Use of ICTs by Farmers: A Study in Odisha

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

Harnessing advantages of Information and Communication Technology (hereafter to be mentioned as ICTs) for changing the face of agriculture, in terms of production and productivity and farmers' wellbeing; calls for a separate set of knowledge, skill, ability and higher (if possible fullest) extent of use by the farming communities. There are physical, economic, logistic, perceptual as well as behavioural problem, experienced by the farmers in harnessing the advantages of ICTs. In this context the present study has been conducted in Khurda district of Odisha with the broad objective to enumerate the level of knowledge, skill and extent of use and perception of different ICTs among farmers those are actively engaged in agriculture and having access to at least one ICT. In the present study, being an original empirical research work, data were collected from 120 farmers of two Blocks of Khurda district of Odisha by pretested structured interview schedule. Blocks were selected randomly and respondents were selected by following the criteria of being engaged in agriculture actively as well as using at least one ICT tool. Statistical tools like, percentage, ranking, index value calculation, ranking, correlation, regression and step wise regression were used for fruitful analysis of collected data. The results of the study revealed that socio-economic orientation of the respondents was centring on semi-medium to poor level. The study also revealed that radio was ranked first by the respondents for getting market information while TV was ranked second. The

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study also revealed that respondents were having high perception about appropriateness of different ICTS, usefulness of different ICTs and also, they have perceived high level of constraints in using different ICTs. The study also revealed that independent variables like, age, education, family education, social participation, cosmopoliteness, land holding, visit outside own village, level of knowledge of devices, knowledge of service providers, extent of use of devices and extent of use of ICTs for different purposes had significant and positive correlation with many of the dependent variables like, level of knowledge of devices, level of knowledge of service providers, extent of use of devices, extent of use for different purposes, appropriateness and usefulness. Further, results of multiple regression showed that, education, visit outside own village, level of knowledge of devices and extent of use of ICTs for different purposes had significant and positive association with the extent of use of ICT devices. Results of step-wise regression showed that, level of knowledge of devices, education, level of knowledge about service providers and extent of use of ICTs for different purposes had significant and positive association with the extents of use of ICT devices by the respondents and the model explained 68% of the total variance (Adjusted r^2).

1. INTRODUCTION

Agriculture occupies the central pace in rural life and it is well known that rural life revolves around agriculture hence any attempt to improve agriculture will usually trigger the rural development. In India several extension approaches like farmer friend approach, group approach, mass media approach, farming system approach, market led extension approach, participatory approach etc. have been adopted for agricultural development. Sustainability and productivity of the agricultural sector largely depends on the quality and effectiveness of extension services. For many years, farmers have been accessing agricultural information from extension workers through interpersonal communication. However, the number of extension workers has been decreasing while farming families have been increasing. Therefore, it is not possible for extension personnel to reach out each and every farmer's doorstep because in reality there is only one extension worker available for 2879 farmers in India [1]. This leads to low achievement of the current extension services in the country with respect to reaching out to farmers with timely and relevant agricultural information.

Information and Communication Technology (ICTs) are seen as a partial solution to rapidly disseminating information to the increasing number of farming families. ICTs have the potential to enable farmers to receive up-to-date knowledge and information about agricultural technologies, best practices, markets, price trends, consumer preferences, weather, and soil-moisture conditions. ICTs based information is crucial for the adoption of different technologies related to different crops for improving yield and income of small holder farmers [2]. The change in society largely depends upon change in accessibility and usability of different ICT tools [3]. There are different ICT tools like radio, TV, mobile phone, Internet, CD player etc. which are used for disseminating information to farmers within less time [4]. Farmers also reported that mobile phones proved to be useful during health emergencies; information services on availability of inputs, quality of inputs, and pest and disease management of crops were also used by the farmers through ICTs [5].

But harnessing advantages of ICT calls for a separate set of knowledge, skill, ability and higher (if possible fullest) extent of use by the farming communities. This is more pertinent in case of developing country like India. How far Indian farming community, especially small and marginal farmers, which together constitute the major portion of Indian farming community, are ready to harness the advantages of ICTs, is a big question. There are physical, economic, logistic, perceptual as well as behavioral problem, having regional and socio-economic biases. It requires readiness of farmers to use ICTs. Resultantly, it is observed that all the Indian farmers are not prepared to access optimum usage of ICT tools for acquiring and utilising knowledge related to agricultural activities. ICTs, as it is seen in many countries including India, have the potentiality to change the face of agriculture, in terms of production and productivity and farmers' wellbeing. Moreover, how far the ICTs itself and the information communicated by it is useful, proper and appropriate- again is a question.

Answer of these questions would definitely provide a basis for policy makers and planners to

dovetail the extension communication through ICTs for improvement in farming sectors. In this context the present study has been with the following specific objectives:

(a) To study the socio-economic orientation of the farmers,
(b) To study the extent of knowledge of farmers about different ICTs and service providers,
(c) To study the nature and extent of use of different ICTs by the farmers,
(d) To study the farmers' perception about appropriateness, usefulness and constraints of different ICTs, and
(e) To ascertain the association between different socio-economic variables with the extent of use of different ICTs.

2. METHODOLOGY

The research study was conducted in two blocks, namely, Balianta and Balipatna of Khurda district of Odisha. From each block one Gram Panchayat i.e., Puranapradhan from Balianta and Nariso from Balipatna block were selected for the study. Again, from each Gram Panchayat three villages i.e., Erakanta, Puranasasan, Puranpradhan from Puranapradhan GP and Khajuriapada, Nariso, Srisampur from Nariso GP were selected at random for the study. Twenty farmers from each village totaling to 120 farmers were selected for the study. Criteria for selecting respondents were that the respondents must be actively involved in agriculture and using at least one ICT tools for receiving agricultural information. Otherwise respondents won't be able to answer many aspects of the present research work. The assumptions were, if they are actively engaged in agriculture, they may need to take the advantages of ICTS; and if they are not using any ICTs, they won't be able to mention their level of knowledge, skill and perception about different ICTs. The data was collected by a pre-tested structured interview schedule through personal interview method.

Socio-economic orientation of the respondents was measured through different variables like, age, education, family education, family type, social participation, cosmopoliteness and extension contact, land holding, ICTs used, frequency of visit outside own village etc. Percentile distribution of respondents over different aspects was observed in two major groups i.e. Major 1 with highest concentration of respondents and Major 2 with second highest concentration of respondents.

For measuring Extent of Social Participation, respondents were asked to mention their status as Not Member, Member and Office Bearer of different organizations and institutions with corresponding score of 0, 2 and 3 respectively [6]. Social Participation Index (SPI) was calculated for each respondent by following the formula: SPI = {(Obtained Score / Maximum obtainable Score) X 100}. Further, respondents were classified in four groups, namely, Low (having SPI value 0-25), Semi-Medium (having SPI Value 26-50), Medium (SPI= 51-75) and High (SPI = 76-100).

For measuring Extent of Cosmopoliteness and Extension contact, respondents' frequency of visit to Zila Parishad, Panchayat, Block level official, District level official, State level official, Bank official, NGO members, NABARD, CIFA, Fishery Extension Office were taken into consideration. Four-point scale containing Fortnightly, Monthly, Bi-monthly and Half Yearly with corresponding score of 4,3,2,1 was employed [7]. Cosmopoliteness and Extension Contact Index (CEI) was calculated by the same formula as mentioned above and respondents were categories into four categories on the basis of CEI as mentioned above.

To study the extent of level of knowledge and skill of farmers about different ICTs, respondents were asked to mention their extent of knowledge and skill about using ICTs like, radio, TV, Personal computer, Internet, Mobile phone, WAP mobile phone, Combination mobile phone and organizer, Internet connected games console, PDA, DVD player, MP3 player and Digital TV etc. In a three-point continuum containing Fully known, Known and Not known with the corresponding Score of 2, 1 and 0 respectively [8] and for ICTs Services Providers, extent of knowledge was measured by a two-point continuum containing Yes and No with corresponding Score of 1 and 0 respectively [8]. At the next stage Knowledge Index (KI) has been calculated for each respondent and by formula as mentioned above.

To study the nature and extent of use of ICTs, respondents were asked to mention their extent of use of ICTs devices like, Radio, TV, Computer, Internet, Mobile, Farm Bulletin, Newspaper, Magazines, and Telephone etc. To measure the extent of use; a three-point continuum containing Daily, Weekly, Monthly with corresponding Score of 3, 2, and 1 [8] respectively has been used. And to ascertain the

extent of use of ICTs for different purposes a five-point continuum containing Daily, Weekly, Fortnightly, Monthly and Six monthly with corresponding Score of 5,4,3,2 and 1 [8] respectively was used. At the next stage Information Source Use Index (ISI) has been calculated for each respondent by following the formula as mentioned above.

To ascertain the perception about Appropriateness, Usefulness and Constraints of using different ICTs, respondents were asked different questions to answer in a three-point scale containing Strongly Agree (with Score 3), Agree (Score 2) and Disagree (with Score 1) [8]. Finally, Appropriateness Index (AI), Usefulness Index (UI) and Constraints Index (CI) were calculated by following the formula AI or UI or CI = {(Obtained Score / Maximum Scare) X 100}.

For ascertaining the perception about appropriateness of ICTs, respondents were asked to mention their perception against ten statements namely, appropriate to socio-economic condition of farmer, information communications are appropriate to farming situation, technology are suitable for poorly educated person, information is appropriate to the farmer's need, information are timely communicated, information are appropriate for different category of farmers, information are appropriate to different farming practices, information can be readily shared, to the point information, and standard weather forecasting helps etc.

For ascertaining usefulness of different ICTs, respondents were asked to mention their perception against following statements: technology communicated are suitable to field situation, doesn't create economic pressure, any time anywhere available, information in local language helps in better understanding, timely available information helps in better adoption, better technological option give higher production, helps in preventing loss during natural calamities, current market information helps in fetching more money, information can be readily shared, repeated information are available, information are season specific, information are enterprise specific, information are useful etc.

And for ascertaining level of constraints perception, respondents were asked to record their responses against following constraints: inadequate infrastructural facilities, low development of ICT tools, slow incorporation of ICTs tools, poor economic condition, hard technological issues, illiteracy among farmer, lack of access to computer, low / no internet access, lack of electricity, lack of training and skill development, lack of knowledge on ICTs, complex process on specific aspects, less technical support from experts, social barrier of using new practices and costly etc.

To ascertain the extent of receiving different farm information from different ICTs, simple ranking was followed.

To ascertain the correlation between different independent and dependent variables multiple correlation, multiple regression and step wise regression was conducted. For that, different socio-economic variables, assumed to be important on the basis of the findings of previous research work and experienced gathered from pilot survey and pre-testing, were considered as independent variables (Y1-Yn). These were, age, education, family education, family type, social participation, cosmopoliteness and extension contact, land holding, ICTs used, frequency of visit outside own village, level of knowledge of devices, knowledge of service providers, extent of use of devices, extent of use ICTs for different purposes etc.

To further the predictive analysis, multiple correlation and step-wise regression were employed in which extents of use of ICT devices was taken as dependent variable (Y) while twelve independent variables, namely, Age(X_1), Education(X_2), Family education (X_3), Social participation (X_4), Cosmopoliteness (X_5), Visit Outside own village (X_6), Level of knowledge of devices(X_7), Level of knowledge of service providers (X_8), Extent of use of ICTs for different purposes (X_9), Appropriateness of ICTs (X_{10}), Usefulness of ICTs (X_{11}) and Land holding (X_{12}) were taken for consideration.

3. RESULTS AND DISCUSSION

Results of the present research work have been presented in different sub-section which has relation to the objective as given below.

3.1 Socio Economic Profile of the Farmers

Socio-economic profile of the respondents has been studied through different aspects like, age of the respondents, level of education of the

respondents and their families, family type, extent of social participation, cosmopoliteness and extension contact, land holding, communication material used and extent of visit of the respondents outside their villages. The results are presented in Table 1 in two categories, i.e., Major 1, having highest number of respondents and Major 2, having second highest number of respondents against each aspects of socio-economic orientation, separately for both the study blocks and for total respondents.

The findings of the study revealed that majority of the respondents belong to 41-50 years of age (Major 1) for both the districts as well as total (48.33%, 40% and 44.16% respectively for Balianta Block, Balipatna Block and Total respondents) followed by 51-60 years age group.

Majority (Major 1) of the respondents were found to have Middle School level of education (31.66%, 28.33% and 30% respectively for Balianta Block, Balipatna Block and Total respondents) followed by High School level of education (Major 2) with little exception in case of Balipatna block. When taken family educational status of the respondents, it was found that majority (Major 1) of the respondents' family had Primary Level of education (86.66%, 83.33% and 85% respectively for Balianta Block, Balipatna Block and Total respondents) followed by Middle School level of education (Major 2). The study is having similarity and dissimilarity of the study conducted [9].

It has been found that a little higher than half of the respondent families were found living in Joint Family followed by Nuclear Family.

Majority of the respondents (Major 1) were found to have low social participation (81.67%, 88.34% and 85% respectively for Balianta Block, Balipatna Block and Total respondents) followed by semi-medium level of social participation (Major 2). Similarly, majority of the respondents were found to have semi-medium to low level of cosmopoliteness and extension Contact.

Majority of the respondents were having 0.51-1.0 ha of land holding (46.66%, 55% and 50.83% respectively for Balianta Block, Balipatna Block and Total respondents) followed by up to 0.5 ha. Radio and Mobile were found to be the most used ICTs for receiving agricultural information and majority of the respondents were found to go outside their own village once in week (71.66%,

76.66% and 74.16% respectively for Balianta Block, Balipatna Block and Total respondents) followed by Once in a month (Major 2). Parts of the findings are found matching with the findings [10].

Radio was found to be most used ICT tool followed by mobile for all the study segments. And majority of the respondents were found to visit outside their own village every week followed by every month.

3.2 Level of Knowledge and Extent of Use of Different ICTs by the Respondents

As mentioned in the methodology portion, for ascertaining level of knowledge and use of different ICTs, level of knowledge about service providers and extent of use index values were calculated. The distributions of respondents in different index level (low, semi-medium, medium and high) against each aspect are presented in Table 2. From the table it can be observed that, in case of knowledge about use of different ICT tools, majority of the respondents had semi-medium level of knowledge (53.34%, 60% and 66.66% respectively for Balianta Block, Balipatna Block and Total respondents) followed by medium level of knowledge (40%, 33.35% and 36.66% respectively for Balianta Block, Balipatna Block and Total respondents). The results match with the findings of [11-13] and partly matching with the findings of [14].

In case of knowledge about different ICT service providers, it was found that majority of the respondents had semi-medium level of knowledge (51.67%, 55% and 53.34% respectively for Balianta Block, Balipatna Block and Total respondents) followed by medium level of knowledge (38.37%, 38.34% and 38.34% respectively for Balianta Block, Balipatna Block and Total respondents). In case of extent of use of different ICTs for different purposes it was found that majority of the respondents had semi-medium level of use index (60%, 61.67% and 60.84% respectively for Balianta Block, Balipatna Block and Total respondents) followed by medium level (33.34%, 26.66% and 30% respectively for Balianta Block, Balipatna Block and Total respondents).

3.3 Nature and Extent of Use of ICTs by the Respondents for Different Purposes

In this case effort was made to know the main purpose of using different ICTs by the

Table 1. Socio-economic orientation of the respondents

Sl.no	Socio-economic characteristics	Balianta block		Balipatna block		Total	
		Major1	Major 2	Major 1	Major 2	Major 1	Major 2
1	Age(years)	41-50 (48.33%)	51-60 (26.66%)	41-50 (40%)	51-60 (30%)	41-50 (44.16%)	51-60 (28.33%)
2	Self educational status	Middle school (31.66%)	High school (26.66%)	Middle school (28.33%)	College (26.66%)	Middle school (30%)	High School (25%)
3	Family educational status	Primary school (86.66%)	Middle school (13.33%)	Primary school (83.33%)	Middle school (16.66%)	Primary school (85%)	Middle school (15%)
4	Family type	Joint (56.66%)	Nuclear (43.37%)	Joint (53.33%)	Nuclear (46.67%)	Joint (55%)	Nuclear (45%)
5	Social participation	Low (81.67%)	Semi-Medium (18.33%)	Low (88.34%)	Semi-Medium (11.66%)	Low (85%)	Semi-Medium (15%)
6	Cosmopoliteness and extension contact	Low (51.66%)	Semi-Medium (48.37%)	Semi-Medium (66.66%)	Low (33.37%)	Semi-Medium (57.5%)	Low (42.5%)
7	Land holding (ha)	0.51-1 (46.66%)	Up to 0.5 (41.66%)	0.51-1 (55%)	Up to 0.5 (36.66%)	0.51-1 (50.83%)	Up to (0.5 39.16%)
8	ICTs Used	Radio (98.33%)	Mobile (93.33%)	Mobile (98.33%)	Radio (95%)	Radio (96.66%)	Mobile (95.83%)
9	Frequency of going outside own village	Once in a week (71.66%)	Once in month (18.33%)	Once in a week (76.66%)	Once in month (10%)	Once in a week (74.16%)	Once in month (14.16%)

Table 2. Level of knowledge about ICT devices, ICTs service providers and extent of use of different ICTs by the respondents

Aspect	Study Block	Index value			
		0-25 (Low)	26-50 (Semi-Med)	51-75 (Medium)	76-100 (High)
Knowledge of ICTs	Balianta	4 (6.66%)	32 (53.34%)	24 (40%)	0
	Balipatna	3(5%)	36 (60%)	20 (33.35%)	1 (1.65%)
	Total	7 (5.83%)	68 (66.66%)	44 (36.66%)	1 (0.83%)
Knowledge of Service Provider	Balianta	5 (8.33%)	31 (51.67%)	23 (38.37%)	1 (1.66%)
	Balipatna	3 (5%)	33 (55%)	23 (38.34%)	1 (1.66%)
	Total	8 (6.66%)	64 (53.34%)	46 (38.34%)	2 (1.66%)
Extent of use of ICTs	Balianta	4 (06.66%)	36 (60%)	20 (33.34%)	0
	Balipatna	7 (11.67%)	37 (61.67%)	16 (26.66%)	0
	Total	11(9.16%)	73(60.84%)	36 (30%)	0

respondents. Six ICTs have been considered. These are Radio, TV, Mobile, Newspaper, Telephone and Farm bulletin. To know the major purpose of using these ICTs, six different purposes were taken. Those are Entertainment (E), Games & Sports (S), News (N), Farm Information (F), Education (Ed) and Communication(C). Respondents were asked to mention their main purpose of using each particular ICT. Results of this section are presented in Table 3.

It can be observed from the table that radio was used by most of the respondents of Balianta block for getting farm information (75%) followed by for entertainment (58.33%). In case of Balipatna block and total respondents, majority were found to use radio for receiving news (81.66%) followed by for getting farm information (68.33% and 78.33% respectively). TV was found to be used for either entertainment or for news for majority of the respondents (both Major 1 and Major 2). While mobile was used by majority of the respondents for communication (Major 1) for all the study blocks and total respondents (85%, 91.66% and 88.33% respectively) followed by (Major 2) for getting farm information (26.66%, 43.33% and 34.95% respectively). Newspaper was used by majority of the respondents, either for receiving news, or for sports news or for education purpose. Telephone (landline) was found to be exclusively used for communication purpose while Farm bulletin was found to be exclusively used for getting farm information. The findings of the study were found tuned with the research conducted by [15,16,5].

3.4 Ranking of Different ICTs used by the Respondents for Different Farm Information

In the present study effort was also made to ascertain the position (Rank) of different ICTs as

perceived by the respondents for getting different farm information. Three major ICTs have been considered. These are Mobile, Radio and Television. Eight different farming aspects have been selected (mentioned in Table 4) for which respondents use those ICTs for receiving information. Respondents were asked to mention the Rank of each ICT against each farming aspect. Considering the opinion of the majority of the respondents, Rank position of each ICT have been ascertained and presented against each farming aspect in Table 4.

It can be observed from the table that Mobile was ranked 1 in case of Exchange of Information and for Speedy Communication, while it was ranked third for receiving all other farming information except Success Stories for both the study block. In case of Radio, it was observed respondents placed it in rank 1 for getting information about Agriculture, Weather, Govt. Programme and Market Information; while it was ranked 2 in case of new technology and mechanization. TV was found to be ranked 2 or 3 in case of information about Agriculture, Weather, Govt. Programme, Market Information; and new technology and mechanization. The results are found to have resemblance with the research work [17,18].

3.5 Perception of Respondents about the Appropriateness, Usefulness and Constraints of Using ICTs

The distribution of respondents on the basis of Perception Index (PI) for appropriateness, usefulness and constraints is presented in Table 5 in four class intervals of PI i.e. Low Perception (Index Value 0-25), Semi-Medium (Index Value 26-50), Medium (Index Value 51-75) and High (Index Value 76-100). From the table it can be observed that for both the study blocks as well as total respondents, majority of the respondents had high level of perception about

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Table 3. Purpose of using different ICTs by the respondents (n=120)

Sl.No	ICT tools	Distribution of respondents					
		Balianta		Balipatna		Total	
		Major 1	Major 2	Major 1	Major 2	Major 1	Major 2
1	Radio	F (75%)	E (58.33%)	N (81.66%)	F (68.33%)	N (81.66%)	F (78.33%)
2	TV	E (58.33%)	N (35%)	N (68.33%)	E (43.33%)	N (51.66%)	E (50.83%)
3	Mobile	C (85%)	F (26.66%)	C (91.66%)	F (43.33%)	C (88.33%)	F (34.95%)
4	Newspaper	N (63.33%)	Ed (46.66%)	N(58.33)	S (51.66%)	N (60.83%)	S (51.66%)
5	Telephone	C (68.33%)		C (63.33%)		C (65.83%)	
6	Farm bulletin	F (25%)		F (20%)		F (22.5%)	

Entertainment (E), Games & Sports (S), News (N), Farm Info (F), Education (Ed) and Communication(C)

Table 4. Ranking of different ICTs for different farm information (n=120)

S. no	Types of Farm Information	Mobile		Radio		TV	
		Balianta	Balipatna	Balianta	Balipatna	Balianta	Balipatna
1	Getting agril. Info	R3 (15)	R3(25)	R1 (45)	R1(48)	R2(48)	R2(35)
2	Weather forecasting	R3(5)	R3(16)	R1(49)	R1(45)	R2(44)	R2(41)
3	To know about diff Govt prog.	R3(27)	R3(11)	R1(50)	R1(46)	R2(41)	R2(31)
4	Market info.			R1(41)	R1(44)	R2(36)	R2(38)
5	To know successful case study						
6	New technology and mechanization	R3(5)	R3(3)	R2(25)	R2(23)	R3(19)	R3(15)
7	For exchange info.	R1(60)	R1(60)				
8	For speedy com.	R1(60)	R1(60)				

R=Rank

Table 5. Distribution of respondents according to perception about the appropriateness, usefulness and constraints of using ICTS

Perception Index (PI)	Study Area	Index value			
		0-25	26-50	51-75	76-100
Appropriateness Index (AI)	Balianta	0	0	13 (21.66%)	47 (78.34%)
	Balipatna	0	5 (8.33%)	14 (23.33%)	41(68.34%)
	Total	0	5 (4.16%)	27 (22.5%)	88 (73.34%)
Usefulness Index (UI)	Balianta	0	0	23 (38.34%)	37 (61.66%)
	Balipatna	0	3 (5%)	24 (40%)	33 (55%)
	Total	0	3 (2.50%)	47 (39.16%)	70 (58.34%)
Constraints Index (CI)	Balianta	0	0	20 (33.33%)	40 (66.67%)
	Balipatna	0	1 (1.66%)	34 (56.67%)	25 (41.67%)
	Total	0	1 (0.01%)	54 ((45%)	65 (54.2%)

appropriateness of different ICTs in delivering farm information (78.34%, 68.34% and 73.34% respectively for Balianta, Balipatna block and Total respondents) followed by medium level of perception about appropriateness (21.66%, 23.33% and 22.5% respectively for Balianta, Balipatna block and Total respondents respectively). The results are found to similarity with the findings [12].

When taking perception of respondents about usefulness of different ICTs, it was found that majority of the respondents had high perception (61.66%, 55% and 58.34% respectively for Balianta, Balipatna and Total respondents) followed by medium level of perception (38.34%, 40% and 39.16% respectively for Balianta, Balipatna and Total respondents). The results are found to similarity with the findings [16,10].

In case of perception of constraints, it was found that majority of the respondents had high level of constraints perception in using different ICTs (66.67%, 41.67% and 54.2% respectively for Balianta, Balipatna and Total respondents) followed by medium level of constraints perception (33.33%, 56.67% and 45% respectively for Balianta, Balipatna block and Total respondents). Results are found to in line with the findings [14,19,20,10].

3.6 Ascertaining Association between Extents of Use of Different ICTs with Different Independent Variables

To ascertain the association between different independent and dependent variables multiple correlation, multiple regression and step wise regression was conducted. The results are presented below. Table 6 represents the results of multiple correlations. From the table it can be observed that age is having negatively significant correlation with level of knowledge of service providers while education and family education were found having positively significant correlation with extent of use of devices, extent of use for different purposes and appropriateness respectively. Social participation was found to have positively significant correlation with level of knowledge of devices, level of knowledge of services providers, extent of use of devices and usefulness.

Cosmopoliteness was found to have positively significant correlation with usefulness; while land holding had positively significant relationship with extent of use of ICTs for different purposes and visit outside own village with level of knowledge of devices.

Level of knowledge of devices was found having positively significant correlation with extent of use of devices, appropriateness and usefulness, while knowledge of service providers was found to have positive and significant correlation with extent of use of devices, appropriateness and usefulness.

Extent of use of devices and extent of use for different purposes were found to have positively significant correlation with appropriateness and usefulness.

3.6.1 Ascertaining association between extents of use of ICT devices with different independent variables

For ascertaining the association, multiple regressions and on the basis of R^2 value, stepwise regressions were conducted. Extents of use of ICT devices was taken as dependent variable (Y) while twelve independent variables, namely, Age(X_1), Education(X_2), Family education (X_3), Social participation (X_4), Cosmopoliteness (X_5), Visit outside own village (X_6), Level of knowledge of devices(X_7), Level of

Table 6. Correlation between socio-economic variables and their extent of use of different sources of information

Variables	Level of knowledge of devices	Level of Knowledge of service providers	Extent of use of devices	Extent of use as per purpose	Appropriateness	Usefulness
Age	0.098	-0.186**	-0.078	0.014	-0.010	-0.029
Education	-0.158	0.171	0.102*	0.146*	0.023	-0.047
Family education	0.138*	-0.004	-0.084	0.107*	0.230**	0.037
Social participation	0.161*	0.208**	0.130*	-0.062	-0.024	0.288**
Cosmopoliteness	0.054	0.091	0.064	-0.009	-0.020	0.275**
Land holding	0.049	0.108	0.042	0.208*	0.204	-0.109
Visit Outside	0.201**	-0.015	-0.108	0.046	-0.092	-0.055
Level of knowledge of devices			0.281**	-0.020	0.190*	0.144*
Knowledge of service providers			0.111*	-0.091	0.292**	0.277**
Extent of use of devices					0.105*	0.135*
Extent of use as per purpose					0.137*	0.196*

**≤0.05 significant @ 5% level, *≤0.01 significant @ 1% level

Table 7. Association between extents of use of ICT devices with different independent variables-Multiple regression analysis

Term	Coef	SE Coef	p-value
Constant	25.6	23.0	0.269
X_1	0.009	0.166	0.957
X_2	0.461	0.284	0.017**
X_3	-0.763	0.751	0.312
X_4	0.026	0.148	0.862
X_5	-0.065	0.128	0.611
X_6	2.83	2.56	0.041**
X_7	0.288	0.102	0.006*
X_8	0.0396	0.0722	0.584
X_9	0.160	0.111	0.031**
X_{10}	-0.059	0.122	0.631
X_{11}	0.106	0.128	0.411
X_{12}	1.73	3.88	0.657

*R^2=53.77%, R^2(Adjusted) = 41.66%, **≤0.05 significant @ 5% level, *≤0.01 significant @ 1% level*

Table 8. Association between extents of use of ICT devices with different independent variables-Step wise regression analysis

Term	Coef	SE Coef	P-value
Constant	39.6	12.9	0.003
X7	0.2856	0.0952	0.003*
X2	0.403	0.238	0.033**
X6	2.66	2.26	0.241
X8	-0.1741	0.0792	0.030**
X9	0.186	0.103	0.044**
R-sq 76.66 % R-sq(adj)= 68 %			

***≤0.05 significant @ 5% level, *≤0.01 significant @ 1% level*

knowledge of service providers (X_8), Extent of use of ICTs for different purposes (X_9), Appropriateness of ICTs (X_{10}), Usefulness of ICTs (X_{11}) and Land holding (X_{12}) were taken for consideration. The result of the multiple regressions is presented in Table 7.

From Table 7 it can be observed that only four independent variables, namely, Education(X_2), Visit Outside own village (X_6), Level of knowledge of devices(X_7) and Extent of use of ICTs for different purposes (X_9) had significant and positive association with the Extent of use of ICT devices. But the model only explained 41.66% (Adjusted R^2) of total variance. Hence, to have a more precise result step wise regression was conducted with forward selection method. Result is presented in Table 8.

The table showed that only five independent variables have been retained in the model out of which four variables, namely, Level of knowledge of devices(X_7), Education(X_2), Level of

knowledge about service providers (X_8) and Extent of use of ICTs for different purposes (X_9) were found to have significant and positive association with the Extents of use of ICT devices by the respondents. The model explained 68 % of the total variance (Adjusted R^2). These findings are found to have partial or full resemblance with the research work [11,21-24].

4. CONCLUSION

The present study revealed that the majority of the respondents were of middle age (41-50 years), having middle school level of education and primary level of family education. Majority of them were found living in joint families and characterised by having low social participation and semi-medium level of cosmopoliteness. Majority of them were having 0.51-1 ha of land; radio was found to be the most used ICTs followed by mobile and majority of the respondents were found visiting outside their own village once in a week.

In terms of knowledge of ICTs, knowledge of service providers and extent of use of ICTs; majority of the respondents were found to belong to semi-medium level followed by medium level.

When considering use of different ICTs for different purposes, majority of the respondents were found using radio for news and farming purposes; while TV was used for news and entertainment and mobile for communication and for getting farm information. Newspaper was found used by majority of the respondents for general and sports news while telephone (Land Line) and Farm Bulletin were found used for communication and for getting farm information respectively.

The study also revealed that respondents ranked radio, TV and mobile in first second and third position for getting agricultural information, for weather forecasting and to know about diff Govt. programme. For getting market information, radio was ranked first and TV was ranked second.

So far as the perception of the respondents concerned, the study revealed that respondents were having high perception about appropriateness of different ICTS, usefulness of different ICTs and also, they have perceived high level of constraints in using different ICTs.

The study revealed that independent variables like, age, education, family education, social participation, cosmopoliteness, land holding, visit outside own village, level of knowledge of devices, knowledge of service providers, extent of use of devices and extent of use of ICTs for different purposes had significant and positive correlation with many of the dependent variables like, level of knowledge of devices, Level of Knowledge of service providers, Extent of use of devices, Extent of use for different purposes, appropriateness and usefulness. Further, results of multiple regression showed that, education, visit outside own village, level of knowledge of devices and extent of use of ICTs for different purposes had significant and positive association with the extent of use of ICT devices. Results of step-wise regression showed that, level of knowledge of devices, education, level of knowledge about service providers and extent of use of ICTs for different purposes had significant and positive association with the extents of use of ICT devices by the respondents and the model explained 68 % of the total variance (Adjusted R^2).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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