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Information Communication Technologies (ICTS) Effect Inimproving Of Sustainable Pistachio Forestmanagementin Aibak District of Smamangan Province, Afghanistan

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Abstract: *The present study was conducted at three FMC which are Sharikyar, Tykhonak-e- Madrasa and Rbatak in Aibak district of Samangan province, Afghanistan during 2011 to compare the information communication technologies (ITCs) with other extension methods and its effect in improving of sustainable pistachio forest management. A total of 120FMC members were interviewed using pre-tested schedule. It was found that 100 % ofrespondents were male and 89 per cent of FMC members had average age of 45 years. So, 87 % of respondents had secondary school's education level. The average of workingexperience of FMC members was5years. However, 85 per cent of respondent were received training programme about the forest management and GPS uses, About 68 % of FMC members had access to mobile phone facilities, 89 per cent of FMC members were received the technical information through mobile by technical advisor regarding the seeding, transplanting, irrigation, pest and diseases management. Cent per cent of respondent were clarified there is no use of GPS, because of non-availability of tools and 95 % of respondent didn't had any information regarding the geographical information system(GIS), cyber extension, video conferencing and digital mapping for managing and conserving the pistachio forest. Thehighestmeanrefersto field demonstration (mean=4.26)andthelowest meanto usingposters(mean=2.60). The study indicates that 73% of the variance in the perceptionofFMC memberscouldbeexplained by four variablesofprovidingmaterialincentives forFMC members,knowledgeaboutindicators ofsustainable forest management,extension/educationclasses and working experience. Based on the perception of FMC members, variables"providingmaterialincentives for FMC members "(Betacoefficient:0.43,sig.:0.000),"knowledge about sustainableforest management indicators" (Beta coefficient: 0.340,sig.:0.002),"extension/education classes" (Beta coefficient: 0.28,sig.: 0.000), and"working experience" (Betacoefficient: 0.27,sig.:0.000)influence the sustainable forest*management positively.

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I. Introduction

Native pistachio populations in Afghanistan are potential repositories of genes for drought tolerance and cold hardiness. Pistachio woodlands occur in a broad band across the northern part of Afghanistan in at least nine provinces. However, they occur on sloping, relatively arid sites having medium to fine-textured soils. The pistachio forests in Afghanistan are open forests, with higher density on north slopes. Mature trees are about twenty feet high. The wild pistachio woodlands of Afghanistan have declined rapidly over the past 30 years, from 40 to 100 trees per hectare to the current estimate of 20 to 40 trees per hectare due primarily to cutting of trees, over grazing, and damage to trees through uncontrolled harvesting of the pistachio nuts. The natural pistachio woodlands have significant environmental and economic value to Afghans. Further, the center of crop origin and genetic diversity is in the area of Afghanistan, Iran, and central Asia. Pistachio nuts are rich in heart-healthy oil, low in saturated fat, and are high in dietary fiber, vitamin B6, thiamine, phosphorus and copper. Pistachio oil is used both medicinally and cosmetically. Pistachio trees are capable of withstanding cold and drought and grow on steep hillsides where it helps prevent erosion. The woodlands have historically served as seasonal pasture for nomadic flocks, providing shade, browse and forage, while receiving the benefit of manure fertilization. However, the sustainable management of forest requires a greater understanding of current and potential future value of forest eco systems as a complete chain of benefits for public and private sector, and this would limit utilization of forests for short-term benefits(DeMontalembert and

Schmithussen,1994).Bare(2005) pointedoutthatsustainableforest managementisarealm ofactivitiesandprocessesin providingservicesandproductsinlongterm andatthe sametimeisconsideredalongapproachwhichbrings a balanceincomprehensive goalsofsocial,economicand ecological in managing natural resources. Pistachio trees in Afghanistan are harvested primarily from native seedling trees, maintaining the genetic diversity of the species within the complex ethnic diversity that characterizes the people of northern Afghanistan. Pistachio is once a major export product of the region, and Afghan nuts are recognized on the world market for their intense flavor and dark green color. Increasingcommunity knowledge and awareness about importance and benefits of forests in longterm would have positive impacts inpreserving natural resourcesand achievingsustainabledevelopment goals (Arkand Mc Guckin,2003).

a) Concept of Information Communication Technology (ICT)

Forest management is the art and science of managing forest resources. However, the term "managing" carries with it various connotations including, directing, controlling, protecting and conserving of forest. In the sense of directing, forest management is fundamentally concerned with deciding how to use forests to provide the values, goods, and services desired by society. The management of forests is very dependent on information, knowledge management, and the capacity to process information. The Management information system for the forestry sector aims to introduce modern approaches to information management in forest sector. This includes technological solutions for information integration, remote-sensing technologies, and mobile technologies. Management information system for the forestry sector (MISFS) will contain a number of subsystems and modules to provide information for steering and managing the forestry sector toward sustainable forest management. The MISFS information strategy will also guide the Ministry of Agriculture, Irrigation and Livestock (MAIL) in aligning information technology (IT) investment in development of forest management projects to obtain a harmonized, cost-effective system. However, management information system for the forestry sector is expected to reduce the fragmentation of information by harmonizing standards within the forest agencies.

b) Present Situation of pistachio forest in Afghanistan

The United Nations Environmental Programme (UNEP), in cooperation with Government of Afghan evaluated the condition of the northern pistachio and juniper woodlands in the provinces of Herat, Badghis, Kunduz, Samangan and Takhar/ Afghanistan in year of 2002. UNEP used satellite image analyses to quantify changes in pistachio woodland in Badghis, Samangan, Herat and Takhar provinces between 1977 and 2002. In 1977, woodlands were found on 55 and 37 per cent of the land base in Badghis, Samanagan, Herat and Takhar provinces, respectively. Tree densities of 40 to 100 trees per hectare were observed. In 2002, satellite imaging no longer detected woodlands in either province, indicating a reduction in tree density to below 40 trees per hectare, if not complete deforestation. Further, the pistachio forest instrument covers a broad spectrum of issues beyond forests. Its implementation requires close cooperation between different authorities and communities who are directly and indirectly depends to pistachio forest. Evergreen forests covered five percent of Afghanistan's current land area, including one million hectares of oak and two million hectares of pine and cedar growing mostly in the eastern part of the country. Open woodland dominated by pistachios, almonds and junipers occupied a full third of the country. The tree is a valuable source of firewood in an area with cold winters where people depend on wood for fuel. This has contributed to the destruction of some populations. Years of war with the Soviet Union resulted in extensive cutting of the woodlands, as people stockpiled wood for fuel, and as military forces eliminated cover for their opponents. Severe drought beginning in the late 1990's resulted in further losses.

c) Glance to pistachio forests in Samangan province of Afghanistan

The total area presently in pistachio woodland in Samangan province is 20,111 ha, which includes 3,322 ha recently-burned woodlands where trees remain standing. This represents 5.5 percent of the entire area remaining in pistachio woodlands. The entire Samangan area is in the historical range of pistachio and its potential habitat (sloping land not within alluvial basins and not sand-covered) appears to be about 80 percent of the entire Samangan area. So remaining pistachio is about six percent of its long-term coverage. However, Ministry of Agriculture, Irrigation and Livestock (MAIL), Government of Afghan, indicate over 50 percent of the remaining pistachio has been cut in the last 25 years; meaning pistachio was historically at least twice as abundant as in the present. In 2006 the forest management committees (FMCs) were established by United Nation Office for Project Service (UNOPS) through Afghan Conservation Corps (ACC) programme with technical advisory of Ministry of Agriculture, Irrigation and Livestock (MAIL) government of Afghanistan to protect manage and develop the pistachio forest in north part of Afghanistan, funded byUnited States Agency for International Development (USAID) /United States Department of Agriculture (USDA). The Forest

Management Committee's (FMCs) activities are managing, protecting, conserving and developing of forest area of Samangan province. However, The people who are living in the Shareekyar , Tykhonak-e- Madrasa and Robatak Villages of *Aibak* district of Samangan province understand the importance of protecting and conserving the pistachio forest to their livelihood . Further, the reforestation activities have served to strengthen Community Development Councils (CDC), local democratically elected village governance systems, and provided a concrete opportunity for the villagers to work together towards longer-term sustainable development through the protection of their valuable pistachio trees. Therefore a study was undertaken to assess these aspects in detail with the following objectives:

1- To understand the effect of ICT in improving of sustainable pistachio forest management by FMC members.
2- To compare the information communication technologies (ICTs) with other extension methods

II. Methodology

The present study was conducted at three FMC which are Sharikyar, Tykhonak-e- Madrasa and Robatak in Aibak district of Samangan province, Afghanistan during 2011. Data collection was done by personal interview method with the help of the well-structured schedule. Formeasurementofcorrelation betweenthe independent variablesandthe dependent variable,correlationcoefficients have beenutilizedandinclude Pearsontest of independence.

Study Design: Themethodologyusedinthisstudyinvolveda combinationof descriptive and quantitative researchand includedthe useof percentage, mean, correlation anddescriptiveanalysisas data processing methods.

Study Location: Sharikyar, Tykhonak-e- Madrasa and Robatak in Aibak district of Samangan province, Afghanistan

Study Duration: during 2011

Sample size120FMC members

Sample size calculation A simple random sampling technique was employed to select FMC members as sample size for the study.

III. Results

Itwas reported that100 % ofFMC members were male and 89 % of FMC members had average age of 45 years. So, 87 % of respondents had secondary school's education level. The average of workingexperience of FMC members was5years.

The FMC membersforthe14 perception statementsaredisplayedinTable-1. Ascanbeseenfrom this Table, thehighestmeanreferstoparticipationofFMC membersinsustainable pistachioforestmanagement(mean=4.48) andthelowestmeantoconflict resolution amongFMC members (mean = 3.97)

Table-1. Mean scoreof theperceptionof FMC membersaboutfactors whichimprovethesustainable Forest Management (1 =stronglydisagree;5=strongly agree).

Sl.No	Perception	Mean	SD
1	Participation of FMC members in sustainable pistachio forest management	4.48	0.67
2	Developing theregulationregarding sustainablepistachio forest management	4.24	0.64
3	No any knowledge about the use of GPS in forest management	4.23	0.63
4	Knowledgeabout importance offorest	4.14	0.66
5	Using of mobile phone for receiving of technical information	4.17	0.77
6	Providingresources for projects	4.09	0.79
7	Allocating financial resources to FMC s for better implementation of the project	3.98	0.77
8	Increasingthe decisionmaking roles of FMC managers	4.18	0.82
9	Conflict resolutionamong FMC members	3.97	0.80
10	Respecting to thelocalbeliefsandhabits by FMC members	4.13	0.87
11	Increasinglinkagesbetween FMC members and otherlocal population	4.35	0.92
12	Emphasizingtheutilizationof indigenousknowledge for FMC members	4.26	0.92
13	Material incentivesforFMC members	4.07	0.85
14	Mutual trustbetween FMC members andauthorities	4.36	0.93

Table -2. Categories of ICT used as a source of technical information by FMC members on Forest Management purpose.

n=120

Sl.No	ICT tools Used by FMC	Respondents			
		Yes		No	
		No	Per cent	No	Per cent
1	Geographical Information System (GIS)	-	-	120	100
2	Global Positioning System (GPS)	-	-	120	100
3	Satellite images	-	-	120	100
4	Mobile phone	107	89	35	29
5	Radio	94	78	26	22
6	TV	111	92	9.0	8.0
7	Satellite images + Mobile + Radio + TV	3.0	2.0	117	98
8	Mobile phone + Radio+ TV	98	82	22	18
9	Mobile phone + Radio	85	71	35	29
10	Radio + TV	100	83	20	17

***Multiple responses are possible.**

Table- 2 reveals that cent per cent of the FMC members are not used GIS as source of information on pistachio forest management followed by GPS and satellite images because there is no any knowledge among the FMC members as well as no availability of these tools. Further, majority of the respondents (92 %) are used TV, followed by mobile (89%), radio + TV (83 %) and mobile + radio + TV (82%) as an information resource for technical purpose. However, 78 % of FMC members were used radio followed by 2 % (only three forest department staff as FMC members)of respondent were used satellite images + mobile + radio + TV for technical information purposes.

Table- 3. Accessibility of ICT tools to FMC members for Forest Management purpose.

n=120

Sl.No	Accessibility of ICT tools	Respondents	
		No	Per cent
1	GIS	-	-
2	GPS	-	-
3	Satellite images	-	-
4	Mobile phone	82	68
5	Radio	94	78
6	TV	111	92

***Multiple responses are possible.**

According to (Table – 3), that 92% of FMC members in the research selected areas had access to TV, followed by radio 78 % and mobile phone 68 %. However, there is no accessibility of modern ITC tools such as GIS , GPS and satellite images by FMC members in study area because of non- availability of such tools, lack of knowledge, skill and expert person.

Table -4. Meansofrespondents'viewsabouteffectivenessof extensionmethods inimproving sustainable forest management(1=very little; 5=very much).

Extension Methods	Mean	SD
Visiting of others successful pistachioforestryprojects	4.29	0.78
Practical training on pistachio forest management	4.24	0.81
Group discussion about the pistachio forest management	3.70	0.76
Use of printedmaterials regarding pistachio forest management	3.49	0.77
Classeslearning about the pistachio forest management	3.59	0.90
Educationalfilms regarding pistachio forest management	3.24	0.90
Radio,forestry programs	3.04	0.77
Television,forestry programs	3.19	1.10
Posters for pistachio forest management	2.65	0.92
Lectureson pistachio forest management	2.66	0.97

Table-4shows themeansofrespondents'views about effectiveness ofextensionmethods inimproving sustainablepistachio forest conservation, protection,management and pistachio forest development.Ascanbeseenfromthis table,thehighestmeanrefersto visitingsuccessful pistachio forestryprojects (mean=4.29)andthelowest meanto usingposters for pistachio forest management (mean=2.65).
Spearman coefficient was employed for measurementof relationships between perceptions of FMC membersabouteffective extensionmethodsinimproving thepistachio forestconservation, protection, management and pistachio forest development.Table-5displaysthe resultswhichshowthattherewasrelationshipbetween perceptionof FMC membersabout sustainability of pistachioforest conservation, protection,management and development,andeducational level,workingexperience, extensionand educationclasses, group discussion, visiting otherpistachio forestryprojects,practical trainingand printed materials on pistachio forest management.

Table-5. Overallcorrelationmeasures between dependent and independent variables.

Independentvariables	**Dependent variable**	**FMC members**	
		R	**Sig.**
Educational level	Sustainableforest management	0.334	**0.00**4**
Workingexperience	Sustainableforest management	0.291	0.013*
Extension andeducation classes	Sustainableforest management	0.627	0.0003**
Group discussion	Sustainableforest management	0.257	0.028*
Visitingforestry projects	Sustainableforest management	0.246	0.036*
Practical training	Sustainableforest management	0.242	0.039*
Magazineand printed materials	Sustainableforest management	0.268	0.023*

**** p <0.01, *p <0.05**

The resultofregressionanalysisbystepwise method indicates that 73% of the variance in the perceptionofFMC memberscouldbeexplained by four variablesofprovidingmaterialincentives forFMC presidents and technical staffs in forest departments,knowledgeaboutindicators ofsustainable pistachio forest management,extension/educationclasses and working experience. Based on the perception of FMC members, variables"providingmaterialincentives for pistachio forest technical staff and FMC presidents "(Betacoefficient:0.43,sig.:0.000),"knowledge about sustainablepistachio forest management indicators" (Beta coefficient: 0.339,sig.:0.002),"extension/education classes" (Beta coefficient: 0.31,sig.: 0.000), and"working experience" (Betacoefficient: 0.27,sig.:0.000)influence the sustainable pistachio forest management positively.

IV. Discussion

Awiderangeofextensionmethods and use of ICTinfluencethe adoptionofsustainable pistachio forestmanagement. Based onthe perceptionof FMC members,regression analysis showedthat87%ofthe varianceinthe perceptionof FMC memberscould be explained by four variables of providingmaterial incentives for forest department technical staffs and FMC members, knowledge aboutindicators ofsustainable pistachio forestmanagement, extension/educationclassesand workingexperience.The result is consistent with Hakimi (2012) in whichextensionclasses wouldencourage localpeopleto participate in rangelandsprotection programs. Respondentsindicatedthat visitingsuccessful of pistachio projectsand practicaltraining werethe mosteffective method in improving sustainable pistachio forest management. The resultsisinaccordancewith studybyWintour(2010)in which the skill of trainees are betterequippedby demonstration field activities. Thismethod would help forest stafffrom desire stage throughconvictionandprobably intotaking action. Basedonthe results of themeanscore, respondentsindicatedthatthemainfactorinimproving the sustainable pistachioforestmanagementwasparticipationof both FMC members and local people who are within and around the pistachio forestsinrelated forest management programmes which are held by government and non-governmental agencies. Theresult isconsistent withTiwari(1994)that sustainableforestmanagementrequires alongterm approach whichemphasizeson participationof beneficiaries.

V. Conclusions

Thelocal people who are whiten and around the pistachio forest shouldbeeducatedaboutthe importance of protecting, conserving, managing and development of pistachioforests.Itiswell knownthatlackof knowledge about sustainablemanagement ofpistachio forests wouldhave negativeconsequencesin protectingandwouldimpedethe process ofinvolvement oflocal people. There is need

formoretrainingandeducation about the ITC tools and providing such kinds of tools to change the attitude offorest technical staff and FMC members about sustainability of pistachioforest management andenhance their roleinmanaging, conserving, protecting and developingthenatural resources not only in Samangan province but all over the Afghanistan forest departments.

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