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Extent of use of information communication technology by extension personnel of KVKs

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Abstract
The present investigation entitled "Extent of Use of Information Communication Technology by Extension Personnel of KVKs" was conducted with the objective to compare the extent of use of ICT by KVK extension personnel of Punjab and Karnataka states for acquiring & disseminating the knowledge. The study was conducted in selected KVKs of Punjab and Karnataka states. Fifty per cent of the KVKs under the jurisdiction of SAUs from each of the state were selected by simple proportionate random sampling method. Out of total 17 KVKs, Punjab was represented by nine KVKs, while out of total 30 KVKs, Karnataka was represented by 15 KVKs. 51 respondents from Punjab and 73 respondents of Karnataka KVKs were selected for the study, totaling to 124 respondents. Majority of the KVK extension personnel of both the states always used google search engine for acquiring knowledge under different purposes. Majority of the respondents of both the states always used telephone/ mobile phone, camera, SMS service system and whatsapp (social media application) for disseminating knowledge to farmers. Overall maximum number of ICT and tools were used for updating knowledge and giving advice to farmers. It was suggested that more trainings should be conducted for increasing the extent of use of ICT for reaching maximum number of population.

Keywords: information communication technology, *Krishi Vigyan Kendras*, extent of use, KVK extension personnel, acquiring and disseminating knowledge

Introduction
The Indian Council of Agricultural Research (ICAR) has a well-established *Krishi Vigyan Kendras* (KVKs) system which acts as bridge between information and input centre for farmers at district level. *Krishi Vigyan Kendras* (Farm Science Centre) are the innovative science based institutions having subject matter specialists from different disciplines of agriculture and allied sectors such as agronomy, horticulture, plant protection, soil science, agricultural engineering, home science etc These KVK extension personnel from different disciplines work for disseminating the latest teaching to the farming community and impart vocational training to the farmers and field level extension workers.

KVK extension personnel need to acquire knowledge on recent research findings for performing these tasks effectively as well as efficiently. At the same time, recommendations on innovative technologies should reach ultimate users in the best possible way. With the advent of new technologies and increase in basic infrastructural facilities like computer, mobile, electricity and internet, Information Communication Technologies (ICTs) can take care of the issue of reaching countless with the appropriate and timely agricultural technologies. ICTs effectively facilitate dissemination of knowledge among farmers, extension agents and other stakeholders. To enable better adoption of improved crop varieties, agricutural technologies, and agronomical operations, ICT act as an initiator. ICTs promotes convergence in agricultural extension by providing common platform for research and extension systems for sharing knowledge. The present study was conducted with the following objective:

Objective
- To compare the extent of use of Information Communication Technology (ICT) by KVK extension personnel

Research methodology
The study was conducted in selected KVKs of Punjab and Karnataka states. Fifty per cent of the KVKs under the jurisdiction of SAUs from each of the state were selected by simple proportionate random sampling method. Out of total 17 KVKs, Punjab was represented by nine KVKs, while out of total 30 KVKs, Karnataka was represented by 15 KVKs.

All the extension personnel working in selected KVKs (in position at the time of data collection) were taken as respondents for the purpose of the study. Out of nine selected KVKs of Punjab, 51 respondents and out of fifteen selected KVKs of Karnataka, 73 respondents were selected for the study, totaling to 124 respondents. Data was collected using structured interview schedule, then analysed using appropriate statistical tools.

Result and Dissuasion

Extent of use of ICT for acquiring knowledge

Table 1 discusses the extent of use of ICT by KVK extension personnel for acquiring knowledge for various purposes like updating knowledge, preparation of presentations and projects and writing research papers. It revealed that google search engine (MWS 1.88) and wikipedia (MWS 1.61) were always used by most of the respondents of Punjab while google search engine (MWS 1.93), KVK website (MWS 1.78) and KVK portal (MWS 1.62) were always used by majority of the Karnataka respondents for updating knowledge. It was further found that extent of use of virtual classes, KVK portal, KVK website and ICT kiosk for updating knowledge was significantly different in both the states.

The data in Table 1further discusses the use of ICT for preparing presentation. It revealed that majority of Karnataka (MWS 1.86) and Punjab respondents (MWS 1.80) always used google search engine for preparing presentations followed by wikipedia which was sometimes used by majority of the respondents of Punjab (MWS 1.43) and Karnataka respondents (MWS 1.48). Use of slide share and e-resources were significantly different in both the states.

Table 1further revealed that for writing research papers most of the respondents of Punjab (MWS 1.92) and Karnataka (MWS 1.66) always used google followed by wikipedia and research gate which was used sometimes by Punjab (MWS 1.35, 1.39) and Karnataka (MWS 1.38, 1.47) respectively. While comparing both the states, it was found that use of google, google scholar and e-resources were significantly different in both the states at one per cent level of significance. Punjab KVK extension personnel were using these ICTs tools more as compared to Karnataka state KVK extension personnel for writing research papers.

Regarding extent of use of ICTs for preparation of projects, it was found that majority of the Punjab (MWS 1.80) and Karnataka (MWS 1.81) respondents always used google search engine while majority was the Karnataka respondents sometimes used research gate (MWS 1.41). Use of e-resources and wikipedia were significantly different in both the states at one per cent level of significance.

It can be concluded that majority of the KVK extension personnel always used google search engine for acquiring knowledge. Extent of use of few of the ICTs was significantly more by Karnataka KVK extension personnel as compared to Punjab KVK extension personnel for acquiring knowledge. The findings are also supported by the results of Akpabio (2007) [2] and Mabe and Oledele (2012) [4] who reported that majority of extension officer had good knowledge about computer, internet and websites which were used for accessing agriculture information.

Table 1: Distribution of respondents according to their extent of use of ICTs for acquiring knowledge

Purpose	ICTs & Tools	Extent of use of ICTs								
		Punjab (51)				Karnataka (73)				
		Always	Sometimes	Never	MWS	Always	Sometimes	Never	MWS	t-stat
		F (%)	F (%)	F (%)		F (%)	F (%)	F (%)		
Updating knowledge	Google	45 (88.23)	6 (11.76)	--	1.88	68 (93.15)	5 (6.84)	--	1.93	0.94
	Wikipedia	32 (62.74)	19 (37.25)	--	1.61	39 (53.42)	33 (45.20)	1 (1.36)	1.48	1.29
	Research gate	21 (41.17)	28 (54.90)	2 (3.92)	1.35	33 (45.20)	30 (41.09)	10 (13.69)	1.30	0.42
	e-resources	11 (21.56)	35 (68.62)	5 (9.80)	1.10	33 (45.20)	28 (38.35)	12 (16.43)	1.27	1.41
	Videoconferencing	11 (21.56)	20 (39.21)	20 (39.21)	0.80	7 (9.58)	34 (46.57)	32 (43.83)	0.64	1.24
	Teleconferencing	4 (7.84)	21 (41.17)	26 (50.98)	0.61	13 (17.80)	32 (43.83)	28 (38.35)	0.78	1.37
	Virtual classes	8 (15.68)	16 (31.37)	27 (52.94)	0.61	29 (39.72)	26 (35.61)	18 (24.65)	1.14	3.70**
	KVK portal	16 (31.37)	34 (66.66)	1 (1.96)	1.27	47 (64.38)	25 (34.24)	1 (1.36)	1.62	3.48**
	KVK website	19 (37.25)	32 (62.74)	--	1.39	57 (78.08)	16 (21.91)	--	1.78	4.74**
	ICT kiosks	8 (15.68)	23 (45.09)	20 (39.21)	0.75	40 (54.79)	26 (35.61)	7 (9.58)	1.45	5.63**
Preparation of presentation	Google	40 (78.43)	11 (21.56)	--	1.80	64 (87.67)	8 (10.95)	1 (1.36)	1.86	0.75
	Wikipedia	24 (47.05)	27 (52.94)	--	1.43	47 (64.38)	16 (21.91)	--	1.48	0.39
	Research gate	21 (41.17)	21 (41.17)	9 (17.64)	1.20	19 (26.02)	39 (53.42)	15 (20.54)	1.04	1.20
	Slide share	17 (33.33)	--	34 (66.66)	0.66	37 (50.68)	32 (43.83)	4 (5.47)	1.45	3.47**
	Link din	17 (33.33)	10 (19.60)	24 (47.05)	0.82	19 (26.02)	39 (53.42)	15 (20.54)	1.05	1.64
	e-resources	13 (25.49)	25 (49.09)	13 (25.49)	0.96	23 (31.50)	42 (57.53)	8 (10.95)	1.21	2.02*
Writing research papers	Google	47 (92.15)	4 (7.84)	--	1.92	53 (72.6)	16 (21.91)	4 (5.47)	1.66	2.91**
	Wikipedia	24 (47.05)	21 (41.17)	6 (11.76)	1.35	41 (56.16)	21 (28.76)	11 (15.06)	1.38	0.23
	Research gate	24 (47.05)	23 (45.09)	4 (7.84)	1.39	35 (47.94)	34 (46.57)	4 (5.47)	1.42	0.29
	e-resources	15 (29.41)	31 (60.78)	5 (9.80)	1.20	41 (56.16)	25 (34.24)	7 (9.58)	1.47	2.30*
	Google Scholar	16 (31.37)	22 (43.13)	13 (25.49)	1.06	32 (43.83)	34 (46.57)	7 (9.58)	1.37	2.43*
Preparation of projects	Google	43 (84.31)	7 (13.72)	1 (1.96)	1.80	62 (84.93)	9 (12.32)	2 (2.73)	1.81	0.05
	Research gate	25 (49.01)	18 (35.29)	8 (15.68)	1.29	37 (50.68)	29 (39.72)	7 (9.58)	1.41	0.91
	e-resources	11 (21.56)	29 (56.86)	11 (21.56)	1.00	32 (43.83)	33 (45.2)	8 (10.95)	1.33	2.71**
	Wikipedia	12 (23.52)	26 (50.98)	13 (25.49)	0.98	34 (46.57)	34 (46.57)	5 (6.84)	1.40	3.48**

**Significant at 1 per cent level of significance, * Significant at 5 per cent level of significance, MWS- mean weighted score": Always-2, Sometimes-1, Never -0

Extent of use of ICTs for disseminating knowledge

The present study also explores the extent of use of ICT by KVK extension personnel for disseminating knowledge for various purposes like for preparing audio visual aids, contacting farmers, diagnosing and solving problems of farmers, demonstrating new technologies, for training farmers, giving advice to farmers and getting feedback from farmers.

Table 2 describes the extent of use of ICT for preparing audio-visual aids by KVK extension personnel. Most of the respondents of Punjab always used computer and internet (MWS 1.80) followed by google search engine (MWS 1.67). Most of the respondents of Karnataka also always used internet (MWS 1.89) computer (MWS 1.90) and google search engine (MWS 1.85) for preparing audio-visual aids. While comparing both the states, it was found that use of google and youtube were significantly different in both the states.

Data in Table 2 further revealed that most of the respondents of Punjab always used telephone/mobile for contacting farmers with the mean score 1.90 followed by WhatsApp groups (MWS 1.71). Majority of the respondents (70.58%) sometimes used radio for contacting farmers with the mean score 1.00 followed by 58.82 per cent respondents who sometimes used TV for contacting farmers with the mean score 0.96. More than half of the respondents each (52.94%) sometimes used email groups and facebook for contacting farmers with the mean score 0.86 and 0.82 respectively.

Most of the respondents (94.52%) of Karnataka also always used telephone/mobile for contacting farmers with the mean score 1.93 followed by 73.90 per cent respondents who always used WhatsApp groups with the mean score 1.66. Nearly half of the respondents (52.05%) sometimes used facebook (mean score 1.03) followed by 50.68 per cent respondents used e-mail groups (mean score 0.97), 47.98 per cent respondents used radio (mean score 1.29) and 46.57 per cent respondents sometimes used TV (mean score 1.22) for contacting farmers. While comparing both the states, it was found that telephone/ mobile was always used by KVK extension personnel of both the states for contacting farmers. Use of radio and TV are significantly different in both the states.

Regarding the extent of use of ICT for diagnosing problems of farmers, most of the respondents of Punjab always used camera as an ICT for diagnosing problems of farmers (MWS 1.82) followed by SMS service system (MWS 1.69) and WhatsApp (MWS 1.65). Majority of the respondents used email (MWS 0.92) also. In Karnataka also for diagnosing problems of farmers, most of the respondents (87.67%) always used SMS service system (MWS 1.85), followed by WhatsApp (MWS 1.75) and camera as an ICT (MWS 1.71). Nearly half of the respondents i.e. 46.57 per cent sometimes used email (MWS 0.96) also.

Table 2: Distribution of respondents according to their extent of use of ICTs for disseminating knowledge

Purpose	ICTs & Tools	Extent of use of ICTs								
		Punjab (51)				Karnataka (73)				
		Always f (%)	Sometimes f (%)	Never f (%)	MWS	Always f (%)	Sometimes f (%)	Never f (%)	MWS	t-stat
Preparing audio visual- aids	Google	35 (68.62)	16 (31.37)	--	1.67	63 (86.30)	10	--	1.85	2.23*
	Internet	41 (80.39)	10 (19.60)	--	1.80	67 (91.78)	6	--	1.89	1.26
	Computer	42 (82.35)	9 (17.64)	--	1.80	67 (91.78)	5	1	1.90	1.50
	Youtube	12 (23.52)	25 (49.01)	--	0.96	36 (49.31)	27	10	1.36	3.02*
Contacting farmers	Telephone /Mobile	46 (90.19	5 (9.8)	--	1.90	69 (94.52)	4 (5.47)	--	1.93	0.54
	Whatsapp group	36 (70.58)	15 (29.41)	--	1.71	54 (73.97)	24 (32.87)	5 (6.84)	1.66	0.48
	E-mail groups	9 (17.64)	27 (52.94)	15 (29.41)	0.86	17 (23.28)	37 (50.68)	19 (26.02)	0.97	0.86
	Radio	8 (15.68)	36 (70.58)	7 (13.72)	1.00	30 (41.09)	35 (47.94)	8 (10.95)	1.29	2.49*
	TV	10 (19.60)	30 (58.82)	11 (21.56)	0.96	28 (38.35)	34 (46.57)	11 (15.06)	1.22	2.05*
	Facebook	8 (15.68)	27 (52.94)	16 (31.37)	0.82	19 (26.02)	38 (52.05)	16 (21.91)	1.03	1.60
Diagnosing problems of farmers	Camera	44(86.27)	7(13.72)	--	1.82	56(76.71)	16(21.91)	1(1.36)	1.71	1.22
	Whats app	35(68.62)	16(31.37)	--	1.65	58(79.45)	14(19.17)	1(1.36)	1.75	1.15
	Email	9(17.64)	31(60.78)	11(21.56)	0.92	19(26.02)	34(46.57)	20(27.39)	0.96	0.30
	Expert system	6(11.76)	20(39.21)	25(49.01)	0.62	11(15.06)	15(20.74)	47(64.38)	0.50	0.16
	Video calling	9(17.64)	8(15.68)	34(66.66)	0.47	8(10.95)	26(35.61)	39(53.42)	0.55	0.60
Solving problems	Videos	25(49.01)	24(47.05)	2(3.92)	1.43	39(53.42)	17(23.28)	17(23.28)	1.29	1.04
	Telephone	44(86.27)	7(13.72)	--	1.84	60(82.19)	12(16.43)	1(1.36)	1.78	0.78
	Mobile/smartphone	40(78.43)	9(17.64)	2(3.92)	1.75	62(84.93)	9(12.32)	2(2.73)	1.82	0.87
	Youtube	8(15.68)	27(52.94)	16(31.37)	0.84	15(20.54)	34(46.57)	24(32.87)	0.88	0.26
	Facebook	9(17.64)	16(31.37)	26(50.98)	0.67	15(20.54)	36(49.31)	22(30.13)	0.90	1.77
	Whats app	28(54.90)	20(39.21)	3(5.88)	1.49	58(79.45)	14(19.17)	1(1.36)	1.75	1.15
	Expert system	6(11.76)	20(39.21)	25(49.01)	0.62	11(15.06)	15(20.74)	47(64.38)	0.50	0.16
	SMS service system	39(76.47)	10(19.60)	2(3.92)	1.69	64(87.67)	9(12.32)	--	1.85	1.85
Demonstrating new technologies	Videoconferencing	--	13(25.49)	38(74.50)	0.25	5(6.84)	18(24.65)	50(68.49)	0.38	1.58
	Television	9(17.64)	33(76.47)	9(17.64)	1.00	45(61.64)	17(23.28)	11(15.06)	1.47	3.70**
	Facebook	9(17.64)	19(37.25)	23(45.09)	0.73	21(28.76)	29(39.72)	23(31.5)	0.97	1.76
Training farmers	Power point presentation	41(80.39)	9(17.64)	1(1.96)	1.76	65(89.04)	8(10.95)	--	1.88	1.41
	Multimedia projector	34(66.66)	14(27.45)	3(5.88)	1.60	52(71.23)	18(24.65)	3(4.10)	1.67	1.34
	Video conferencing	--	--	51(100.00)	0.57	15(20.54)	12(16.43)	46(63.01)	0.58	0.05
	Videos	19(37.25)	30(58.82)	2(3.96)	1.33	53(72.6)	19(26.02)	1(1.36)	1.71	4.04**
Giving advice to farmers	Telephone / Mobile	50 (98.03)	1 (1.96)	--	1.98	69 (94.52)	4 (5.47)	--	1.95	0.98
	Whats app group	29 (56.86)	19 (37.25)	3 (5.88)	1.47	62 (84.93)	11 (15.06)	--	1.82	3.68**
	ICT kiosks	7 (13.72)	18 (35.29)	26 (50.98)	0.63	46 (63.01)	19 (26.02)	8 (10.95)	1.64	4.71**
	SMS service system	35 (68.62)	15 (29.41)	1 (1.96)	1.67	67 (91.78)	5 (6.84)	1 (1.36)	1.90	3.09**

	Expert system	4 (7.84)	42 (82.35)	5 (9.80)	0.98	32 (43.83)	25 (34.24)	16 (21.91)	1.22	1.98*
	Facebook	5 (9.80)	35 (68.62)	11 (21.56)	0.88	25 (34.24)	29 (39.72)	19 (26.02)	1.08	1.58
	Videos	1 (1.96)	40 (78.43)	10 (19.60)	0.82	37 (50.68)	31 (42.46)	5 (6.84)	1.44	6.09**
Getting feedback from farmers	Video conferencing	--	7(13.72)	44(86.27)	0.13	3(4.10)	15(20.54)	55(75.34)	0.41	0.97
	Teleconferencing	5(9.80)	15(29.41)	31(60.78)	0.49	32(43.83)	13(17.8)	28(38.35)	1.03	3.58**
	Whats app	25(49.01)	24(47.05)	2(3.92)	1.45	48(65.75)	18(24.65)	7(9.58)	1.56	0.96
	Emails	15(29.41)	19(37.25)	17(33.33)	0.96	31(42.46)	29(39.72)	13(17.8)	1.25	2.05*
	Facebook	3(5.88)	25(49.01)	23(45.09)	0.61	14(19.17)	38(52.05)	21(28.76)	0.90	2.48*

**Significant at 1 per cent level of significance, * Significant at 5 per cent level of significance, MWS- mean weighted score": Always-2, Sometimes-1, Never -0

Further table 2 explains the use of ICT and tools for solving problems of farmers. Most of the respondents of Punjab always used telephone (MWS 1.84) followed by mobile/smartphones (MWS 1.75) whereas Karnataka respondents always used mobile/smartphones (MWS 1.84) followed by telephone (MWS 1.78). Videos were also sometimes used by respondents for solving problems of farmers with the mean score 1.29.

Table 2 further illustrates that majority of the Punjab (MWS 1.00) and Karnataka (MWS 1.47) respondents sometimes used TV for demonstrating new technologies. Use of TV was significantly different in both the states. For training of farmers, most of the Punjab respondents always used power point presentation (MWS 1.96) and multimedia projector (MWS 1.60). Videos were also sometimes used for this purpose (MWS 1.33). Whereas most of the Karnataka respondents always used power point presentation (MWS 1.88) and videos (MWS 1.71) followed by multimedia projector (MWS 1.67). The results are in line with the findings pf that 94.11 per cent extension personnel had knowledge about power point presentation and they perceived it the best suited tool for transfer of technology.

Data in table 2 further revealed that most of the Punjab and Karnataka respondents always used mobile phones (MWS 1.98, 1.95) for giving advice to farmers. Punjab extension personnel always used SMS service system (MWS 1.67) and sometimes whatsApp group (MWS 1.47), expert system (MWS 0.98), videos (MWS 0.82) and facebook (MWS 0.88) for this purpose. Whereas majority of the Karnataka respondents always used SMS service system (MWS 1.90), WhatsApp group (1.82) and ICT kiosk (MWS 1.64) for giving advice to the farmers. Sometimes videos (MWS 0.82), expert system (MWS 1.22) and facebook (MWS 1.08) were also used by Karnataka respondents.

Data in Table 2 further explains the extent of use of ICT by KVK respondents for getting feedback from farmers. Majority of the Punjab respondents sometimes (MWS 1.45) while Karnataka respondents always used WhatsApp (MWS 1.56) for getting feedback from farmers. Further table revealed that the Karnataka respondents sometimes used teleconferencing (MWS 1.03) and e-mail (MWS 1.25) also for this purpose.

It can be concluded that majority of the respondents of both the states always used telephone/ mobile phone, camera, SMS service system and Whatsapp for disseminating information to farmers. The findings were in line with Matthews *et al* (2007) [3], Agwu *et al* (2008) [1] and Saravanan *et al* (2014) [7].

Conclusion

The results concluded that google search engine was always used by majority of the KVK extension personnel of both the states for acquiring knowledge for various purposes. For disseminating knowledge KVK extension personnel always used telephone/ mobile for contacting farmers. They were using camera, SMS service system and WhatsApp group always for diagnosing the problems and telephones and mobile/ smart phones were always used for solving the problems. The use of power point presentations was always used by KVK extension personnel of both the states for training farmers. Mobile, SMS service system and WhstsApp were always used by KVK extension personnel of both the states for giving advice to farmers. Whatsapp was always used for getting feedback from farmers. Overall maximum number of ICT and tools were used for updating knowledge and giving advice to farmers. It was suggested that more trainings should be conducted for increasing the extent of use of ICT for reaching maximum number of population.

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