Information & Communication Technology, ICAR Hqrs

Policy and Guidelines for Mobile Apps Development

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ICAR

INDIAN COUNCIL OF AGRICULTURAL RESEARCH (ICAR)
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Guidance

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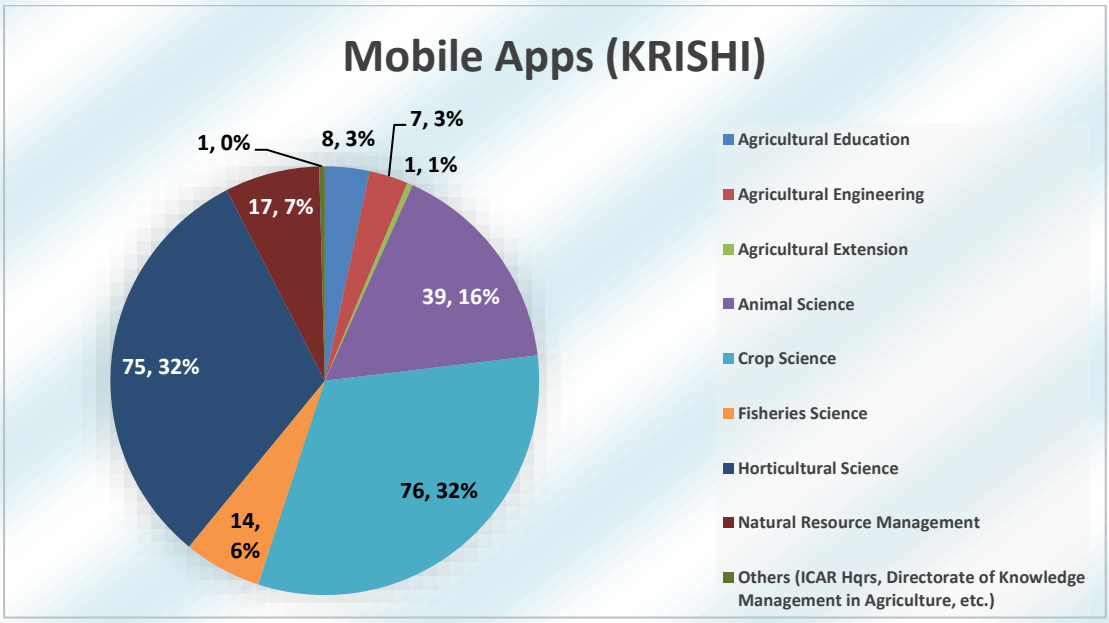
1. Introduction

Mobile phones are now essential for our daily activities due to development of extensive network connectivity even at remote location of the country. Consequently, large number of mobile applications (apps) have been developed by different ICAR institutes / organizations covering different domains / thematic areas / applications. The development of these mobile apps could not be appropriately planned and coordinated due to sudden digital information explosion and diversity of agricultural produce / commodity. These mobile apps are to be evaluated in terms of their usage, uniqueness, content management, technology standard compliance, navigational features, etc. Further, many apps developed by ICAR Institutes are available in play store for one commodity or crop that creates confusion to the users. For example, say Rice, there are 15 links retrieved by KRISHI Mobile Apps store and these are Rice Xpert, Paddy Seed Xpert, Mobile Rice IPM, Weather Light / Trap Catch, Rice IPM, Pest Predict–EMS, RKMP - Rice Innovations, RKMP Rice Crop FAQs, RKMP-M Learning, RKMP-Rice VOCS and many more such examples exists in various play stores. In this regard, an effort was made by ICAR to develop an integrated mobile app named as KISAAN (Krishi Integrated Solution for Agri-Apps Navigation) app which is a centralized gateway and provides access to different mobile apps by ICAR / KVKs under initiative of ICAR Research Data Repository for Knowledge Management (KRISHI Portal). This KISAAN app provides a single interface in multiple Indian languages for Indian Farmers to access agricultural knowledge ranging from cereal crops, horticulture, livestock, poultry, fisheries, dairy, natural resources, agricultural engineering, agricultural education and agricultural extension based on various categories. This mobile app has also been developed in twelve Indian Languages. This is being further upgraded to newer version with more features.

In addition to the KISAAN, ICAR also made an effort to create “Mobile App Gallery” in KRISHI (Agricultural Knowledge Resources and Information System Hub for Innovations) portal developed by ICAR-IASRI, New Delhi. The team has made an effort to collate all the apps developed by National Agricultural Research & Education System (NARES) including KVKs and other organizations as well. The basic information related to these apps are operating system, language, subject matter division, name of the institute and its type (ICAR / SAU / KVK / Others), rating, number of downloads / Installs, version, date of creation / publication including brief description of the app, URLs etc. Archival of APK files is also being done on KRISHI Portal Mobile App Gallery. The search facility has been provided based on keywords, SMD, Institute, Language, Organization Type (ICAR / SAUs / KVK / Others). Currently, there are 338 mobile apps

uploaded in the mobile app gallery which includes mobile apps from ICAR Institutes, SAUs, KVKs and Other Government Agencies. The KISAAN App is being developed on this database of Mobile App Gallery through web services.

Five basic problems are being noted in mobile apps developed by different ICAR institute i.e., (i) multiple apps for same commodity / produce, (ii) static nature of contents in many apps, (iii) older technologies, (iv) need for further enriching content quality and (v) require of including feedback mechanism. Thus, there is an urgent need to make an integrated and coordinated effort while developing these apps so that one app for one crop or commodity may be developed by these organizations making integrated efforts. This will also help in providing precise, accurate and timely information to the users especially farmers to increase production, productivity and profitability. The appropriate mechanism needs to be put in place for addressing feedback and resolving issues submitted by the end users. The mobile apps will revolutionize the way an Indian farmer avails information on advanced agricultural technologies, seeds, varieties, and livestock as per their requirement leveraging the current accelerated Internet and smart phone penetration in our country.



The main purpose of this document is to create a technical guideline and made accessible the required information related to standards, security, guidelines and policy for development of mobile apps and its implementation in the specified crop or commodities including release procedure.

2. One app for one commodity / produce

To avoid confusion among the stakeholders, there is need to develop one app for one commodity / produce and the contents should be fetched from the centralized database or repository or content management system. This will help the developer in updating the contents in apps. This integrated app is the need of the hour as all required information will be fetched from the single platform or window. This approach will also help in installing and testing different mobile apps based on desired purpose of the app. Later, these single commodity apps can be further integrated as a larger window framework similar to unified mobile app as UMANG (Unified Mobile App for New-age Governance) developed by Ministry of Electronics and Information Technology (MeitY), Government of India. Therefore, coordinated effort is required from the Subject Matter Division (SMD) level with respect to unified contents, features and services.

The app should also send time to time advisory and alerts to the registered users and capable of doing and providing various required services based on crop / commodity / produce. Payment gateway option may also be included in case of purchase of any material from the concerned institute or government agency.

The exchange of information should be an integral part of the system which will help in developing the new module and its integration with the existing app in the following manner

- Information extracted from existing apps, if stored in database otherwise need to be stored in easy to use format.
- Exchanging the information through the use of APIs / Web services in JSON / XML format
- Filter, refine and display the useful and important information / knowledge in an easy to visualize manner.
- Validation of content / information from subject matter institutions
- Integration of validated information in app and its upgradation.

3. Guideline for development of new mobile apps in ICAR

i. Proposal to develop a mobile app need to be submitted to respective SMD of the Institute. The proposal must carry objective, purpose, need, data source,

feature / services included, related available apps or web resources, provision for future update / upgrade / user feedback and technology platform. After assessing the requirements of the app, the same can be forwarded to ADG (ICT) for technical approval of the Council related to development environment, data exchange, APIs development and usages, web services, etc. Required technical guidance and support will be provided by ICT Unit, ICAR for its development and implementation.

ii. Integration and compilation of contents may be coordinated at SMD level by mentioning verified and structured contents as followed by POUR (Perceivable, Operable, Understandable and Robust) Principle.

iii. All the required services must be accessible from single and unified interface and should be able to integrate with the KISAAN app and relevant information may also be added to KRISHI portal for improved access and search for popularization and wider accessibility.

iv. It is expected that a mobile app will follow the standard template, format, responsive user interface for display of contents, guidelines, industry standard user interface guidelines and other regulations including all the security compliance.

v. Facility of alerts and advisory need to be included in the mobile apps and feedback mechanism will also be incorporated including its redressal mechanism.

vi. Search option need to be incorporated to provide shortcuts or alternate ways to access the desired modules using suitable keywords. This feature will enhance the usefulness, visibility and accessibility of the developed app.

vii. Demonstration of technology, planting material, showcasing of technology, payment gateway etc. may be incorporated through small multimedia enabled audio and video clips for easy to understand and self-explanatory manner. AR / VR technologies, wherever required may also be incorporated for this purpose.

viii. Developed app should provide the feature related to exchange of contents or service from other mobile apps which will be helpful and useful in developing unified mobile apps.

ix. After the development of app, the developed APK will be submitted to ICT Unit, ICAR for its evaluation and archival. The evaluation will be done by the respective subject matter experts (three to five) for contents and user interface including expected user experience based on the developed

proforma. The subject matter experts and other stakeholders may be taken from the ICAR institutes or KVKs or any other relevant officials. This activity will be carried out by the ICT Unit of ICAR in coordination with SMDs of ICAR.

x. Plans and guidelines for updates and upgrades need to be incorporated in the document.

xi. The APK file of developed mobile apps is need to be submitted to Mobile App Gallery for archival before its final release including related documents.

4. Technology stacks for development

In order to develop mobile apps, open source technology is to the used until and unless commercial products are absolutely required with suitable justification. Some of the useful technical open source tools are as follows

- Operating System: Linux distribution
- API manager: WS2
- Load Balancer: NGINX
- Web server: Apache
- Database: SQLite / Postgres and Redis for cache and session management
- Message Borker: Kafka
- Log management: Graylog
- Notifications: Firebase
- Analytics: Tomcat, AngularJS, Postgres

5. Guidelines and Standards

Mobile has become an integral part of everyone's daily life. The ease of access and right information at right time can be accessible at any point of time. With the introduction of 4G technology and upcoming 5G technology provides ample opportunity to make use of mobiles. This is likely to lead explosion of mobile app developments along with its technological advancements. Therefore, it is expected from the developers / organizations to follow the standards and guidelines issued by the industry and Government of India from time to time to avoid the failure and unexpected crash of application. The input required for various agricultural activities / operations including placement of orders for machinery, purchase of seed / fertilizers, controlling the operations for fertilizers and other chemicals, etc. The mobile app development must consider the incorporation of platform specific features with assistive technologies, which has been a boon for a person with disabilities to provide the rich and useful experience to farmers and other

stakeholders. The developed apps must follow the below mentioned guidelines provided by Government of India

- Guidelines for Indian Government Websites (GIGW 2009),
- National Policy on Universal Electronics Accessibility (2013) and
- Rights of Persons with Disabilities Act 2016.

The standards for development of mobile apps has been put into place by World Wide Web Consortium (W3C) and is being also modified time to time with respect to update of technology and platform (https://www.w3.org/standards/). Right now, Web Content Accessibility Guidelines (WCAG) 2.0 are available for Android, iOS, and BBC (https://www.w3.org/WAI/standards-guidelines/).

6. Mobile Accessibility Guidelines

Mobile apps are not platform specific as many operating systems exists for mobile devices such as Google's Android, Apple iOS, Windows mobile, etc. This requires specific use of technology or features to enable in a particular or specific devices. Both the popular mobile OS i.e., Android and iOS operating systems provide standardized mechanisms to communicate various attributes of a User Interface element (UI Element) such as the label associated with a UI element, role of a UI element (such as whether it is a button or an edit control) and state information (such as whether it is disabled, checked or pressed) This mechanism is called Accessibility Application Programming Interface (API). Some of these accessibility settings are as follows

- **Colours**: Contrast between background and foreground text, invert colours, large text, grayscale, mono audio, etc. and it should be eyes friendly which are easy and smooth for working with long hours on phone. Thus, it is expected that specific design guidelines need to follow by the designers (https://www.w3.org/WAI/WCAG21/quickref/#use-of-color).
- **UI Labels:** Each element must have an accessible label as contents i.e., text, image, button and any other controls. The embedding of text into images as labels need to be avoided as it will be difficult for the screen readers. Following points should be considered in creating labels:
    - Precise and clear
    - Updated labels with additional feature
    - Role and state information
    - Label strings should be localised as per languages

- **Role information:** The elements should be clearly defined and identified with its look and feel which will also be helpful for persons with disability.
- **Grouping of related labels:** The related elements may be grouped together for ease of understanding and interpretation. This will avoid unnecessary stress on fingers and eyes.
- **Scrolling:** The vertical and horizontal scrolling may be avoided and the design should be responsive.
- **Caption**: Text captions for audio and video contents or alternate text may be mentioned in case of low bandwidth.
- **Flashing content:** The contents should not have flashed more than three times per second.
- **Notifications and Error Messages:** The messages and notifications should be precise and clear with self-contained meaning to the users and also ensured that these notifications and messages are audible as well as can be read by screen readers.

7. General Guidelines

i. **Testing:** The app must be tested with various types of devices for its responses with respect to different screen sizes and versions.

ii. **Performance:** Features should be avoided which takes longer time to respond and download and also consumes lot of power.

iii. **App Icons and other images:** Following links may be used for images and icons specific to important mobile operating systems i.e., Android (https://developer.android.com/distribute/best-practices/launch/store-listing.html) and **iOS (**https://developer.apple.com/app-store/insights/).

iv. **Specific contents:** The limited information with clear meaning need to be mentioned in the apps to avoid cluttering of contents on the screen

   a. Name of app, logo and Ministry / Department Name and address should be on first screen and the same may be avoided in other subsequent screens.

   b. A link on first page clearly mention for “About the App” that specify brief description, version / build of the app and various other information such as contact information, ownership details, copyright notice, terms of use, privacy statement etc. and ICAR Data Use License.

v. **Security:** The apps should be undergone with security audit and the backend APIs through Cert-in empanelled vendors. Following points may be considered

   a. Wherever possible sensitive information must not be stored be on the mobile.

   b. Follow specific Security practices for **Android** (https://developer.android.com/training/articles/security-tips.html) **and IOS (**https://developer.apple.com/security/**).**

   c. Only HTTPS settings will be permissible for APIs access.

vi. **Data Capture for key elements:** The data capture for sensitive information related to Aadhar, Voter-ID, PAN, Vehicle numbers, employee-id, beneficiary-id, etc. may be read as QR CODE (2D Barcode) to avoid errors in typing and extra precaution should be taken in making use of e-KYC details.

vii. **Application Development & Re-Engineering Guidelines (**https://www.meity.gov.in/writereaddata/files/Application_Development_Re-Engineering_Guidelines_0.pdf) may also be referred to ensure development of Common Application Software (CAS) and to obviate duplication of efforts

8. Hosting of Apps and APIs

i. Preferably, mobile apps and APIs should be hosted at ICAR Data Centre for providing 24*7 accessibility and availability.
ii. Security Audited APIs MUST be hosted in highly secure data centres equipped with firewalls and other security features.
iii. Hosting service provider MUST provide 24*7 accesses to APIs and backend databases.
iv. Appropriate disaster recovery site should be configured at different geographical location to avoid disruption of service in case of natural or manmade disasters.
v. API hosting service provider should also provide technical support and help to the owner of the application.
vi. Adequate security measures must be built in the API to detect and discourage unauthorized use of the APIs.

9. Privacy Policy

Privacy policy should be a carefully written with clear message with respect to information collection, if any through the app. It should also clearly state the mobile resources app which is being used during the usage of various services being provided by the apps.

- **Consent:** The consent of the users must be taken prior to use any information related to specific users in any form. Generally, the personal information should not to be disclosed to the third party to avoid any conflict.
- **Changes:** The Privacy Policy must be updated from time to time with recorded reasons whatever it may be. It should also be placed somewhere in the app preferable links on first page itself. The same can also be provided on website associated with the apps with corresponding hyperlink.
- **Contact us:** The end user can contact the team through specific dedicated email address for any query or clarification. This hosting organization should keep track / check on this email address and addresses the concern raised by the users.
- **Any other:** The details of the other information or concerns related to Privacy Policy can be accessed from MeitY, Govt. of India guidelines.

10. IPR and Copyrights

The developed mobile applications hosted on any Play stores should essentially follow the IPR and Copyrights guidelines. An appropriate copyright notice will help to avoid infringement / plagiarism of the app as well as its associated APIs. The statements can be uploaded on respective play stores and before launching an app, get the app Name and logo protected through IPR (http://ipindia.gov.in/index.htm). The support specific to various platform can be further accessible from https://support.google.com//legal/troubleshooter/1114905 for Android and Apple from https://www.apple.com/legal/internet-services/itunes/appstorenotices/#?lang=en. The sample Copyright Policy Statement can be prepared as follows:

"Name Logo and design of the app is subject to copyright protection. The content may be viewed / downloaded without requiring any specific prior permission. Any other proposed use of the material is subject to the approval of (Name of Department). Application for obtaining permission should be made to (email address of the concerned Department)."

The ICAR Guidelines for Intellectual Property Management & Technology Transfer / Commercialization (Revised 2018) may be taken in account wherever required.

11. Terms and Conditions

Terms & Conditions shall address the Ownership Details, Usage Policy of Content, Legal Aspects. The user must not use the app for any of the following activities:

- Unlawful, malicious or criminal activity;

- Defamatory, harassing or threatening activity.
- Create disruption in service for other users of the app;
- Do not use the App in a way that may damage the App, the Service or the systems and security.

Sample Terms and Conditions can be prepared as follows and it can be changed or modified as per institute mandate and policy.

"The App is designed, developed and maintained by (Name of the institute prefixed with ICAR), Ministry of Agriculture and Framer's Welfare, Government of India. Though all efforts have been made to ensure the accuracy and currency of the content on this app, the same should not be construed as a statement of law or used for any legal purposes. In case of any ambiguity or doubts, users are advised to verify/check with the Department(s) and/or other source(s), and to obtain appropriate professional advice.

Under no circumstances will this institute/organization be liable for any expense, loss or damage including, without limitation, indirect or consequential loss or damage, or any expense, loss or damage whatsoever arising from use, or loss of use, of data, arising out of or in connection with the use of this app. These terms and conditions shall be governed by and construed in accordance with the Indian Laws. Any dispute arising under these terms and conditions shall be subject to the jurisdiction of the courts of India.

You must not attempt to extract any source code from the App, disassemble it or make any derivative versions, or attempt to interrupt or decipher the transmissions between the App and our systems.

The App and all copyright, database rights, and other intellectual property rights related to it belong to us."

12. Feedback and Evaluation

POUR principle is being widely used to determine the functional accessibility of any IT based application

- **Perceivable:** A user can identify content and interface elements through senses such as visual, touch and sound etc. Some of these examples are naming of labels in the form, color combination of text and background, chart without caption of data, unclear scanned PDF/images, etc.

- **Operable:** A user is able to easily use various mouse/ touch screen controls for easy navigation in selecting various menus/sub-menus options including different keyboard short-cuts.

- **Understandable:** The developed application must clearly follow design and usage patterns including formatting. Some of the examples are uniformity in terms of menus/sub-menus options in an easy to navigate manner, mouse an over may specify the meaning of difficult terms/acronyms, form validation with suitable message as pop-up or inline help etc.

- **Robust:** It means that application should follow compliant standards. The compliance will provide the application to work in appropriate technologies, platform, operating systems, browsers, etc. Some of these examples are cross browsers working, screen reader access, plug-in to play support, auto-fill options, ways to interact with different type of inputs, etc.

In this regard, these Mobile Apps needs to be independently evaluated with respect to their developmental objective, contents, features and target stakeholder(s). This will also help the users to receive the feedback in terms of relevance, quality, user friendliness, content adequacy, usefulness, etc. for further improvements. The apps will be evaluated by receiving the feedback from at least five subject matter experts and possibly some stakeholders for contents and usefulness, relevance, quality and user friendliness. The feedback will be compiled and shared with the developing organization for its improvement so that it can be effectively and adequately used by the designated stakeholders. The feedback and evaluation form is enclosed in Annexure I & II respectively.

13. Security Guidelines for Mobile Applications

i. Mobile applications must be security audited through CERT-in empanelled vendors initially and after every updates, whenever, new module/page is added or modified or even with update in any functionality. Mobile Security Testing Guide (MSTG) is also accessible from https://owasp.org/www-project-mobile-security-testing-guide/.

ii. Incorporate security requirements at the design, development and implementation phases.

iii. The custom database must be placed in hardened server and patches may be updated time to time. These patches may be related to operating system or database itself.

iv. Whenever any new release with respect to development kits, all components should be hardened and recompile the app with latest stable (non-vulnerable) release.

v. Effectively monitor the performance related to transaction and logs to keep check on any intrusion or attack by configuring system logs on server, e.g. Web-Access logs, Application Logs, Security Logs, etc.

vi. Ensure proper backups of application, database, logs on a segregated server (preferable on disconnected server or physical storage devices)

vii. Whenever any suspicious/intrusion incident is detected, kindly block the site for financial transaction and report incident to Incident handling agency.

viii. The detailed guideline and checklist issued by NIC mentioned in annexure.

The detailed guidelines can be accessed from https://web.guidelines.gov.in/.

14. Important Resources and Validation Tools

- Validation tools are used to check the code for standards compliance. HTML validators, CSS validators and broken link (or dead links) checkers are few such tools. Some validation tools are;
  - http://validator.w3.org **(HTML)**
  - http://jigsaw.w3.org/css-validator **(CSS)**
  - http://www.cssportal.com/css-validator **(CSS)**, http://validator.w3.org/checklink **(Broken Links)**
- Accessibility compliance of the Website may be checked from;
  - http://wave.webaim.org/
  - http://www.etre.com/tools/accessibilitycheck/
  - http://www.stanford.edu/group/accessibility/cgi-bin/accessibilitychecker/checker/index.php
- The Guidelines for Indian Government Websites website complies with World Wide Web Consortium (W3C) Web Content Accessibility Guidelines (WCAG) 2.0 level AA.
- The following links may be visited for assistive technologies and screen readers to address various impairments like Visual, Hearing, Mobility, and Learning impairment
  - www.freedomscientific.com
  - www.spectronicsinoz.com
  - www.gwmicro.com

- The information related to different screen readers, such as JAWS, NVDA, SAFA, Supernova and Window-Eyes can be accessible from:
    - Non Visual Desktop Access (NVDA) from http://www.nvda-project.org/ (free)
    - System Access To Go from http://www.satogo.com/ (Free)
    - Hal http://www.yourdolphin.co.uk/productdetail.asp?id=5 (Commercial)
    - JAWS http://www.freedomscientific.com/jaws-hq.asp (Commercial)
    - Supernova http://www.yourdolphin.co.uk/productdetail.asp?id=1 (Commercial)
    - Window-Eyes http://www.gwmicro.com/Window-Eyes/ (Commercial)

15. Template for Mobile apps

i. The mobile app should be developed by following responsive design and scrolling option need to be avoided as far as possible.

ii. Front page must have at least three panels and these panels should mention the following

   a. Top panel will contain the logo of ICAR, Indian Council of Agricultural Research, Name of the App in bilingual (Hindi and English)

   b. Centre panel will contain the description by showing the background image of related operations/field/farm/promising technology etc. This section may also contain brief options for further browsing of the app. Option for language will also be put into this panel, if the mobile apps support multiple languages.

   c. Bottom panel need to specify the name of the department and the Institute including its complete address. The links for social media URLs may also be provided in this section including copyrights, terms & conditions, disclaimer, contact us, etc.

iii. All figures, images, pics, line diagrams should be original to avoid any copyrights issue. The pictures should be light in size by applying suitable image and video compression mechanism.

iv. All contents need to be verified and relevant source of the information may also be indicated wherever required.

Annexure I

Feedback and Evaluation Form

The feedback form has been designed in the form of small questionnaire. It is expected that the evaluators will download the app and use the app. Based on ones experience, the rating on five point scale (5=Excellent, 4=Very Good, 3=Good, 2=Fair, 1=Poor, 0=Not useful or NA) can be given based on its Relevance, Quality, User friendliness, Content adequacy and Usefulness on five point scale. The information of the evaluators will be kept confidential and not shared with anyone. The form has been divided in five sections excluding basic information.

Basic Information:

1. Name of the Mobile App:
2. Name(s) of the developer(s):
3. Name and address of the developer Institution/organization:
4. Name of the evaluator(s):
5. Name and address of the evaluator's Institution/organization:
6. Designation of respondent:
7. Subject Discipline of respondent:
8. Gender:
9. Age:
10. Frequency of usage:
11. Period of evaluation (In terms of usage):
12. Target User(s) of the app:
    a. Farmers
    b. Students
    c. Extension professionals
    d. Vendors/Retailers
    e. Researchers
    f. Research Organizations
    g. Research mangers
    h. Policy makers
    i. Others (Specify)

The app can be assessed based on its Relevance, Quality, User friendliness, Content adequacy and Usefulness on five point scale (5=Excellent, 4=Very Good, 3=Good, 2=Fair, 1=Poor, 0=Not useful or NA). This will determine the rating of mobile apps with respect to different attributes/functionalities and expected usage.

S. No.	Attribute/Functionality	Rating
A.	**User friendliness**	
1.	**Easy to use/operate** Easy to learn or understand.	
2.	**User interface** App design makes the **user's** interaction as simple and efficient .	
3.	**Presentation and design** The content in the mobile app is presented beautifully	
4.	**User Navigation and controls** Different choices of input are available for selecting or choosing the desired options.	
B.	**Contents**	
5.	**Flow of information** Mobile app is easy to navigate allows users to find the content they're looking for much faster.	
6.	**Adequacy of contents** Mobile app has sufficient content that is needed for purpose desired knowledge	
7.	**Uniqueness of contents with respect to other sources** Mobile app has unique features that other app don’t have.	
8.	**Updation of contents** Apps is updated on a regular basis to keep them fresh and functioning.	
9.	**Redundant and duplicate contents** There is repetitive ness and duplication of content in the mobile app.	
C.	**Usefulness**	
10.	**Useful to designated stakeholders** Mobile app is useful to stakeholders for all practical purpose.	
11.	**Ability to communicate and convey information** Mobile app is successful to communicate information to users.	
12.	**Extent of two way communication** Mobile app is successfully to transmit information both ways.	

13.	**Purposefulness for target users** The mobile app is able to address desired purpose of the user	
D.	**Relevance**	
14.	**Relevancy with respect to developers** The mobile app has Relevancy with respect to developers.	
15.	**Relevance with respect to stakeholders** The mobile app has relevance with respect to stakeholders.	
16.	**Updates Frequency** It has provision of making updates	
17.	**Too much or insufficient information** Information content in this app is crisp and easy to understand.	
E.	**Quality**	
18.	**Searching facility** Search option available for desired contents.	
19.	**Responsiveness** The goal of responsive design is to detect the visitor's screen size and orientation and change the layout accordingly.	
20.	**Response time** Response time is the time taken by the mobile app to respond to the server.	
21.	**Feedback Mechanism** The mobile app has feedback mechanism for encouraging users to directly state what they think about the app.	
22.	Sending alerts on updates	
23.	Frequently ask questions (FAQs)	
24.	Query/feedback redressal time	
F.	**Others** *(Pl. provide your suggestions for its improvement)*	
25.	Suggest additional features/information which needs to be incorporated	
26.	Suggest features/information which are not relevant and is to be discarded	
27.	Any other relevant observation	
28.	Overall observation about the Mobile App	
29.	Will recommend to designated stakeholders/users	

This will determine the rating of mobile apps with respect to different attributes/ functionalities and expected usage.

Annexure-II

Users Feedback Questionnaire for ICAR Mobile Apps

The feedback Questionnaire has been designed in the form of small questionnaires. This questionnaire is to be filled by the surveyor based on the response from the user. Based on users experience, the rating on five point scale (5=Excellent, 4=Very Good, 3=Good, 2=Fair, 1=Poor, 0=Not useful or NA) can be given at the end. User can be farmer, researcher, policy maker or any other stakeholder of the Mobile App. Separate form will be filled for each of the mobile apps of ICAR used by the user.

Basic Information of User:

1. Name:
2. Fathers Name:
3. Address:
4. Gender:
5. Age:
6. Primary occupation:

Basic Information of surveyor:

1. Name:
2. Address:
3. Designation:

S.No.	Question	Response
1.	Are you using any mobile app developed by ICAR?	Yes/No
2.	If answer for question 1 is **YES**, then please list the name(s) of mobile app(s). If answer is **NO** then no need fill the following sections	
3.	Name of the Mobile App	
4.	Average per week frequency of access the above mobile app.	

S.No.	Question	Response
Please rate the above Mobile App on scale of 1 to 5 with respect to following attributes		
User friendliness		
1.	**Easy to use/operate** Easy to learn or understand.	
2.	**User interface** App design makes the **user's** interaction as simple and efficient .	
3.	**Presentation and design** Content in the mobile app is presented beautifully.	
4.	**User Navigation and controls** Different choices of input are available for selecting or choosing the desired options.	
Contents		
5.	**Flow of information** Mobile app is easy to navigate allows users to find the content they're looking for much faster.	
6.	**Adequacy of contents** Mobile app has sufficient content that is needed for purpose concerned knowledge.	
7.	**Redundant and duplicate contents** Repetitiveness in the content in the mobile app.	
Usefulness		
8.	**Useful to designated stakeholders** Mobile app is useful	
9.	**Purposefulness for users** Solve the purpose of the user	
Quality		
10.	**Searching facility** Search option available for desired contents	
11.	**Response time** Response time is the time taken by the mobile app	
12.	**Feedback Mechanism** Mobile app has feedback mechanism	
13.	Sending alerts on updates	
14.	Frequently ask questions (FAQs)	
15.	Overall observation about the Mobile App	
Others (Pl. provide your suggestions for its improvement)		
16.	Suggest additional features/information which needs to be incorporated	
17.	Suggest features/information which are not relevant and is to be discarded	
18.	Any other relevant observation	

Annexure III

INDIAN COUNCIL OF AGRICULTURAL RESEARCH
NEW DELHI

Format for approval of developed mobile apps/ Web application from Council.

Please provide information in the given format for approval of mobile app/ web application by the Council.

Basic Information:

1. Name of the Mobile App/ Web Application:
2. Name(s) of the developer(s):
3. Universal Resource Locator (Url) address:
4. Name and address of the developer Institution (s)/organization(s):
5. Target User(s) of the Mobile app/ Web application (Please circle relevant option(s):
    a. Farmers
    b. Students
    c. Extension professionals
    d. Vendors/Retailers
    e. Researchers
    f. Research Organizations
    g. Research mangers
    h. Policy makers
    i. Others (Specify)

S.No.	Items	Description	Comments of SMD
1.	Objective(s) for development of the application		
2.	Specific need / services supported / provided by the application		
3.	Brief content details (not more than 50 words)		
4.	ICT/IT technology used as front end with justification		
5.	ICT/IT technology used as back end with justification		
6.	The proposed hosting platform.		
7.	Availability of other digital resources available for this purpose, if any.		
8.	Availability of additional and unique information in the developed application		
9.	Other available digital resources/applications of ICAR which may be integrated with this application to make it complete from users perspective.		
10.	Expected number of users of developed application		
Please rate your app/ application on five point scale (5=Excellent, 4=Very Good, 3=Good, 2=Fair, 1=Poor, 0=Not useful or NA) with respect to following attribute			

S.No.	Items	Description	Comments of SMD
User friendliness			
1.	**Easy to use/operate** Easy to learn or understand.		
2.	**User interface** App/ application design makes the **user's** interaction as simple and efficient .		
3.	**Presentation and design** The content in the mobile app/ application is presented beautifully		
4.	**User Navigation and controls** Different choices of input are available for selecting or choosing the desired options.		
Contents			
5.	**Flow of information** It is easy to navigate allows users to find the content they're looking for much faster.		
6.	**Adequacy of contents** It has sufficient content that is needed for purpose desired knowledge		
7.	**Uniqueness of contents with respect to other sources** It has unique features that other app don't have.		
8.	**Up-dation of contents** It needs updating on a regular basis to keep them fresh and functioning.		
9.	**Redundant and duplicate contents** There is repetitive ness and duplication of content in the mobile app.		
Usefulness			
10.	**Useful to designated stakeholders** It is useful to stakeholders for all practical purpose.		
11.	**Ability to communicate and convey information** It is successful to communicate information to users.		
12.	**Extent of two- way communication** It is successfully to transmit information both ways.		
13.	**Purposefulness for target users** The mobile app is able to address desired purpose of the user		

Relevance			
14.	**Relevancy with respect to developers** It has Relevancy with respect to developers.		
15.	**Relevance with respect to stakeholders** It has relevance with respect to stakeholders.		
16.	**Updates Frequency** It has provision of making updates		
17.	**Too much or insufficient information** Information content in this is crisp and easy to understand.		
Quality			
18.	**Searching facility** Search option available for desired contents.		
19.	**Responsiveness** The goal of responsive design is to detect the visitor's screen size and orientation and change the layout accordingly.		
20.	**Response time** Response time is the time taken by the mobile app to respond to the server.		
21.	**Feedback Mechanism** The mobile app has feedback mechanism for encouraging users to directly state what they think about the app.		
22.	Sending alerts on updates	Yes/No	
23.	Frequently ask questions (FAQs)	Yes/No	
24.	Query/feedback redressed time	Yes/No	

Name and signature of the developer

Name and signature of the Director

Comments of SMD:

Name and signature of Head of SMD