

TECHNOLOGY LED KNOWLEDGE INTERVENTION THROUGH DEVELOPMENT OF SMARTPHONE APP ON PACKAGE OF PRACTICES OF FODDER CROPS, RANGE GRASSES AND LEGUMES

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SUMMARY

Technological advancements are being quickly adopted by agriculturists in the recent years. MAT (Mobile Applications Technology or m-learning) is no longer considered a techno-centric trend and is attractive for those interested in devices and technologies. The m-learning engages learners in learning activities without them being restricted to a physical location. Applications (apps) are the fundamental feature of android or mobile devices. This paper briefly reviews the development of multilingual android phone based application named “Fodder and Range grasses” enriched with importance and cultivation practices of 57 crops which includes fodder crops, range grasses and legumes. As this app is entirely free of charge, uses web interface and is compatible in all smartphones, will provide a unique opportunity for technology led quick knowledge intervention on cultivation and management of important fodder crops, range grasses and range legumes.

Key words : Fodder crops; Mobile Applications Technology; Range grasses; Range legumes; Smartphone

Livestock is an integral component of Indian agriculture contributing 26% of agricultural Gross Value Added (GVA) of the country. Agriculture as such contributes 16.4% of countries GVA (Economic survey, 2017-18). With 2.29% of the world land area, India is maintaining about 512.1 million numbers of the world’s livestock population (GOI, 2017). Further, the country is holding about 56.7% of world’s buffaloes, 12.5% cattle, 20.4% small ruminants, 2.4% camel, 1.4% equine, 1.5% pigs and 3.1% poultry (IGFRI Vision, 2050). Livestock population is projected to rise at the rate of 1.23% in the near future (Datta, 2013). However, as per an estimate, India needs 400 million tonnes of milk by 2050. Even though we are first in milk production, our productivity (1538 kg/year) is far low than world average (2238 kg/year). Besides this, the country faces a net deficit of 35.6% green fodder, 10.95% dry crop residues and 44% concentrate feed ingredients (IGFRI Vision, 2050).

Certainly, there is an urgent need to enhance the fodder productivity to meet out milk demand of the country and feed and fodder requirement for such a large livestock population. The important source of fodder supply in India is from crop residues, cultivated fodder and fodder from common property resources like forests, permanent pastures and grazing lands.

India owing to limited production of fodder crops from arable lands, as, arable land is mainly used for food and cash crops. The major fodder crops being cultivated in arable land under non-*leguminous* fodder are maize, oats, sorghum, bajra, hybrid Napier, Guinea grass, para grass etc. and under leguminous fodder are berseem, cowpea, lucerne, velvet bean and others. Adaptation of forage species particularly perennial species and trees (agroforestry) has ability to produce more forage yield under changing climate and reduces the ill-effect of climate change through carbon

sequestration (Dhyani *et al.*, 2010; Kaul *et al.*, 2010; Rai and Palsaniya *et al.*, 2011).

Considering the limitations of traditionally cultivated fodder crops, it is necessary to introduce various non-traditional fodder crops along with cultivated fodder crops. There are many hardy grasses which can be grown on wastelands without irrigation. Such species can be established on field bunds, home gardens and along farm boundaries. So, to disseminate the scientific package of practices of fodder crops, range grasses and legumes to the intended beneficiaries. A smartphone application named Fodder and Range grasses covering all the necessary package of practices of fodder crops, range grasses and legumes is developed for various stakeholders for enhanced productivity.

MATERIALS AND METHODS

There are many hardy grasses and legumes that can grow on wastelands, forest lands, community lands without much of interventions and can give year around fodder supply called as rangeland grasses. Information about these range fodders are crucial to any grass and forage enthusiasts (Fig.1). Efforts has been made to collect and organize all the scattered information of cultivated fodder, range grasses and range legumes in single digital platform in form of mobile application (Pandey and Roy, 2011; Kumar *et al.*, 2016 and Roy *et al.*, 2018). The study was carried out in two phases: I-Information gathering from different sources about cultivation and management of different cultivated and rangeland fodder crop; II-Development of smartphone app and uploading the information gathered about cultivation and

management. The development and tests were carried out at ICAR-Indian Grassland and Fodder Research Institute, Jhansi (UP).

Development of Smartphone Application

Forage and range grass mobile app basically provides all sort of information regarding cultivation aspect of fodder crops, range grasses and range legumes in user friendly interface.

It also gives information regarding the varieties available and their seed availability information to end users it effectively summarizes fifty seven forage crop species in one platform in bilingual mode and can serve as an IT tool for identification of forage crop species through attractive photographs of forage crop species.

This mobile application has been developed in android platform for smartphones and android tablets in order to provide important information on cultivated and rangeland fodder crops to various stakeholders present globally. The latest version of Android Studio tool (version 3.2.1) is used for development smartphone app. The content of the apps is organized and managed by WordPress version 5.0.2. WordPress is a free and open-source content management system based on PHP language and MySQL database. WordPress is used as it has several interactive features such as easy to use, responsive design, multiple theme options, plugins for customization, woo commerce for e-commerce, self-hosted platform, community support, eco-friendly, easy social media integration' outstanding scalability etc. Similarly, PHP is a server-side scripting language designed for Web development and MySQL is an open

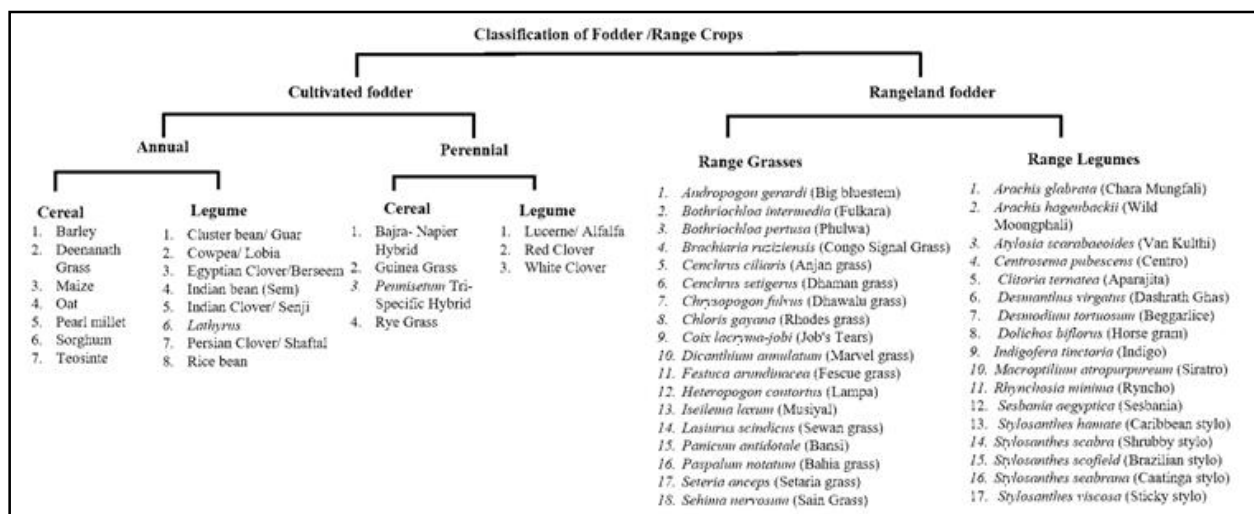


Fig. 1. Flow chart of fodder/range crops.

source relational database management system. PHP is a popular programming language which is utilized to build dynamic web applications with MySQL database connections. PHP has advantage likewise cross-platform, ease of use, speed, open source and powerful library support, stable etc.

RESULTS AND DISCUSSION

The Android smartphone and tablet app has been developed and published on the Google Play platform. Fodder and Range Grass Mobile application can be accessed, retrieved and downloaded by using the link <https://play.google.com/store/apps/details?id=com.frgapp.app>. It is also a web application (web app) which is accessible through web browsers action URLs- <http://rmsi.in/foddercrops-app/>. The structure and working of both the developed applications is same.

The app is covering a wide range of cultivated fodder, range grasses and legumes. A total of 57 crops have been described which could be broadly divided into cultivated fodder and rangeland fodder. Further, cultivated fodder is bifurcated into annual and perennial fodder likewise, rangeland fodder is

bifurcated into range grasses and legumes. Again, annual cultivated fodder and perennial cultivated fodder is further classified into cereal and legumes fodder.

Under cultivated fodder, a total of 22 crops have been described in context of their name of family, common name, a brief morphological description, other uses, nutritional composition, copping season, soil type and land preparation, sowing time, seed rate, seed treatment, recommended fertilizer dose, weeds and their control measure, diseases and their control measure, pests and their control measures, harvesting/ yield along with a table wherein, important varieties with their year of release, releasing institute, its yield, special character and seed availability information and a quality photograph is given. Similarly, under rangeland fodder, a total of 35 crops have been covered and each one of them is provided with all the above information.

This database will be helpful for making smart land and crop use decisions with respect to fodder production and management. Alternate land and crop use options that strengthen resilience and diminish vulnerability of human societies are fundamental to livelihood improvement .The land use option will be

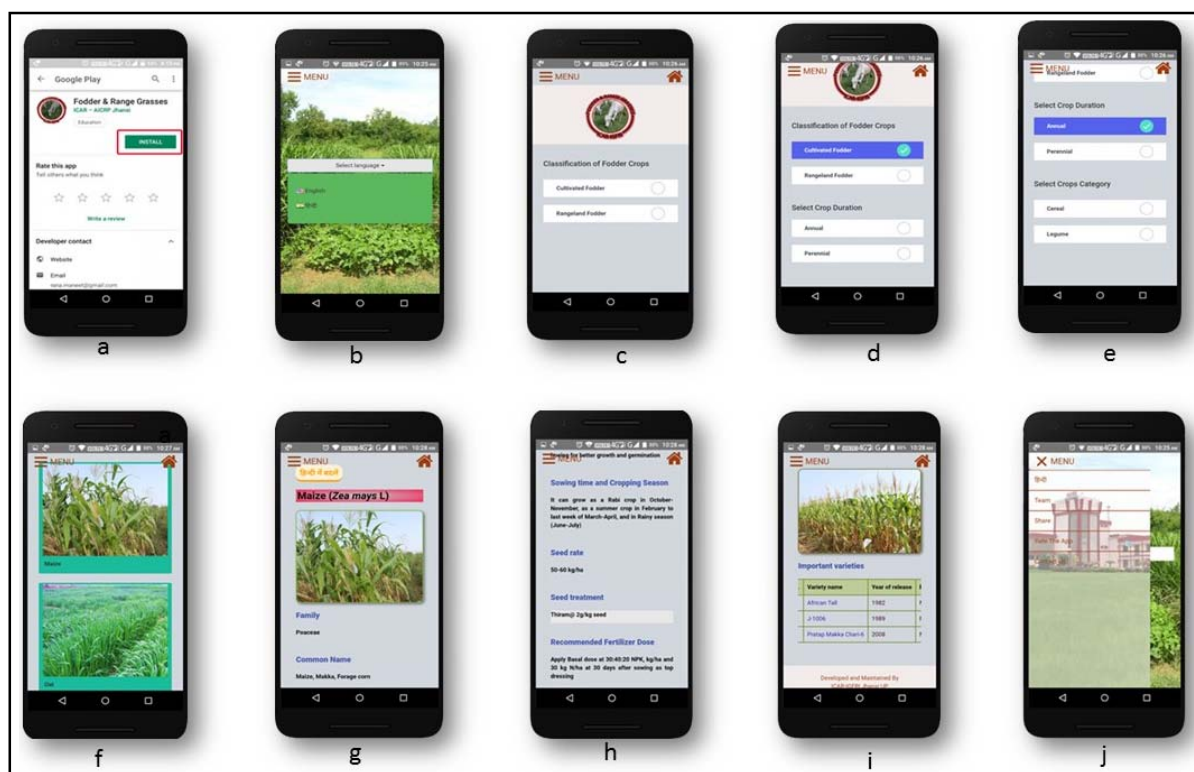


Fig. 2. Installation and working of the App (a) Installation of app view (b) Language select view (c) Type of fodder (d) Select category (e) Select crop duration (f) Select crop (g) Details about crop (h) Management practices (i) Important varieties (j) Side bar menu with necessary details.

able to potentially support livelihood improvement through simultaneous production of food, fodder and firewood as well as mitigation and adaptation to climate change. Transformation of knowledge into technical venture has been done through development of smartphone application. Availability of smartphone application will extend its reach to remote areas of country hence benefitting the concerned stakeholders like farmers, students, researchers and NGOs.

CONCLUSION

An app called Fodder and Range grasses is developed for Android smartphones and tablets. The content of both the apps is organized and managed by WordPress version 5.0.2. The Android app allows to obtain information on cultivated fodder and rangeland fodder in context of their cultivation and management. It is available free of charge, operates on androids smartphones through a web interface. This application will be useful for farmers, students, research scholar, scientist, NGOs etc. providing quick access to cultivation and management of fodder crops.

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