were to;

1. Determine the demographic characteristics of women in irrigation schemes;
2. Identify the source of information for women in irrigation farming;
3. Discern the training needs of women based on the 23 competencies related to irrigation farming;
4. Examine the socio-economic characteristics of the women and their relationship with the training needs.

### 3. Materials and Methods

The study was carried out in the North West Province, South Africa. The study population included all women involved in irrigation farming (120) in the province. The sites of irrigation schemes include Taung irrigation scheme which is situated in 27° 34' South and 24° 44' East. The scheme is divided into five cooperatives as follows: Bosele; Ipelegeng; Reaitlthoma; Rethuseng; and Tshidiso (Acha, 2014). The second irrigation scheme is situated in Dinokana Village in Ramotshere Moiloa Local Municipality, Its GPS coordinates are 25° 17' South and 26° 02' East (Tekana & Oladele, 2014). A simple random sampling technique was used to select respondents. A sample of 83 women farmers was randomly selected to obtain a representative sample from female farmers on the irrigation schemes. A structured questionnaire with open and close-ended items was used consisting of farmer's personal characteristics and 23 farming tasks categorized into Pre and Post Planting, Irrigation management and Marketing. To determine the validity of the questionnaire, the researcher used a panel of experts in agricultural extension; the questionnaire was face validated by a panel of agricultural extension experts and researchers. Reliability of the instrument was improved through a number of ways. Firstly, a pilot test was performed on a selected group of women farmers in the Taung Irrigation Scheme. Secondly, undergraduate students who were assisting with data collection were given training on the questionnaire before the data collection process. In order to declare the dependability of the questionnaire, a split-half technique was used to determine  $r^2$  (0.85) reliability coefficient. Permission to conduct interviews with participants in the study area was requested and obtained from community leaders and traditional heads.

The farmers response was calculated from the rating scale of very important (VI) (3), important (I) (2) and (NI) (1) with the cut-off point of 2. The cut-off point implies that an indicator above 2 indicates that the task is very important and WS rating will be in between the range of 2-3. The WS rating at 2 implies important while tasks that are not important are below 2 and WS rating will be in between the range of 1-2.

#### Analytical Model

$$\text{Weight score (WS)} = \frac{(\text{No of VI} \times 3) + (\text{No of I} \times 2) + (\text{No of NI} \times 1)}{\text{Total no. of VI} + \text{I} + \text{NI}} \times 100$$

#### 3.1. Linear Multiple Regression

This regression model was used to segregate factors determining women farmers' training needs with specific reference to the effect of socio-economic characteristics and types of irrigation on the irrigation scheme. The F test was used to test the significance of the linear regression.

**Model specifications for training needs:**

Training needs (Y) = f ( $\beta_0 Y_0 + \beta_1$  Age+  $\beta_2$  Marital status +  $\beta_3$  Number of dependents +  $\beta_4$  Number of households +  $\beta_5$  Level of educational +  $\beta_6$  Tenure status +  $\beta_7$  Farm size +  $\beta_8$  Member of farmers' group +  $\beta_9$  Contact with Extension Services +  $\beta_{10}$  Number of years in farming+  $\beta_{11}$  Duration of being part of the irrigation scheme +  $\beta_{12}$  Number of workers in the irrigation scheme +  $\beta_{13}$  Central Pivots irrigation +  $\beta_{14}$  Flood irrigation system +  $\beta_{15}$  Sprinkler irrigation +  $\beta_{16}$  Micro Irrigation +  $\beta_{17}$  Drip irrigation +  $\beta_{18}$  other irrigation.

$$Y = f(\beta_0 Y_0) + \beta_1 \dots \dots \dots 1$$

**4. Results and Discussions**

The results in table 1 revealed that a greater proportion of farmers in the schemes were married (42.2%) while 31.3% were single and 26.5% widows. The results showed that 34.9% of respondents interviewed had a primary school education, 24.1% had a high school education, and 10.8% had no formal schooling while only 2.4% had college and tertiary education. The low level of education could have a negative impact on decision-making in managing irrigation schemes. These results imply that there is a need for agricultural extension agents to address all the challenges of women farmers as their educational needs are obvious, therefore, there is a need to devise educational strategies to enhance their contribution to agriculture (Ndifon *et al.*, 2012). Education is one of the key catalysts towards improving farm production because of the rapid changes in technology and the economy (Montenegro & Patrinos, 2014). According to Action Aid (2015), not being exposed to education and training has an impact on women farmers as they are not well represented in most state-led efforts to improve land and water management, rural infrastructure, access to markets and agricultural research.

About 88% of the farmers are not involved in non-farming activities mainly because the existing schemes and farming have always been their only work and a source of income. This may be because their educational background limits them from exploring and getting involved in other activities besides farming. Oya (2010) argues that in Mozambique and Tanzania, husbands prevent women from engaging in off-farm paying work because they are likely to come in contact with other men. Majority of the women in Sri Lanka earn their living through farming, as women are not allowed to perform any off-farm jobs (Molen, 2001).

Table 1 shows that 96.4% of farmers had contact with extension services while 3.6% indicated they did not have any contact with extension services. Of those who had contact with extension officers, 56.6% indicated occasional contact while 32.5% indicated regular contact. Extension services are important in terms of boosting

agricultural productivity and also as a form of disseminating information to farmers. The results are in line with the findings of Njuki *et al.* (2013) who found that in Ghana, women have access to extension services, and the majority of them are satisfied with the services they receive. In Bangladesh, extension services are generally directed towards male farmers (Njuki *et al.*, 2013). Women are less likely to access resources and may, therefore, be by-passed by extension service providers (Meinzen-Dick *et al.*, 2010).

**Table 1. Personal Characteristic of Respondents**

Marital status	Frequency (%)
Single	26(31.3)
Married	35(42.1)
Widowed	22(26.5)
Level of education	
Primary School	29(34.9)
Secondary school	21(25.3)
High School	20(24.1)
College	2(2.4)
University	2(2.4)
Non Formal Education	9(10.8)
Engagement in non-farming activities	
No	73(88)
Yes	10(12)
Contact with extension agent	
No	3(3.6)
Yes	80(96.4)

Table 2 shows that about 66.3% of farmers indicated that they receive information through extension officers, 59% receive information through the radio while 56.6% do so through community meetings. The newspaper is not a common source of information for farmers. The findings are in line with those of Isaya *et al.*, (2016) who found that in Hai and Kilosa districts of Kilimanjaro and Morogoro regions, majority of women farmers have reported high usage of radio and extension workers as their primary sources of information. The results are contrary to the findings of Rio (2013) who found that women farmers do not prefer radio as a source of information because of some programmes which are not accessible or were too general for them and maybe broadcasted when they are busy working.

**Table 2. Showing the Source Of Information for Women in Irrigation Farming**

Sources of information	Yes	No
Television	32(38)	51(62)
Radio	49(59)	34(41)
Newspaper	1(1.2)	82(98.8)
Cell phones	42(50.6)	41(49.4)
Internet	1(1.2)	82(98.8)
Community meetings	47(56.6)	36(43.4)
Extension officers	55(66.3)	28(33.7)

#### 4.1. Training needs of farmers

Table 3 shows the list of 23 farming activities for women involved in irrigation farming developed from the operations and activities carried on existing field by farmers. The farming activities are divided into three categories namely; Pre- and Post-Planting (10), Irrigation (4) and Marketing (9).

#### 4.2. Importance of Pre- and Post-Planting Tasks

Training on the appropriate application of herbicides and fungicides along with selecting appropriate planting methods for various crops (81%) were the most prominent and important needs under pre- and post-planting tasks followed by calibrating of planters and seeders for various crops and evaluation of soil profile in farming (78%). The results overwhelmingly revealed high importance attached to competency and training needs for women in irrigation schemes. The entire mean for the level of importance of training needs was above cut-off point 2 in pre- and post-planting tasks. The percentage distribution of the WS and ranking of the tasks revealed that more training is required to meet the training needs of respondents. Beaman *et al.*, (2013) argue that even if women are given chemicals such as fertilizers, fungicides, and herbicides for free, it may not improve farm returns if they do not have knowledge on how to use or apply them.

#### 4.3. Importance of Irrigation Management Tasks

The results revealed that 74% of respondents suggest training on recommendation suitable profile and water conservation measures for specific farmland is the most important need, followed by evaluation of farming land for soil and water conservation (68%) and knowledge on the amount of water to use (58%). The entire mean for the level of importance of training needs was above cut-off point 2 in irrigation management tasks. The results are in line with the findings of Adekunle *et al.*, (2015) who highlighted that in Kwara State, Nigeria, most women farmers

involved in irrigation farming might not know their responsibilities in terms of water distribution and, therefore, rely on cooperatives more than water user associations.

#### 4.4. Importance of Marketing Tasks

With regard to marketing, it was revealed that training needs on knowledge of marketing contracts emerged the most important. 81 percent of the respondents expressed interest in it, followed by farm record-keeping (68%) and price determination for your produce and financial management (58%). The actual means identified revealed that there was high importance for needs to be devoted to the competency and training needs for women in irrigation schemes since all the tasks were above the cut-off point of 2. According to Rekha and Rojas (2008), most women in developing countries are keenly involved in crop production and marketing, constraints such as lack of marketing information and technical information are affecting their development in agricultural production. Nichols and Hilmi (2009) argue that it is important for farmers to know how to conduct marketing research, as this will enable them to investigate what consumers' want, where they are and what price they are willing to pay.

**Table 3. Weighed Score and the Ranks of the Training Needs of Women in Irrigation Farming: Pre and Post-Planting, Irrigation Management and Marketing**

Thematic area	North West Irrigation Schemes (n= 83)				
	VI	I	NI	WS	Rank
Pre- and post-planting					
Soil preparation for ploughing	47	31	5	2.50	9
Determining inter antra row spacing	47	30	6	2.49	10
Determining seed depth	53	25	5	2.58	8
Selecting appropriate planting methods for various crops	81	2	0	2.97	1
Knowledge of crop rotation	58	20	5	2.63	7
Calculating the amount of fertilizer to apply for various crops	57	24	2	2.66	6
Appropriate application of herbicides and fungicides	81	2	0	2.97	
Calibrating planters and seeders for various crops	78	4	1	2.97	
Planning and carrying out harvesting appropriately for various crops	68	10	5	2.76	5
Evaluating soil profile in farming	78	4	1	2.93	4
Irrigation management					
Evaluating farming land for soil and water conservation	68	10	5	2.76	2
Recommendation suitable profile and water conservation measures for specific farmland	74	4	5	2.83	1
Irrigation scheduling and frequency	47	31	5	2.50	4
Knowledge of the amount of water to use	58	20	5	2.64	3
Marketing					



Knowledge of the market for your produce	57	23	2	2.64	6
Price determination for your produce	58	20	5	2.64	
Knowledge of reading and interpreting marketing information	57	21	5	2.63	
Knowledge of marketing contracts	81	2	0	2.98	1
Value adding	57	23	2	2.64	
Farm record-keeping	68	10	5	2.76	2
Service provider for storage facilities	47	31	5	2.51	5
Financial management	58	20	5	2.64	4
Packaging	60	23	0	2.72	3

VI= Very Important, I= Important, NI= Not Important, WS= Weighed Score

#### 4.5. Linear Multiple Regression Analysis Showing the Relationship Between Socio-Economic Characteristics and Training Needs

Table 4 displays the outcomes of the linear multiple regressions used to determine the effect of the independent variables on the training needs status of women involved in irrigation farming. The independent variables were significantly related to the F value of 39.802,  $P \leq 0.05$ . Seven out of the eighteen explanatory variables were significant while eleven variables were insignificant. The significant variables include the number of households ( $T = 1.720$ ,  $P \leq 0.090$ ), use of central pivots irrigation type ( $T = 2.290$ ,  $P \leq 0.001$ ), usage of flood irrigation system ( $T = 3.097$ ,  $P \leq 0.003$ ), using flood irrigation system ( $T = 3.097$ ,  $P \leq 0.003$ ), use of drip irrigation type ( $T = 2.251$ ,  $P \leq 0.028$ ) and the use of other irrigation types ( $T = 3.845$ ,  $P \leq 0.000$ ). These findings imply that the higher the number of households, use of central pivots irrigation type, use of flood irrigation system, use of sprinkler irrigation type, use of micro-irrigation type, use of drip irrigation type and use of other irrigation types, the higher the training needs among women in irrigation farming. However, age, marital status, number of dependents, level of educational, tenure status, farm size, member of farmers' group, contact with extension services, number of years in farming, number of years in being part of the irrigation scheme and number of workers in the irrigation scheme did not have a significant relationship with competence of women involved in irrigation farming.

**Table 4 Linear Multiple Analysis of the Competence Level of Women Involved In Irrigation Schemes**

Parameters	B	Stand Err	Beta	T	SIG
Constant	15.556	4.827		3.223	0.002
Age	0.047	0.032	0.064	1.451	0.152
Marital status	-1.353	0.523	-0.116	-2.588	.012**
Number of dependents	-0.476	0.191	-0.121	-2.497	.015**
Number of members in household	0.209	0.122	0.071	1.72	.090*
Level of education	-0.042	0.226	-0.007	-0.188	0.852
Tenure status	-0.414	0.334	-0.048	-1.241	0.219
Farm size	-0.022	0.014	-0.064	-1.538	0.129
Member of farmers' group	-2.162	0.944	-0.092	-2.29	.025**
Contact with extension services	-1.248	1.969	-0.026	-0.634	0.529
Number of years in farming	-0.431	2.974	-0.482	-0.145	0.885
Number of years spent in the irrigation scheme	0.415	2.972	0.465	0.14	0.889
Number of workers in the irrigation scheme	0.008	0.03	0.01	0.245	0.805
Use of central pivots irrigation type	2.963	0.871	0.19	3.401	.001**
Use of flood irrigation system	3.111	1.005	0.195	3.097	.003**
Use of sprinkler irrigation type	2.836	1.149	0.164	2.468	.016**
Use of micro irrigation type	2.773	1.112	.168	2.492	.015**
Use of drip irrigation type	2.775	1.233	0.174	2.251	.028**
Use of other irrigation types (canal, dragline or furrow)	3.843	0.999	0.246	3.845	.000***
R	.958 <sup>a</sup>				
R Square	0.918				
F	39.802				
Sig	.000 <sup>b</sup>				
P	0				

\*\*\*1% significance \*\* 5% significance \*10 % significance

## 5. Conclusion and Recommendations

The study examined the training needs of women in irrigation farming based on the identified tasks through the application of Weight Score (WS) and linear multiple regression analyzing the relationship between dependent and independent variables. The implication of the results indicates more work needs to be done to meet the training needs of women in irrigation farming. Based on the finding of the study, it can be concluded that women farmers in the irrigation schemes were mostly illiterate

which is expected to be a critical factor affecting training needs. This implies that the majority of the respondents was or has never been involved sufficiently in the agricultural training programmes in the study area.

It is, therefore, recommended that the identified training needs of respondents should be the area of focus and priority of the extension agents and agencies in the study area and also, that it is of great importance to inform women farmers adequately about training programmes especially those who are still struggling with the traditional ways of receiving information and that there should be sensible efforts to arrange adult education programmes for women farmers since most of them have not received any form of formal education.

It is also recommended that the concerned stakeholders and policymakers should focus on the specific most important needs as identified in the study and the parameters with significant indication to the competency level of the respondents should be considered when planning and implementing new training programmes for women farmers in the study area, and in similar irrigation schemes in South Africa at large.

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