

Review Article

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## Animal Husbandry Mobile Apps in Transformation Livestock Farming

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### ABSTRACT

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Mobile apps are potential digital tools which can be effectively utilized to reach Animal Husbandry information to a large number of farmers within a short period of time. They can be used to enhance farm income and productivity through providing correct information, better input and farm management, easy marketing and linkage with government agency for policy support to farmer etc. However, there are challenges like low smart phone penetration rate in rural India, variable internet connectivity, low digital literacy among farmers, limited availability of agricultural information in local languages etc.

### Introduction

Livestock sector plays a multi-faceted role in socio-economic development of rural households and contributes about 4.2 percent to the Gross Domestic Product and 25.6 percent to the Agricultural Gross Domestic Product in the country. Empirical evidences indicate that livestock is an important component of the Animal Husbandry system, providing an additional source of income and nutritional cover to a large section of the rural population, particularly the disadvantaged and poor households (Rao *et al.*, 2003; BIRTHAL and Ali, 2005; Ravikumar and Chander, 2006;

Singh *et al.*, 2007). The distribution of livestock, as a liquid asset to poor families, is more egalitarian as compared to land (Taneja and BIRTHAL, 2004). However, the recent trend in livestock sector growth suggests that in order to meet the emerging demand for livestock based products, both in domestic and global markets, there is a need to reorient the production system by enhancing the efficiency and creating quality consciousness. Adhiguru *et al.*, (2009) argued that farmers are not only looking for various information sources for carrying out their production and marketing tasks efficiently but also for ensuring delivery of safe and quality products to the consumers.

ICT based information delivery to livestock sector can significantly improve the quality of decision-making in livestock farming system (Tiwari *et al.*, 2010).

Among ICTs, there has been increasing use of mobile phones which is changing the agricultural communication process. The introduction of mobile phones has resulted in new services and applications. There are an increasing number of mobile apps providing access to Animal Husbandry and allied sector information. A mobile application is software on a mobile phone handset or tablet computer that enables a user to access specific information; make payments and other transactions; send messages; etc. The application (app) is downloaded (for free or for payment) from a wireless network from an online store and may require a live connection to function effectively. The main advantages of mobile apps for farmers are, easy to access information on farmers mobile. The information is stored in the mobile handset itself for easy access. The scope of mobile apps in offering EAS (Extension and Advisory service) is tremendous during COVID-19 pandemic situation. This will enable the farmers for self management of livestock in such disaster situations.

Government of India has launched a number of web and mobile based applications for dissemination of information on Animal Husbandry related activities, free of cost, for the benefit of farmers and other stakeholders. There are apps also developed by Veterinary institutions, private sector, NGOs. These apps are disseminating information from livestock research and extension to farmers and other stakeholders and facilitating exchange of information among stakeholders. The documentation of these mobile apps and evaluating their content and features is of immense importance for the farmers as it will provide guidance in choosing suitable app for

getting need based reliable information for livestock farming. This will also assist the mobile app developers in designing new app or in modifying and improving their exiting mobile apps.

Farmers can easily access these portals through smart mobile phones. Through internet, they can get the information pertaining to current market prices and many crop related facts that can provide them more benefits. Worldwide most of the farmers, even in remote places have mobile phones. They can be equipped with targeted agricultural advice through text and voice message even without internet access. These timely delivered advisories at low cost provide improvement in farmers' practices for increasing agricultural income. Mobile apps also provide help to Government and private sector for distributing subsidies to farmers or managing the inventories of emergency input stocks in government storage facilities. It encouraged more data sharing between the private and public sectors in service of the public good. Country like India, where diversification in languages exists among farming community; regionally suitable mobile apps with information on soil, climate, nutrient management and input price could be effectively helpful (Inwood & Dale, 2019). Youth farmers' generations are very much stick to their mobile phones and therefore, information can very quickly reach through digital applications (Rose *et al.*, 2016).

### **Widely used Mobile Apps in the field of Animal Husbandry**

Mobile apps for Animal Husbandry help in acquiring knowledge and decision making. A range of mobile apps have been developed for the benefit of the farmers for improving information transfer efficiency and significantly impact Livestock business. This study categorized some of the commonly

available Animal Husbandry apps for different purposes such as

**Mobile Apps were categorized into the following in Animal Husbandry**

Central Government & State Government developed Apps

Indian Council of Agriculture Research (ICAR) developed Apps

State Agricultural Universities (SAU's) developed Apps

Dairy Co-operatives & Private Organizations developed Apps

**Following are the major advantages of using mobile apps in Animal Husbandry sector**

Provides advisories through text and video messaging services.

Access to information on Management, Nutrition, etc which directly affect agricultural decision making.

Market intelligence through providing data on prices, quality and quantity of arrival of various agricultural commodities at different markets across the country.

Online monitoring and management of /livestock/poultry/fisheries etc is possible through mobile apps.

Provision of feedback from farmers and other stakeholders in different fields of agriculture.

Information on important machineries and equipments are easily accessible using these apps.

Mobile apps can be utilized for delivering services offered by Government to farmers in the form of inputs and subsidy distribution.

It can be used in management of irrigation systems in large field, sensor based farming, identification of different soil types etc.

It facilitates effective farm management by recording data, analyzing it and giving suitable recommendation for different enterprises.

**Challenges of Using Mobile Apps in India**

It requires skilled manpower to operate mobile apps for which digital literacy is must.

Diversity in language across the country makes it difficult to make apps in local languages.

The content requires translation at many stages which may affects its quality and reduce acceptability among farming community.

Better internet speed is required for using mobile apps. Many times in rural area, internet connection and speed is a major issue which affects mobile application services.

Farmers are not adequately equipped with required knowledge & skill to use mobile apps.

Many mobile apps are charging money for its use, therefore farmer may not afford paid services through these apps.

Lower adoption and use of mobile apps by farmer is a huge challenge and government must enhance digital literacy in order to resolve it.

**Table.1** Central Government & State Government developed Apps

Institute	S. No	App Name	LOGO	LINK
Ministry of Fisheries Animal Husbandry and Dairying, New Delhi - National Dairy Development Board, Gujarat	1.	e-GOPALA		<a href="https://play.google.com/store/apps/details?id=coop.nddb.pashuposhan&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=coop.nddb.pashuposhan&amp;hl=en_IN&amp;gl=US</a>
	2.	NDDDB AGR		<a href="https://play.google.com/store/apps/details?id=com.iviewlabs.nddbbar&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=com.iviewlabs.nddbbar&amp;hl=en_IN&amp;gl=US</a>
	3.	Dairy Husbandry Practices (Hi)		<a href="https://play.google.com/store/apps/details?id=coop.nddb.guidetoanimalhusbandry_hindi&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=coop.nddb.guidetoanimalhusbandry_hindi&amp;hl=en_IN&amp;gl=US</a>
	4.	Dairy Husbandry Practices		<a href="https://play.google.com/store/apps/details?id=coop.nddb.guidetoanimalhusbandry&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=coop.nddb.guidetoanimalhusbandry&amp;hl=en_IN&amp;gl=US</a>
	5.	Journey of Milk		<a href="https://play.google.com/store/apps/details?id=com.nddb.jom&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=com.nddb.jom&amp;hl=en_IN&amp;gl=US</a>
	6.	Story Of Milk A Cow's Tale (en)		<a href="https://play.google.com/store/apps/details?id=org.nddb&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=org.nddb&amp;hl=en_IN&amp;gl=US</a>
	7.	Story Of Milk A Cow's Tale (hi)		<a href="https://play.google.com/store/apps/details?id=org.nddb.storyofcow.hindi&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=org.nddb.storyofcow.hindi&amp;hl=en_IN&amp;gl=US</a>
	8.	INAPH In-Breeding Check		<a href="https://play.google.com/store/apps/details?id=coop.nddb.inaph.in_breeding_check&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=coop.nddb.inaph.in_breeding_check&amp;hl=en_IN&amp;gl=US</a>
	9.	Pashu Poshan Kisan Rath		<a href="https://play.google.com/store/apps/details?id=coop.nddb.pashu_poshan&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=coop.nddb.pashu_poshan&amp;hl=en_IN&amp;gl=US</a>
National Information Centre, New Delhi	1.	Kisan Rath		<a href="https://play.google.com/store/apps/details?id=com.velocis.app.kishan.vahan&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=com.velocis.app.kishan.vahan&amp;hl=en_IN&amp;gl=US</a>

**Table.2** Indian Council of Agriculture Research developed (ICAR) Apps

Institute	S. No	App Name	LOGO	LINK
Indian Council of Agriculture Research, New Delhi	1.	KISAAN		<a href="https://play.google.com/store/apps/details?id=net.mobile.icar.kisaaan">https://play.google.com/store/apps/details?id=net.mobile.icar.kisaaan</a>
	2.	ICAR Technologies		<a href="https://play.google.com/store/apps/details?id=gov.krishi.icar.technologyrepository">https://play.google.com/store/apps/details?id=gov.krishi.icar.technologyrepository</a>
Central Institute for Research on Goats, Makhdoom	1.	Bakrimitra (ICAR - CIRG)		<a href="https://play.google.com/store/apps/details?id=com.cirg.bakrimitra&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=com.cirg.bakrimitra&amp;hl=en_IN&amp;gl=US</a>
	2.	Bakrimitra (ICAR - CIRG)		<a href="https://play.google.com/store/apps/details?id=com.cirg.goatfarming&amp;hl=ta&amp;gl=US">https://play.google.com/store/apps/details?id=com.cirg.goatfarming&amp;hl=ta&amp;gl=US</a>
	3.	AI in Goats(बकरी गर्भाधान सेतु)		<a href="https://play.google.com/store/apps/details?id=com.goat_incimation&amp;hl=en_US&amp;gl=US">https://play.google.com/store/apps/details?id=com.goat_incimation&amp;hl=en_US&amp;gl=US</a>
	4.	CIRG - Goat Farming (बकरी पालन / வெள்ளாடு/ ఆడు)		<a href="https://play.google.com/store/apps/details?id=com.cirg.goatproducts&amp;hl=ta&amp;gl=US">https://play.google.com/store/apps/details?id=com.cirg.goatproducts&amp;hl=ta&amp;gl=US</a>
Directorate of Poultry Research, Hyderabad	1.	ICAR DPR App		<a href="https://play.google.com/store/apps/details?id=com.webfarmatics.icar&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=com.webfarmatics.icar&amp;hl=en_IN&amp;gl=US</a>
National Institute on Veterinary Epidemiology and Disease Informatics, Bangalore	1.	AINP-GIP		<a href="https://play.google.com/store/apps/details?id=info.nivedi.gip&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=info.nivedi.gip&amp;hl=en_IN&amp;gl=US</a>
	2.	Leptospirosis		<a href="https://play.google.com/store/apps/details?id=com.nivedi.leptospirosis&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=com.nivedi.leptospirosis&amp;hl=en_IN&amp;gl=US</a>
	3.	LDF		<a href="https://play.google.com/store/apps/details?id=info.androidhive.lfd&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=info.androidhive.lfd&amp;hl=en_IN&amp;gl=US</a>
Central Institute of Research on Buffaloes, Hisar	1.	ICAR-CIRB Bhains Janan (Buffalo Reproduction) App		<a href="https://play.google.com/store/apps/details?id=com.cirb&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=com.cirb&amp;hl=en_IN&amp;gl=US</a>
	2.	ICAR-CIRB Bhains Poshahar (Buffalo Nutrition) App		<a href="https://play.google.com/store/apps/details?id=com.cirb.buffaloposhahar&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=com.cirb.buffaloposhahar&amp;hl=en_IN&amp;gl=US</a>

	3.	ICAR-CIRB Bufelth		<a href="https://play.google.com/store/apps/details?id=com.cirb.buffhealth&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=com.cirb.buffhealth&amp;hl=en_IN&amp;gl=US</a>
<b>Indian Veterinary Research Institute, Izathnagar</b>	1.	IVRI-Pig Farming App(शूकर पालन)		<a href="https://play.google.com/store/apps/details?id=com.icar.ivri.pig_app&amp;hl=hi&amp;gl=US">https://play.google.com/store/apps/details?id=com.icar.ivri.pig_app&amp;hl=hi&amp;gl=US</a>
	2.	IVRI- Waste Management Guide App		<a href="https://play.google.com/store/apps/details?id=com.icar.ivri.iasri.wmapp&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=com.icar.ivri.iasri.wmapp&amp;hl=en_IN&amp;gl=US</a>
	3.	IVRI - Artificial Insemination App		<a href="https://play.google.com/store/apps/details?id=com.ivri.iasri.aiaapp&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=com.ivri.iasri.aiaapp&amp;hl=en_IN&amp;gl=US</a>
	4.	IVRI- Biosecurity and Biosafety (Jaiw Suraksha) App		<a href="https://play.google.com/store/apps/details?id=com.icar.ivri.iasri.biosecurity&amp;hl=en&amp;gl=US">https://play.google.com/store/apps/details?id=com.icar.ivri.iasri.biosecurity&amp;hl=en&amp;gl=US</a>
	5.	IVRI-Dairy Manager App (डेयरी मैनेजर)		<a href="https://play.google.com/store/apps/details?id=com.ivri.iasri.dmappp&amp;hl=hi&amp;gl=US">https://play.google.com/store/apps/details?id=com.ivri.iasri.dmappp&amp;hl=hi&amp;gl=US</a>
	6.	IVRI-Disease Control (रोग नियंत्रण एप्प) App		<a href="https://play.google.com/store/apps/details?id=com.icar.ivri.iasri.diseasecontrolapp&amp;hl=hi&amp;gl=US">https://play.google.com/store/apps/details?id=com.icar.ivri.iasri.diseasecontrolapp&amp;hl=hi&amp;gl=US</a>
	7.	IVRI - Landlly Pig App		<a href="https://play.google.com/store/apps/details?id=com.ivri.iasri.lanldlypig&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=com.ivri.iasri.lanldlypig&amp;hl=en_IN&amp;gl=US</a>
	8.	IVRI-Animal Reproduction App(पशु प्रजनन)		<a href="https://play.google.com/store/apps/details?id=com.mraaapsjd.akmu.pasujanapp&amp;hl=hi&amp;gl=US">https://play.google.com/store/apps/details?id=com.mraaapsjd.akmu.pasujanapp&amp;hl=hi&amp;gl=US</a>
	9.	बाजरा संकर नेपियर(B-N Hybrid): कम लागत पर हरा चारा		<a href="https://play.google.com/store/apps/details?id=in.nic.ivri.agapp&amp;hl=hi&amp;gl=US">https://play.google.com/store/apps/details?id=in.nic.ivri.agapp&amp;hl=hi&amp;gl=US</a>
	10.	IVRI - Pig Ration (शूकर राशन ) App		<a href="https://play.google.com/store/apps/details?id=icar.iasri.ivri.pigratation&amp;hl=hi&amp;gl=US">https://play.google.com/store/apps/details?id=icar.iasri.ivri.pigratation&amp;hl=hi&amp;gl=US</a>
	11.	IVRI-Technologies & Services App तकनीकी एवम सेवाएं		<a href="https://play.google.com/store/apps/details?id=com.icar.ivri.iasri.ivritechnologiesandservicesapp&amp;hl=hi&amp;gl=US">https://play.google.com/store/apps/details?id=com.icar.ivri.iasri.ivritechnologiesandservicesapp&amp;hl=hi&amp;gl=US</a>
	12.	IVRI-Vaccination Guide App(टीकाकरण गाइड)		<a href="https://play.google.com/store/apps/details?id=com.icar.ivri.iasri.vcguideapp&amp;hl=hi&amp;gl=US">https://play.google.com/store/apps/details?id=com.icar.ivri.iasri.vcguideapp&amp;hl=hi&amp;gl=US</a>

	13.	IVRI-Veterinary Clinical Care App पशु चिकित्सा सेवा		<a href="https://play.google.com/store/apps/details?id=com.icar.ivri.iasri.veterinaryclinicalcareapp&amp;hl=hi&amp;gl=US">https://play.google.com/store/apps/details?id=com.icar.ivri.iasri.veterinaryclinicalcareapp&amp;hl=hi&amp;gl=US</a>
	14.	IVRI-Zoonoses App (ज़ूनोसेस एप्प)		<a href="https://play.google.com/store/apps/details?id=com.icar.ivri.iasri.zoonosesapp&amp;hl=en_US&amp;gl=US">https://play.google.com/store/apps/details?id=com.icar.ivri.iasri.zoonosesapp&amp;hl=en_US&amp;gl=US</a>
	15.	पशुओं में परजीवी नियंत्रण		<a href="https://play.google.com/store/apps/details?id=in.res.ivri.parainfo&amp;hl=hi&amp;gl=US">https://play.google.com/store/apps/details?id=in.res.ivri.parainfo&amp;hl=hi&amp;gl=US</a>
	16.	Organic Livestock Farming		<a href="https://play.google.com/store/apps/details?id=in.ivri.res.olfapp&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=in.ivri.res.olfapp&amp;hl=en_IN&amp;gl=US</a>
ICAR-Indian Statistical Research Institute, New Delhi	1.	KVK Mobile App		<a href="https://play.google.com/store/apps/details?id=com.icar.iasri.kvkapp&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=com.icar.iasri.kvkapp&amp;hl=en_IN&amp;gl=US</a>
	2.	NIBLD		<a href="https://play.google.com/store/apps/details?id=net.iasri.nibld&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=net.iasri.nibld&amp;hl=en_IN&amp;gl=US</a>
Central Sheep and Wool Research Institute, Avikanagar	1.	Avimitra		<a href="https://play.google.com/store/apps/details?id=com.variablesoft.avimitra&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=com.variablesoft.avimitra&amp;hl=en_IN&amp;gl=US</a>
KVK Karur, Karur	1.	Cattle Fertility App		<a href="https://play.google.com/store/apps/details?id=com.designexperts.cow_fertility&amp;hl=en&amp;gl=US">https://play.google.com/store/apps/details?id=com.designexperts.cow_fertility&amp;hl=en&amp;gl=US</a>
National Research Centre on Meat, Hyderabad	1.	Meat App		<a href="https://play.google.com/store/apps/details?id=in.gov.icar.nrcmeat&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=in.gov.icar.nrcmeat&amp;hl=en_IN&amp;gl=US</a>
National Research Centre on Mithun, Nagaland	1.	Mithun-mitra App		<a href="https://appagg.com/android/education/mithun-mitra-34175867.html?hl=en">https://appagg.com/android/education/mithun-mitra-34175867.html?hl=en</a>
National Institute on Animal Nutrition and	1.	Feed Chart App		<a href="https://play.google.com/store/apps/details?id=com.borne.root.nianp_feedchart&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=com.borne.root.nianp_feedchart&amp;hl=en_IN&amp;gl=US</a>

Physiology, Bangalore	2.	ICAR-NIANP Smart Tools		<a href="https://apkpure.com/icar-nianp-smart-tools/com.feedformulation">https://apkpure.com/icar-nianp-smart-tools/com.feedformulation</a>
National Institute on High Security Animal Diseases, Bhopal	1.	Bird Flu se Suraksha App		<a href="https://play.google.com/store/apps/details?id=com.action.birdflu&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=com.action.birdflu&amp;hl=en_IN&amp;gl=US</a>
Indian Grassland and Forage Research Institute - All India Coordinated Research Project, Jhansi	1.	Fodder & Range Grasses		<a href="https://play.google.com/store/apps/details?id=com.frgapp.app&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=com.frgapp.app&amp;hl=en_IN&amp;gl=US</a>
	2.	Forage India		<a href="https://play.google.com/store/apps/details?id=inforage_india.res.httpaicrponforagecrops.forageindia&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=inforage_india.res.httpaicrponforagecrops.forageindia&amp;hl=en_IN&amp;gl=US</a>
	3.	Forage Seed		<a href="https://play.google.com/store/apps/details?id=com.aicrpforgeseed.app&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=com.aicrpforgeseed.app&amp;hl=en_IN&amp;gl=US</a>
National Bureau of Animal Genetic Resources of India, Karnal	1.	Animal Genetic Resources of India (AGRI-IS) App		<a href="https://play.google.com/store/apps/details?id=localhost.angrapp&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=localhost.angrapp&amp;hl=en_IN&amp;gl=US</a>
Central Avian Research Institute, Izathnagar	1.	ICAR CARI App		<a href="https://play.google.com/store/apps/details?id=com.cari.egg">https://play.google.com/store/apps/details?id=com.cari.egg</a>
National Research Centre on Equine, Hisar	1.	Infoequine App		<a href="https://play.google.com/store/apps/details?id=info.ncrc&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=info.ncrc&amp;hl=en_IN&amp;gl=US</a>
National Research Centre on Pig, Assam	1.	Swine App		<a href="https://play.google.com/store/apps/details?id=com.icar.actech.swineapp&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=com.icar.actech.swineapp&amp;hl=en_IN&amp;gl=US</a>
	2.	Swine Summer Stress App		<a href="https://play.google.com/store/apps/details?id=com.kgec.swinesummerstress&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=com.kgec.swinesummerstress&amp;hl=en_IN&amp;gl=US</a>
	3.	African Swine Fever Hindi App		<a href="https://play.google.com/store/apps/details?id=com.kgecicar.africanswinefeverhindi&amp;hl=en&amp;gl=US">https://play.google.com/store/apps/details?id=com.kgecicar.africanswinefeverhindi&amp;hl=en&amp;gl=US</a>

	4.	African Swine Fever App		<a href="https://play.google.com/store/apps/details?id=com.kgec.africanswinefever&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=com.kgec.africanswinefever&amp;hl=en_IN&amp;gl=US</a>
National Dairy Research Institute, Karnal	1.	Dairy Animal Reproduction		<a href="https://play.google.com/store/apps/details?id=ndri.drnishant.animalreproduction&amp;hl=en_IN">https://play.google.com/store/apps/details?id=ndri.drnishant.animalreproduction&amp;hl=en_IN</a>

**Table.3** State Agricultural Universities developed (SAU's) Apps

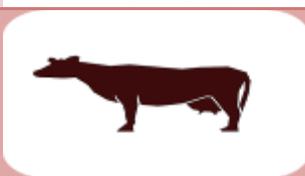
Institute	S. No	App Name	LOGO	LINK
Acharya NG Ranga Agricultural University, Guntur	1.	Pashu Poshan App		<a href="https://play.google.com/store/apps/details?id=com.angrau.pasuposhan&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=com.angrau.pasuposhan&amp;hl=en_IN&amp;gl=US</a>
	2.	KVK –Agri tech ATP		<a href="https://apppage.net/preview/org.kvkagriatp.kvkagriapp">https://apppage.net/preview/org.kvkagriatp.kvkagriapp</a>
Sri Venkateswara Veterinary University, Tirupathi	1.	Dairy Cattle Ration Formulator		<a href="https://play.google.com/store/apps/details?id=ratio_n_formulation.feed_ration_latest&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=ratio_n_formulation.feed_ration_latest&amp;hl=en_IN&amp;gl=US</a>
Tamil Nadu Agricultural University, Coimbatore	1.	Cattle Expert System Tamil		<a href="https://play.google.com/store/apps/details?id=com.cdac.tnau_cattle_tamil&amp;hl=en_US&amp;gl=US">https://play.google.com/store/apps/details?id=com.cdac.tnau_cattle_tamil&amp;hl=en_US&amp;gl=US</a>
	2.	Cattle Expert System		<a href="https://play.google.com/store/apps/details?id=com.cdac.tnau_cattle_eng&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=com.cdac.tnau_cattle_eng&amp;hl=en_IN&amp;gl=US</a>
Tamil Nadu University Veterinary and Fishery Sciences, Chennai	1.	Training Calendar		<a href="https://play.google.com/store/apps/details?id=com.tanuvas.tanuvas&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=com.tanuvas.tanuvas&amp;hl=en_IN&amp;gl=US</a>
	2.	Feed Calculator		<a href="https://play.google.com/store/apps/details?id=com.codingtown.cow&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=com.codingtown.cow&amp;hl=en_IN&amp;gl=US</a>
	3.	TANUVAS - VETDERMATOPATHOLOGY		<a href="https://play.google.com/store/apps/details?id=com.tanuvas.vetdermatopathology&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=com.tanuvas.vetdermatopathology&amp;hl=en_IN&amp;gl=US</a>

	4.	TANUVAS - Sheep and Goat Farming		<a href="https://play.google.com/store/apps/details?id=tanuvas.ac.in.sheepandgoatmobileapp&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=tanuvas.ac.in.sheepandgoatmobileapp&amp;hl=en_IN&amp;gl=US</a>
	5.	Zoonoses - TANUVAS		<a href="https://play.google.com/store/apps/details?id=com.tanuvas.zoonoses&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=com.tanuvas.zoonoses&amp;hl=en_IN&amp;gl=US</a>
<b>Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana</b>	1.	PRECISION DAIRY FARMING		<a href="https://play.google.com/store/apps/details?id=in.gadvasu.livestockhusbandry&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=in.gadvasu.livestockhusbandry&amp;hl=en_IN&amp;gl=US</a>
	2.	Dairy Prajnan		<a href="https://play.google.com/store/apps/details?id=dairyprajnan.gadvasu.in.dairyprajnan&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=dairyprajnan.gadvasu.in.dairyprajnan&amp;hl=en_IN&amp;gl=US</a>
	3.	Pig Farming		<a href="https://play.google.com/store/apps/details?id=org.gadvasu.pigfarming&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=org.gadvasu.pigfarming&amp;hl=en_IN&amp;gl=US</a>
	4.	Goat Farming		<a href="https://play.google.com/store/apps/details?id=org.gadvasu.goatfarming&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=org.gadvasu.goatfarming&amp;hl=en_IN&amp;gl=US</a>
<b>Dau Shri Vasudev Chandrakar Kamdhenu Vishwavidyalaya, Chhattisgarh</b>	1.	CGKV App		<a href="https://play.google.com/store/apps/details?id=com.om.kamdhenu.cgkvapp&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=com.om.kamdhenu.cgkvapp&amp;hl=en_IN&amp;gl=US</a>
<b>West Bengal University of Animal and Fishery Sciences, Kolkata</b>	1.	MUUK		<a href="https://play.google.com/store/apps/details?id=com.app.wbuafs.muuk&amp;hl=en&amp;gl=US">https://play.google.com/store/apps/details?id=com.app.wbuafs.muuk&amp;hl=en&amp;gl=US</a>
	2.	Jalpaiguri KVK		<a href="https://play.google.com/store/apps/details?id=org.app.wbuafs.jalpaigurikvk&amp;hl=en_IN">https://play.google.com/store/apps/details?id=org.app.wbuafs.jalpaigurikvk&amp;hl=en_IN</a>
	3.	North 24Pgs KVK		<a href="https://play.google.com/store/apps/details?id=org.app.wbuafs.north24pgskvk&amp;hl=en&amp;gl=US">https://play.google.com/store/apps/details?id=org.app.wbuafs.north24pgskvk&amp;hl=en&amp;gl=US</a>
	4.	Murshidabad Krishi		<a href="https://play.google.com/store/apps/details?id=org.app.wbuafs.murshidabadkrishi&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=org.app.wbuafs.murshidabadkrishi&amp;hl=en_IN&amp;gl=US</a>

Sri Karan Narendra Agriculture University, Jobner	1.	KVK Ajmer		<a href="https://play.google.com/store/apps/details?id=com.kvkajmer">https://play.google.com/store/apps/details?id=com.kvkajmer</a>
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**Table.4** Dairy Co-operatives & Private Organizations developed Apps

Institute	S. No	App Name	LOGO	LINK
Bharatiya Agro Industries Foundation, Pune	1.	BAIF-HF		<a href="https://play.google.com/store/apps/details?id=com.synergyconnect.baifhf&amp;hl=en&amp;gl=US">https://play.google.com/store/apps/details?id=com.synergyconnect.baifhf&amp;hl=en&amp;gl=US</a>
	2.	Godhan Seva by mKRISHI®		<a href="https://play.google.com/store/apps/details?id=com.tcs.baif.mkrishi&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=com.tcs.baif.mkrishi&amp;hl=en_IN&amp;gl=US</a>
	3.	BAIF Pashudhan Mitra by mKRISHI®		<a href="https://play.google.com/store/apps/details?id=com.tcs.pashudhan.mkrishi&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=com.tcs.pashudhan.mkrishi&amp;hl=en_IN&amp;gl=US</a>
Gujarat Cooperative Milk Marketing Federation (GCMMF), Gujarat	1.	Amul Farmers App		<a href="https://play.google.com/store/apps/details?id=com.prompt.ma.mapplicationfinalAmul&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=com.prompt.ma.mapplicationfinalAmul&amp;hl=en_IN&amp;gl=US</a>
	2.	Amul Pashu Seva		<a href="https://play.google.com/store/apps/details?id=com.amuldairy.amulaimemberapp&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=com.amuldairy.amulaimemberapp&amp;hl=en_IN&amp;gl=US</a>
Jayalakshmi Agro Tech, Hagaribommanahalli	1.	Dairy Kannada		<a href="https://play.google.com/store/apps/details?id=com.agri.dairy&amp;hl=en&amp;gl=US">https://play.google.com/store/apps/details?id=com.agri.dairy&amp;hl=en&amp;gl=US</a>
	2.	Fodder Kannada		<a href="https://play.google.com/store/apps/details?id=com.agri.fodder&amp;hl=en_US&amp;gl=US">https://play.google.com/store/apps/details?id=com.agri.fodder&amp;hl=en_US&amp;gl=US</a>
Jaitrasri infotech Hyderabad	1.	Poultry App		<a href="https://play.google.com/store/apps/details?id=com.poultryapp.www&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=com.poultryapp.www&amp;hl=en_IN&amp;gl=US</a>
Tamilnadu Co-operative Milk Producers' Federation Ltd, Chennai.	1.	Madurai Aavin Field Work / Inspection App		<a href="https://play.google.com/store/apps/details?id=com.aavininspect&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=com.aavininspect&amp;hl=en_IN&amp;gl=US</a>
Heritage, Hyderabad	1.	Heritage VET+		<a href="https://m.apkpure.com/heritage-vet/com.heritagevetplus">https://m.apkpure.com/heritage-vet/com.heritagevetplus</a>

Mobility appz, Indore.	1.	Krishi Vigyan in Hindi (किसान के लिए उपयोगी)		<a href="https://play.google.com/store/apps/details?id=com.it.krishivigyan&amp;hl=en_IN">https://play.google.com/store/apps/details?id=com.it.krishivigyan&amp;hl=en_IN</a>
Nithra Apps India Private Limited, Tamilnadu.	1.	Uzhavan Maadu - உழவன் மாடு		<a href="https://play.google.com/store/apps/details?id=nithra.tamil.madu.cattle.cow.breeding&amp;hl=ta&amp;gl=US">https://play.google.com/store/apps/details?id=nithra.tamil.madu.cattle.cow.breeding&amp;hl=ta&amp;gl=US</a>
Wiki Kids Limited, Hyderabad	1.	Animal Husbandry		<a href="https://play.google.com/store/apps/details?id=wwk.wikikids.com.animalhusbandry&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=wwk.wikikids.com.animalhusbandry&amp;hl=en_IN&amp;gl=US</a>
MJM Design, Karnataka	1.	Animal Husbandry Livestock		<a href="https://play.google.com/store/apps/details?id=com.ls.livestock&amp;hl=en&amp;gl=US">https://play.google.com/store/apps/details?id=com.ls.livestock&amp;hl=en&amp;gl=US</a>
Pashupalan	1.	Pashupalan (पशुपालन/पशुपालन)		<a href="https://play.google.com/store/apps/details?id=com.animalhusbandry&amp;hl=gu&amp;gl=US">https://play.google.com/store/apps/details?id=com.animalhusbandry&amp;hl=gu&amp;gl=US</a>
पशु मेला – Animall, Karnataka	1.	गाय भैंस wala पशुमेला		<a href="https://play.google.com/store/apps/details?id=in.animall.android&amp;hl=hi&amp;gl=US">https://play.google.com/store/apps/details?id=in.animall.android&amp;hl=hi&amp;gl=US</a>
कृषिफाई : एग्रीकल्चर नेटवर्क एँप - मेड इन इंडिया, Haryana	1.	Pashu Mela App - Gaay Bhains ki Kharid Bikri		<a href="https://play.google.com/store/apps/details?id=krishify.animal.pashu.mela&amp;hl=en_SG&amp;gl=US">https://play.google.com/store/apps/details?id=krishify.animal.pashu.mela&amp;hl=en_SG&amp;gl=US</a>
Safasha Business Solution's, Lahore	1.	Cattle Market Management System (CMMS)		<a href="https://play.google.com/store/apps/details?id=com.safashabusinesssolution.cattlemarketcompany&amp;hl=en_US&amp;gl=US">https://play.google.com/store/apps/details?id=com.safashabusinesssolution.cattlemarketcompany&amp;hl=en_US&amp;gl=US</a>
Bigsys infotech pvt. Ltd, Uttar Pradesh	1.	PASHU MANDI		<a href="https://play.google.com/store/apps/details?id=com.pashu_mandi.pashu_mela.pashu_bazaar.market&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=com.pashu_mandi.pashu_mela.pashu_bazaar.market&amp;hl=en_IN&amp;gl=US</a>
Ma Narmada Dudh Dairy, Madhya Pradesh	1.	Pashu Bazar		<a href="https://play.google.com/store/apps/details?id=com.yogiksoft.pashu&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=com.yogiksoft.pashu&amp;hl=en_IN&amp;gl=US</a>
RNBV APPS, Vijayawada	1.	Pig Master - A Guide App for Pig Farming		<a href="https://play.google.com/store/apps/details?id=com.rnbvandroidapps.pigapp&amp;hl=en_IN&amp;gl=US">https://play.google.com/store/apps/details?id=com.rnbvandroidapps.pigapp&amp;hl=en_IN&amp;gl=US</a>

Uneven digital access, low accuracy of data in apps, non-availability of content as per local need are important challenges in adopting mobile apps.

Numbers of agricultural applications are very limited compared to other sectors like health (Costopoulou *et al.*, 2016).

Diversity of agricultural applications are limited in India compared to USA or Brazil (Barbosa *et al.*, 2020).

There are digital tools which provide live services to various agricultural solutions with charge, which farmers unwilling to pay (Bonke *et al.*, 2018)

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