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# Contribution of agricultural and forestry extension services to inclusive extension system in North-West Pakistan: A case study of Mansehra and Swat districts of Khyber Pakhtunkhwa Province

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**Agriculture and forestry are generally considered as parallel activities where different institutions are working for rural people. The mountainous region of Khyber Pakhtunkhwa Province (KP) of Pakistan makes an interesting case study because good forest cover is appeared and farming is an important component of local livelihood system. This study presents the findings from the field survey of 48 extension services personnel (24 from each) of agriculture and forest departments. The main objectives of the study were to identify the linkages between agricultural and forestry extension services and to find out the factors hindering the effectiveness of linkages. A 3-point Likert scale was used to find out the frequency of the extension services offered for crops, trees and fruit trees by agricultural and forestry extension. Descriptive analysis was used to describe the frequencies, mean and standard deviation of the demographic characteristics of the respondents. Wilcoxon-Mann-Whitney U-test for independent nonparametric sample was also used for finding the association among the areas of practices and the extension services. The results show that fruit trees are the common area of practices where both organizations provide extension services to the farming community. Both departments are also carrying-out the above services for fruit trees in particular while crops and other trees in general. Weak formal and in-formal contacts between agricultural and forestry extension services were found. It was concluded that by implementing common activities for fruit trees, linkages between agricultural and forestry extension services can be established. The paper also identifies differences in age, educational background, less number of field visits and weak formal linkages of field staff as the factors hindering the effectiveness of extension services.**

**Key words:** Agricultural extension, forestry extension, linkages, common practices, fruit trees.

## INTRODUCTION

### Agriculture and forestry extension

Extension is the diffusion of applicable information to the farming community (Agbogidi and Ofuoku, 2009). Extension services use educational methods to help farmers help themselves. In other words, extension education is a voluntary type of non-formal education for farmers outside of school and college (Onumadu et al., 2001). Extension services are important to improve food security situation by improving crop productivity

(Amir et al., 2013).

The agriculture and forestry sectors are generally considered parallel activities wherein different institutions are working. In the agriculture sector, provision of services to the farming community in order to improve its agricultural productivity and to improve livelihoods on a sustainable basis is the prime responsibility of agricultural extension (Kibett et al., 2005). It promotes the transfer of agricultural technology and innovations in order to improve the livelihoods of end users mean farming community (Khan and Akram, 2012). Similarly, forestry extension programs are designed to meet the needs of small-scale producers in forested area through agro-forestry techniques. Effective collaboration among different institutions working for similar purposes is essential for the achievement of the desired goals (FAO, 1996).

## Agricultural and forestry extension in Pakistan

The agriculture sector contributes 21.8% of GDP, employs 45% of the labor force (Government of Pakistan, 2011) and comprises a 66% share of exports (GoP, 2010, 2011) in Pakistan's overall economy. More than 70% of the country population resides in rural areas and relies on this sector directly or indirectly (GoP, 2011). On the other hand, forests and planted trees in Pakistan cover approximately 4.6 million hectares, which is equivalent to 4.8% of the total land area (GoP, 2005).

In Pakistan, extension work has been in progress since the country's independence in 1947. However, at that time the extension department did not have its independent identity; extension work was undertaken under the shadow of different community development programs. The agricultural extension in Pakistan has been managed by provinces as Agricultural Extension Department and provides technical skills to farmers. The Agriculture management model in Pakistan is quite similar to other developing countries. The Ministry of Food, Agriculture and Livestock (MINFAL) through its provincial departments carries out most of the agricultural extension (Swanson et al., 1990). At present, agricultural extension is modeled around a training and visit system, which relies on contact farmers to diffuse technical information to surrounding farmers (Ahmad et al., 2000). With special reference to forest, in 1991, the Pakistani government appointed forest extension workers to promote farm forestry (Baig et al., 2008). In comparison with agricultural extension, forest extension services are quite different in Pakistan where at federal level Ministry of Environment and Climate Change and at provincial level forestry departments look after the forestry issues within their domains. Each province has a forest department which is responsible for the administration of the sector. Forestry administration is decentralized and provinces are responsible for "planning and implementation of forest and range management programmes". Long-term policy, however, is a federal responsibility.

## Problem statement and research objectives

Public sector agricultural extension services of developing countries have been criticized rigorously for their poor efficiency (World Bank, 2006). These rural advisory services have a mandate to transform the livelihoods of rural dwellers through effective linkages with sister organizations or departments (Ifeanyi-obi et al., 2012). However weak institutional linkages between different service providers in the agriculture sector are responsible for the poor performance of agriculture in Pakistan (Farooq and Ishaq, 2005). Forest makes major contributions which serve as productive, protective, regulative and socio-cultural functions in Pakistan's economy (Ali et al., 2006). Similar to agricultural extension, forestry extension services also faces problems of weak linkages with allied state departments in Pakistan (Jan et al., 2008). Among these institutional problems, the lack of coordination between institutions (local government and the forestry department) is regarded as the most important (Babar et al., 2008).

For this reason the present study was conducted with the objectives to identify the linkages between agricultural and forestry extension services and also to find out the factors hindering the effectiveness of linkages among agricultural and forestry extension system in the study area.

## MATERIALS AND METHODS

### Area of study

The Khyber Pakhtunkhwa Province (Figure 1), previously known as the North-West Frontier Province (NWFP) of Pakistan, was chosen for the present research project because the province is rich in forestry resources and its economy is mainly dependent on agriculture as well as forestry.

### Sampling techniques and sampling

A multi-stage sampling technique was used to select the required sample (Cochran, 1977). In the first stage, from within Khyber Pakhtunkhwa, two districts (Mansehra and Swat) were purposely selected because both districts are among those districts of

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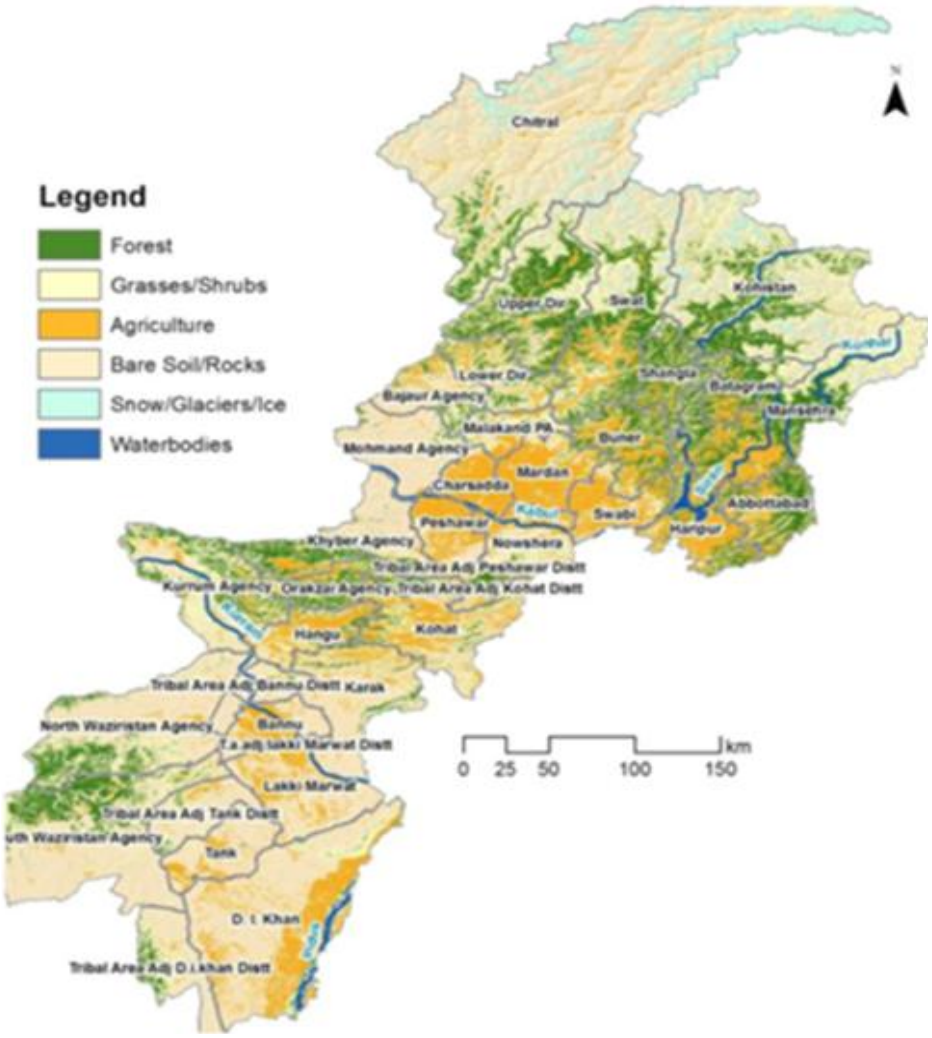


**Figure 1.** Khyber Pakhtunkhwa Province, Pakistan.

Pakistan which have maximum forest resources and the major part of the population of these mountainous regions depends directly on agriculture and forest only. In the second stage, from within each of the two districts, two tehsils[1] were selected with the criteria of maximum number of field staff from agricultural extension and forestry extension services as compared to other tehsils. The entire 48 field staff's working in the study area from agricultural extension and forestry extension were selected which constitutes the sample for the present research (Figure 2). An Agricultural Officer works as a front line extension worker whereas agricultural Inspectors and Field Assistants help him to organize his work. Usually one Agricultural Officer appointed in one tehsil. On the other hand Range Officer/Forest Officer is responsible to manage the forests under his control consistent with the objects of managements in each case. Similar to Agricultural Officer in most of the cases one Range Officer is appointed in one tehsil. He is responsible for the execution of all works in the range, with the help of Block Officers/Foresters and Forest Guards, according to the instructions from higher authorities.

[1] A tehsil is an administrative unit within a district in Pakistan. A district usually has two or more tehsils.

**Methods of data collection**

The data were collected through the field survey during August and September, 2012. Qualitative and quantitative social science research methods were used in this study. For the present study, the quantitative data were collected using structured questionnaire during survey as research instrument. As most of the respondents who were not having good command in English, therefore the questionnaires were filled by the researcher after face-to-face interviews. The qualitative data helps to explicate the quantitative data and in-depth understanding of the problem. Key informants interviews with some officials based at provincial and district levels and participant observations were used as the tools to acquire the qualitative data for this study.

**Measurement of variables**

To classify the frequency of the extension services offered for crops, trees and fruit trees by agricultural and forestry extension workers 3-point Likert scale was used as 1=Never, 2=Sometimes and 3=Most of the times.

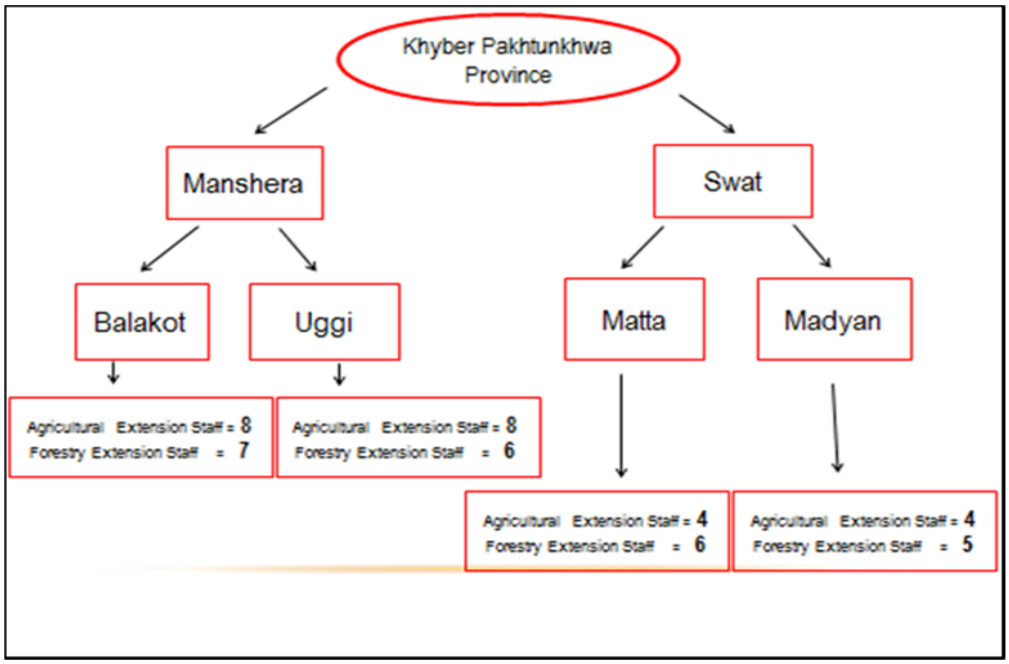


**Figure 2.** Selection of sample according to their working territory.

**Analysis of data**

The quantitative data were analyzed using the Statistical Package for Social Scientists, SPSS (Davis et al., 2004). A descriptive analysis was used for frequencies, means and standard deviations (Eck and Torres, 1996; Ogunjuyigbe et al., 2005; Lodhi et al., 2006). The Wilcoxon-Mann-Whitney t-test (for an independent nonparametric sample) was also used to find the association among the areas of practices and the extension services implemented by agricultural and forestry extension separately. The same method was also used to identify the common areas of practice among agricultural and forestry extension services.

**Profile of study area**

***District Mansehra***

Total area of the district is “10,67,291” acres with population of 1,152,839 (GoP, 2012). Cultivation of crops mainly depends on seasonal rainfall. The mentionable crops of Mansehra are wheat, maize, rice, tobacco rape seed and mustard, barley and fodder, vegetables, soybeans and pulses. Fruit orchards are also a source of income. Large number of people earns their livelihood through agriculture. Mansehra is one of the richest districts as regards the forest wealth of Pakistan, having many small and large forests scattered throughout the region. Forests of the district are rich in trees as Deodar, Blue pine, Chirr, Walnut, Cherry, Poplar and Kao (wild olive) etc. A large variety of medicinal plants are also found in the forests. Such plants are also grown especially in the northern forests and a large variety of wild life is also depending on these forests (GoP, 2009).

***District swat***

District swat is a part of the high altitude Hindu Kush Himalaya (HKH) region of Pakistan comprising a diverse set of biophysical, ecological and socio-economic characteristics. Total area of the district is “13,18,801” acres and population of 1,257,602 (GoP, 2012). Agriculture accounts for roughly 50% of the economic activities of district. The main crops of swat include wheat, maize, vegetables, tobacco, fruits, soya bean and sun flower. Swat is well known for certain fruits and nuts. Peaches, apricot, walnuts, almonds and pistachios are consumed locally as well as export for revenue. Analysis of land cover data of this region is particularly important because of disparate accounts on the state of forest resources of Pakistan in general and swat in particular. Mainly official Pakistani sources frequently claim that Pakistan forests have been progressively increasing as a result of afforestation efforts and increasing environmental awareness. On the other hand, a number of studies and international statistics have reported significant deforestation in Pakistan.

## RESULTS

### Demographic characteristics

The data in Table 1 show the demographic characteristics of the respondents. In the age category, 11 agricultural extension workers were categorized in middle age and 18 forestry extension workers were categorized in old age. The means SD for age of the respondents from agriculture extension and forestry extension were 2.13 ± 0.74 and 2.75 ± 0.61, respectively. The education level of the extension workers is an important characteristic for meaningful progress towards intended goals (Gibson and Brown, 2003). Eighteen respondents from agricultural extension services and fifteen from forestry extension services had a diploma (12 years of education) in agriculture and forestry, respectively. Only four respondents from both extension

**Table 1.** Distribution of the Respondents according to their Demographic Characteristics.

| Extension services / Factors | Agricultural | | | | | Forestry | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **Category** | **Frequency** | **Percentage** | **Mean** | **SD** | **Category** | **Frequency** | **Percentage** | **Mean** | **SD** |
| Age (years) | Young (16-30) | 5 | 20.8 | 2.13 | 0.741 | Young (16-30) | 1 | 4.2 | 2.75 | 0.608 |
| | Middle Age (31-45) | 11 | 45.8 | | | Middle Age (31-45) | 5 | 20.8 | | |
| | Old (46 and above) | 8 | 33.3 | | | Old (46 and above) | 18 | 75.0 | | |
| | **Total** | **24** | **100.0** | | | **Total** | **24** | **100.0** | | |
| Education | Masters | 4 | 16.7 | 2.75 | 0.847 | Masters | 3 | 12.5 | 2.92 | 0.881 |
| | Bachelors | 0 | 0 | | | Bachelors | 1 | 4.2 | | |
| | Diploma | 18 | 75.0 | | | Diploma | 15 | 62.5 | | |
| | Certificate | 2 | 8.3 | | | Certificate | 5 | 20.8 | | |
| | **Total** | **24** | **100.0** | | | **Total** | **24** | **100.0** | | |
| Position | Agricultural Officer | 4 | 16.7 | 2.75 | 0.944 | Range Officer | 6 | 25.0 | 2.13 | 0.797 |
| | Agricultural Inspector | 1 | 4.2 | | | | | | | |
| | Field Assistant | 17 | 70.8 | | | Block Officer | 9 | 37.5 | | |
| | Budder | 1 | 4.2 | | | | | | | |
| | Field Worker | 1 | 4.2 | | | Forest Guard | 9 | 37.5 | | |
| | **Total** | **24** | **100.0** | | | **Total** | **24** | **100.0** | | |
| Experience (years) | 1-10 | 14 | 58.3 | 1.88 | 1.191 | 1-10 | 2 | 8.3 | 3.33 | 0.963 |
| | 11-20 | 3 | 12.5 | | | 11-20 | 1 | 4.2 | | |
| | 21-30 | 3 | 12.5 | | | 21-30 | 9 | 37.5 | | |
| | 31-40 | 4 | 16.7 | | | Above 30 Years | 12 | 50.0 | | |
| | **Total** | **24** | **100.0** | | | **Total** | **24** | **100.0** | | |

Source. Field Data.

services held professional masters (16 years of education) and bachelor's (14 years of education) degrees in an agriculture or forestry-related subject. The data also indicate that most of the respondents were lower-ranking field staff that is, seventeen were Field Assistants from agricultural extension services and eighteen were Block Officers and Forest Guards collectively from forestry extension services. They are considered front-line agents, as they have frequent contact with the target community and are locally based. The results in Table 1 demonstrate that fourteen respondents from agricultural extension services had work experience up-to 10 years and from forestry extension service 12 respondents had work experience above then 30 years.

## Extension services

An effective provision of extension services can help in increasing the productivity and improving the livelihood. Extension services are implicit as a connection among farmers, researchers and teaching institutions (Khan and Akram, 2012). The collected data regarding respondents who deliver extension services for crops, trees and fruits trees is depicted in Table 2.

## Education and training

Majority of the respondents that is, eighteen from

**Table 2.** Distribution of the respondents according to the extension services they provide in crops, tress and fruit tress.

| Area of practices \ Extension services | | Education and training | | | Production technology transfer | | | Protection technology transfer | | | Post - harvesting technology transfer | | | Marketing | | | Financing | | | Infrastructure development | | | Community mobilization | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Never | Some times | Most of the times | Never | Some times | Most of the times | Never | Some times | Most of the times | Never | Some times | Most of the times | Never | Some times | Most of the times | Never | Some times | Most of the times | Never | Some times | Most of the times | Never | Some times | Most of the times | For each extension service |
| Agricultural Extension | Crops | 0 | 10 | 14 | 0 | 11 | 13 | 0 | 12 | 12 | 0 | 8 | 16 | 0 | 7 | 17 | 1 | 17 | 6 | 1 | 10 | 13 | 0 | 10 | 14 | 24 |
| | Trees | **12** | 11 | 1 | **9** | 15 | 0 | **9** | 15 | 0 | **13** | 11 | 0 | **13** | 11 | 0 | **18** | 6 | 0 | **15** | 9 | 0 | **12** | 11 | 1 | 24 |
| | Fruit tress | 0 | 6 | 18 | 0 | 8 | 16 | 0 | 7 | 17 | 0 | 11 | 13 | 0 | 12 | 12 | 3 | 16 | 5 | 2 | 13 | 9 | 0 | 6 | 18 | 24 |
| Forestry Extension | Crops | **11** | 13 | 0 | **12** | 12 | 0 | **14** | 10 | 0 | **19** | 5 | 0 | **19** | 5 | 0 | **21** | 3 | 0 | **21** | 3 | 0 | **5** | 19 | 0 | 24 |
| | Trees | 0 | 6 | 18 | 0 | 9 | 15 | 0 | 9 | 15 | 0 | 9 | 15 | 0 | 9 | 15 | 0 | 15 | 9 | 0 | 14 | 10 | 0 | 7 | 17 | 24 |
| | Fruit tress | 0 | 8 | 16 | 0 | 11 | 13 | 0 | 11 | 13 | 0 | 11 | 13 | 0 | 13 | 11 | 0 | 19 | 5 | 0 | 16 | 8 | 0 | 9 | 15 | 24 |

Source: Field data.

agricultural extension and sixteen from forestry extension as indicated in Table 2, that they provided education and training to the farming community in their working territory about fruit trees most of the times. While twelve respondents from agricultural extension and eleven from forestry extension had never provided education and training for trees and crops, respectively to their target community.

## Technology transfer

The data regarding technology transfer on "production techniques" given in Table 2 shows that sixteen respondents from agricultural extension services and thirteen from forestry extension services were involved in dissemination of modern technology using in production techniques for fruit trees most of the times. While nine respondents from agricultural extension and twelve from forestry extension were never involved in technology transfer for production of trees and crops in the farming community of their working area, respectively.

Table 2 also indicates clearly that a majority, seventeen respondents from agricultural extension services and thirteen from forestry extension services, were involved most of the times in diffusion of modern technology procedures in protection of fruit trees. Additionally, nine of the respondents from agricultural extension and fourteen from forestry extension told that they were never involved in technology dissemination for protection of trees and crops, respectively.

The data regarding "post-harvest techniques" given in in Table 2 reveals that thirteen respondents from agricultural extension services and also thirteen from forestry extension services were involved in dissemination of recent post-harvesting techniques for fruit trees most of the times. Whereas, thirteen of the respondents from agricultural extension and nineteen from forestry extension were never involved in spreading of

technology transfer for post-harvesting techniques for trees and crops in the farming community of their target area, respectively.

**Marketing**

One of the responsibilities of extension services is to facilitate the farmers about marketing and create awareness about new markets trends to their target farming community. The data in Table 2 depicts that half of the respondents; twelve from agricultural extension services helps in marketing of fruit trees most of the times, while thirteen of the respondents from agricultural extension told that they never offer this for trees among the farmers of their working territory. The data in Table 2 also describes that a majority, thirteen of the respondents from forestry extension offers services in marketing procedures about fruit trees sometimes besides trees. Furthermore, ninteen had never offered any advice related to marketing as extension service for crops in their target community.

**Financing**

The data in Table 2 shows that sixteen respondents from agricultural extension services were involved in helping and organizing the available financial resources for fruit trees sometimes. While an overwhelming majority eighteen respondents never discussed this topic for trees in the farming community of their area. On the other hand, data in Table 2 reveals that ninteen respondents from forestry extension services said they help with financial issues in the target community by providing residents easy and available solutions for fruit trees sometimes, whereas twenty one respondents from forestry extension accepted that they never touch these issues of financing for crops in their target community

**Infrastructure development**

Although infrastructure development is not one of the core responsibilities of Extension Services, however during natural and some man-made disasters; extension services help the farmers and line departments in the field in addressing the issue of infrastructure development due to closer relations to the farming community. The data in Table 2 reflects that thirteen respondents from agricultural extension services took part in this activity sometimes as related to fruit trees. However, majority fifteen respondents from agricultural extension meanwhile never took part in this type of work for trees in their target community. Furthermore, Table 2 describes that sixteen respondents from forestry extension services sometimes offered their services for infrastructure development related to fruit trees. An overwhelming majority that is, twenty one respondents from forestry extension never took part in infrastructure development related to crops in their target community.

**Community mobilization**

Community mobilization is one of the important extension services which help the farmers through awareness of effective work and proper utilization of the available resources for achieving their needs. The data in Table 2 demonstrate that eighteen respondents from agricultural extension services were involved in community mobilization in different ways for fruit trees most of the times. Unfortunately, twelve respondents from agricultural extension accepted the fact that they never involved in community mobilization for trees in the farming community of their area. On the other hand, Table 2 data shows that 15 respondents from forestry extension services shown their association with community mobilization related to fruit trees most of the times. A small portion of respondents that is, five from forestry extension were never engaged in community mobilization as a core activity for crops in the farming community.

**Association between extension services and area of practice by agricultural extension and forestry extension**

The results of Mann-Whitney's U test in the responses of 3-Likert scale for identifying the association between extension services and areas of practice provided by agricultural extension and forestry extension is given in Table 3. The result shows that similar kind of association was found between crops and fruit trees by agricultural extension in provision of all extension services as the z-value (-1.212, -0.876, -1.460, -0.876, -1.460, -0.747, -1.192, -1.212) for education and training, technology transfer for production, protection and post-harvest techniques, marketing, financing, infrastructure development and community mobilization. Also, similar kind of interest was found between trees and fruit trees by forestry extension in provision of all extension services as the z-value (-0.628, -0.579, -0.579, -0.579, -1.147, -1.257, -0.590, -0.606) respectively. The small values for difference in mean rank also supports the results.

**Association between extension services and area of practice among agricultural extension and forestry extension**

The results of Mann-Whitney's U test in the responses of 3-Likert scale for exploring the association between extension services and areas of practice among

**Table 3.** Association between extension services and area of practice of agricultural extension and forestry extension.

| Area of practices / Extension services | | Education and training | Production technology | Protection technology | Post-harvest techniques | Marketing | Financing | Infrastructure development | Community mobilization |
|---|---|---|---|---|---|---|---|---|---|
| Agricultural Extension | **Crops - fruit trees** | | | | | | | | |
| | Mean rank difference | -4.00 | -3.00 | -5.00 | 3.00 | 5.00 | 2.46 | 4.30 | -4.00 |
| | Z | -1.212 | -0.876 | -1.460 | -0.876 | -1.460 | -0.747 | -1.192 | -1.212 |
| | **Fruit trees - trees** | | | | | | | | |
| | Mean rank difference | 20.00 | 19.00 | 19.62 | 18.96 | 18.50 | 16.25 | 16.38 | 20.00 |
| | Z | -5.280*** | -5.109*** | -5.258*** | -5.046*** | -4.951*** | -4.442*** | -4.387*** | -5.280*** |
| | **Crops - trees** | | | | | | | | |
| | Mean rank difference | 18.00 | 17.12 | 16.50 | 20.34 | 20.80 | 18.50 | 18.88 | 18.00 |
| | Z | -4.774*** | -4.694*** | -4.564*** | -5.359*** | -5.474*** | -5.036*** | -4.974*** | -4.774*** |
| Forestry Extension | **Trees – fruit trees** | | | | | | | | |
| | Mean rank difference | 2.00 | 2.00 | 2.00 | 2.00 | 4.00 | 4.00 | 2.00 | 2.00 |
| | Z | -0.628 | -0.579 | -0.579 | -0.579 | -1.147 | -1.257 | -0.590 | -0.606 |
| | **Fruit trees - crops** | | | | | | | | |
| | Mean rank difference | 19.66 | 18.50 | 19.42 | 21.70 | 21.30 | 21.62 | 22.00 | 16.88 |
| | Z | -5.224*** | -4.951*** | -5.145*** | -5.721*** | -5.637*** | -5.912*** | -5.904*** | -4.758*** |
| | **Trees - crops** | | | | | | | | |
| | Mean rank difference | 20.75 | 19.50 | 20.25 | 22.12 | 22.12 | 22.12 | 22.25 | 18.46 |
| | Z | -5.493*** | -5.171*** | -5.332*** | -5.826*** | -5.826*** | -5.913*** | -5.926*** | -5.120*** |

(i) Grouping variable: Department of respondents, (ii) Mean Rank Difference = Mean Rank of Fruit Trees by AES – Mean Rank of Fruit Trees by same rule used for calculating the values of Mean rank difference for others.The statistics significant at 1% level of significance is indicated by ***

agricultural extension and forestry extension is given in Table 4. The result illustrates very perceptibly that similar kind of interest was found for fruit trees among agricultural extension and forestry extension in delivering extension services that is, z-value (-0.628, -0.876, -1.180, 0.000, -0.286, -0.757, -0.096 -0.924) for education and training, technology transfer for production, protection and post-harvest techniques, marketing, financing, infrastructure development and community mobilization. The small values for difference in Mean Rank are also supports the results.

## Extension personnel field visits

For the effective delivery of extension activities e.g. dissemination of modern knowledge, experimental demonstration and quick solutions to farmers problem; field visits plays an important role. The data describes in Table 5 that extension personnel's from both agricultural extension and forestry extension visits frequency was very low and irregular. The response to the frequency of extension personnel's visit to their fields, only one respondent from agricultural extension and two

**Table 4.** Association between extension services and area of practice among agricultural extension and forestry extension.

| Extension services / Area of practices | Education and training | Production technology | Protection technology | Post-harvest techniques | Marketing | Financing | Infrastructure development | Community mobilization |
|---|---|---|---|---|---|---|---|---|
| **Fruit trees** Mean rank difference | 2.00 | 3.00 | 4.00 | 0.00 | 1.00 | -2.38 | -0.34 | 3.00 |
| Z | -0.628 | -0.876 | -1.180 | 0.000 | -0.286 | -0.757 | -0.096 | -0.924 |
| **Crops** Mean rank difference | 18.58 | 18.50 | 19.00 | 22.34 | 22.54 | 20.75 | 21.62 | 16.08 |
| Z | -4.977*** | -4.951*** | -5.059*** | -5.886*** | -5.951*** | -5.636*** | -5.755*** | -4.583*** |
| **Trees** Mean rank difference | -20.00 | -18.38 | -18.38 | -19.88 | -19.88 | -20.25 | -18.75 | -19.50 |
| Z | -5.280*** | -4.966*** | -4.966*** | -5.249*** | -5.249*** | -5.412*** | -5.030*** | -5.146*** |

(i) Grouping variable: Department of respondents, (ii) Mean Rank Difference = Mean Rank of Fruit Trees by AES – Mean Rank of Fruit Trees by same rule used for calculating the values of Mean rank difference for others.The statistics significant at 1% level of significance is indicated by ***

from forestry extension visited few days in a week.An overwhelming majority that is, twenty one from agricultural extension and twenty forestry extension, of the respondents visit few days during a month, respectively. Among these respondents, the proportion of lower field staff is higher as compared to higher one in both. Almost same results were achieved by Luqman (2004) according to his 94.5% of the respondents made visit and contact on fortnightly basis. Visit on less than once a month was also reported by two respondents from each extension service in the study area. This frequency distribution showed that extension staff visits very partial. Frightening fact was also reported during the field survey that extension personnel commonly incline the big and influential farmers.

**Linkages between agricultural extension and forestry extension**

A close working relationship and institutional linkages among the different service providers in parallel field activities plays a vital role in providing high quality of services to the recipients in the area. Similarly, extension services provided by agricultural extension and forestry extension especially in the highland or mountainous region in some cases are very much interlinked e.g. education and trainings especially raising fruit trees nurseries, soil conservation practices, watershed management etc. dissemination of new and modern knowledge through technology transfer, marketing and more are in the way of life of farmers in regions. Figure 3 is describing the frequency of contact among extension personnel's and their type of contact that is, formal and in-formal of agricultural extension and forestry extension in the study area. Majority of respondents from agricultural extension they don't have any type of contact, while few have formal and informal contact with range officers from forestry extension. Similarly, most respondents from forestry extension don't have any contact, and few have formal and informal contact with Agricultural Officers from agricultural extension in their working areas. Figure 3 also presents that a considerable number of respondent from agricultural extension do not have any contact, whereas most has informal and few has formal contact with block officer of forestry extension in the area. Also, some respondents do not have

**Table 5.** Distribution of the Respondents according to their field visit.

| Position of respondents | | Frequency of visit to working territory | | | Total |
|---|---|---|---|---|---|
| | | Few days/week | few days/month | less than once a month | |
| Agricultural Extension | Agric officers | 0 | 4 | 0 | 4 |
| | Agric inspectors | 0 | 1 | 0 | 1 |
| | Field assistants | 1 | 15 | 1 | 17 |
| | Budder | 0 | 0 | 1 | 1 |
| | Field workers | 0 | 1 | 0 | 1 |
| | Total | 1 | 21 | 2 | 24 |
| Forestry Extension | Range officers | 1 | 5 | 0 | 6 |
| | Block officers | 1 | 7 | 1 | 9 |
| | Forest guards | 0 | 8 | 1 | 9 |
| | Total | 2 | 20 | *2* | *24* |
| **Total** | | **3** | **41** | **4** | **48** |

Source: Field data.

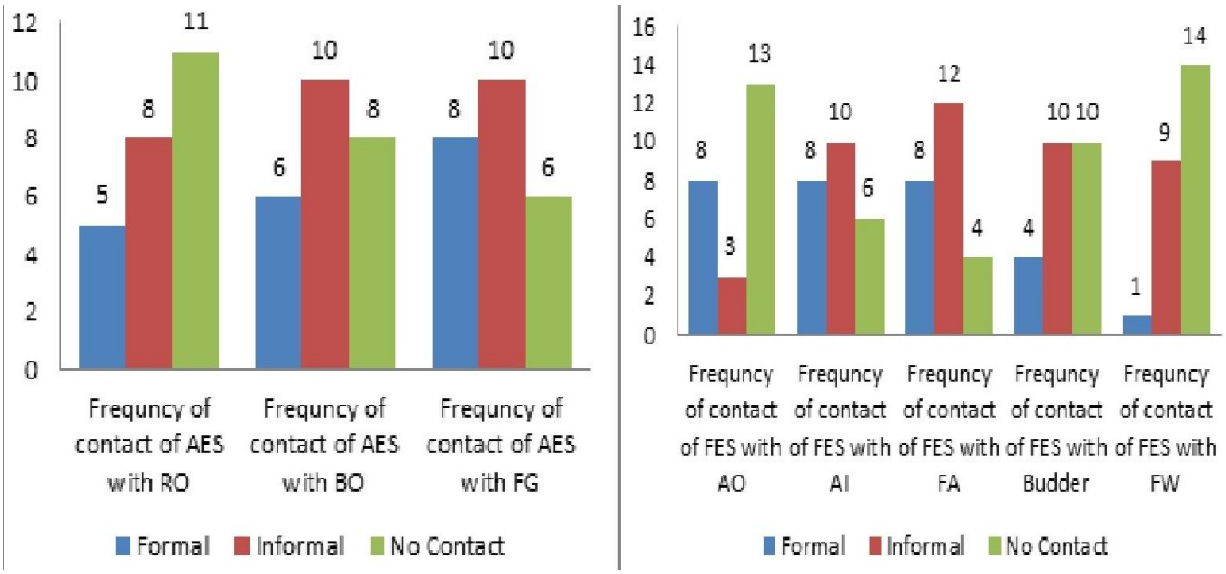


**Figure 3.** Frequency of contact with type of contact between extension Personnel's.

any contact, most have informal and few has formal contact with Agricultural Inspector in the area. Most interestingly, Forest Guard from the forestry extension has the highest frequency of formal contact that is, eight respondents from agricultural extension as compared to others. Informal contact frequency with forest Guards was reported high and few have no contact. On the other hand, Field Assistants from agricultural extension have good frequencies of formal and informal contact with forestry extension personnel's. There were only four forestry extension personnel's who don't have contact with Field Assistants in the area. Considerable frequency of contact of forestry extension workers with Budder and field workers from agricultural extension was reported as informal contact.

## DISCUSSION

Pakistan, like many other developing countries, has inherited an enormous rural socio-economic sector blessed with rich natural resources (Mallah, 2005). It is the fact that huge proportion of its population is involved, directly or indirectly, in farming and related activities. More than 70% of the country population resides in rural areas and relies on this sector directly or indirectly (GoP,

2011). In rural highland areas agricultural extension and forestry extension are the main institutional components as they promote the transfer and exchange of information that can be useful to the farming community and ultimately for the agriculture and forestry development of the country. Unfortunately, in many countries like Pakistan there is a major problem of weak linkages among the extension services of agriculture and forestry departments (Sharma, 2003; Mubangizi et al., 2004; Jan et al., 2008). The purpose of this study was to to explore the common areas of practices in agricultural and forestry extension services which will be helpful in establishing strong linkages and also to probe out the factors hindering the effectiveness of extension services provided by agricultural and forestry extension system.

The demographic characteristics of the individuals working in field-related jobs such as agriculture, and forestry are of primary importance (Hassan et al., 2002). The analysis of the demographic characteristics of the respondents reveals that majority of the respondents from agricultural extension were middle-aged people while majority of respondents from forestry extension was in the category of old people. During discussion, it was reported that this age differences created the superiority attitude among the respondents of agricultural extension due to their argument that they are more energetic and effective in delivering the extension services while older age took less interest in work and more in talking. The argument is also supported by Basant (1988) and Tsur et al. (1990) who found out that a person with lesser in age the quicker will be his acceptability and response to any action, mainly in communication and understanding. It is a fact that through higher education and good communication skills desirable changes can bring in the human behaviour. From the results it is evident that most of the respondents (Agricultural Inspector, Field Assistants from agricultural extension and Range Officers, Block Officers, Forest Guards from forestry extension) had low level of education that is, diploma in agriculture and forestry. It was also discovered by Glendinning et al. (2001) that lower education level may also act as dominant variable affecting the communication and linkages. The importance of position and hierarchy in carrying out diverse activities of a job is vibrant everywhere in the world. In other words, the competent authority's instruction and advice are generally more acceptable. From the data, it is clear that majority of the respondents were in lower hierarchy that is, Field Assistants from agricultural extension and Block Officers, Forest Guards from forestry extension. Moreover, during the discussion with respondents, it was found that they have minor role in decision making regarding the field related activities. The analysis of the data shows that there is a major difference of experience of working in field related activities carried out by extension personnel's from agricultural extension and forestry extension in the in the study area.

Agriculture and forestry are generally considered as parallel activities where many institutions are working for their development. Effective linkages can be established among these different institutions by finding out their common areas of interest. The analysis of data collected for this study shows that agricultural and forestry extension have common interests in fruit trees where they both offer similar kind of services such as education and training, technology transfer, marketing, financing, infrastructure development and community mobilization. Most of extension personnel's from agricultural and forestry extension considered their tasks related to agricultural crops and trees respectively. The argument is supported by Hedjazi and Veisi (2007) who concluded that agricultural extension has a strong reliance to exchange information among farmers regarding agricultural crops and Mead (1995) mentioned that forestry extension is used to advocate for tree plantation. During the discussion with respondent from agricultural extension in the field survey it was reported that most of the time extension personnel's from forestry extension ask technical help from them regarding fruit trees plantation especially the time of sowing of nurseries and transplantation to field on the basis of informal contact.

The extension staff visits to farmer's field are important not only for farmer's education but also for diagnostic services. Follow up of every activity is inevitable for smooth running and feedback. The common language and learning by undertaking new things are also key factors for the success of field visits (Khan and Akram, 2012).The analysis of the data shows that majority of the respondent both from agricultural extension and forestry extension visited their clientele only few days in a month. An in-depth investigation into this insignificant number of visiting time revealed that there was a limited field staff and they were engaged into other official works assigned by their perspective departments. These negligible visits to the working territories of field staff on one side disturb the extension farmer contact but also affect the decision to participate in extension activities (Moulick et al., 1966), moreover, it is responsible for not having linkages with stakeholders in the area.

From the data of the field survey, it is very clear that majority of the extension personnel's from agricultural extension and forestry extension don't have any contact in the field. The analysis of the qualitative data collected during the Key Informant Interview session explored that linkages were very weak due to inter-departments biased atmosphere in achieving the goals and objectives of public service extension providers especially in agriculture and forestry. Shahbaz et al. (2007) reported that due to lack of effective extension system and weak departmental linkages the mountain farmers in NWFP use old age technology of crop production and tree plantation. Categorically, the data establish the fact that weak formal and informal contacts between agricultural and forestry extension are the key factors hindering the

effectiveness of their services and community mobilization.

## Conclusions

It was concluded that majority of the respondent's from agricultural extension belonged to young age group whereas from forestry extension majority belonged to old age group. A large majority (consisting of Agricultural Inspectors, Field Assistants from agricultural extension and Range Officers, Block Officers and forest guards from forestry extension) had educational background as diploma (12 years education) in agriculture and forestry subject. Fruit trees were the common area of practices where both provide extension services of education and training, technology transfer about production, protection and post-harvest techniques, marketing, financing and community mobilization among the farming community. Both departments were also carrying-out the above services for fruit trees in particular while crops and other trees in general. Most of the field staff visited their respective working territory from few days during a month. Weak formal and informal contacts between agricultural and forestry extension services were also found.

## Conflict of Interests

The author(s) have not declared any conflict of interests.

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