

MAPPING DIGITAL MEDIA TECHNOLOGY AND EVERYDAY: FIELDWORK AMONG MILLENNIAL FARMERS IN KERALA

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BY

AMEER SALMAN O M

Roll No. 206141003



**DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES
INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI**

GUWAHATI, INDIA

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Indian Institute of Technology Guwahati
Department of Humanities and Social Sciences

Guwahati 781039

Assam, India

DECLARATION

I hereby declare that the thesis entitled “**Mapping Digital Media Technology and Everyday: Fieldwork among Millennial Farmers in Kerala**” is the result of an investigation carried out by me at the Department of Humanities and Social Sciences, Indian Institute of Technology Guwahati, under the supervision of Prof. Sambit Mallick. The work has not been submitted either in whole or in part to any other university/institution for a research degree.

IIT Guwahati

Ameer Salman O M

July 2024



Indian Institute of Technology Guwahati

Department of Humanities and Social Sciences

Guwahati 781039

Assam, India

CERTIFICATE

This is to certify that Mr. **Ameer Salman OM** has prepared the thesis entitled “**Mapping Digital Media Technology and Everyday: Fieldwork among Millennial Farmers in Kerala**” for the degree of Doctor of Philosophy at the Indian Institute of Technology Guwahati. The work was carried out under my supervision and in strict conformity with the rules laid down either in whole or in part to any other university/institution for this purpose. This is the result of his investigation and has not been submitted either in whole or in part to any other university/institution for a research degree.

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July 2024

Sambit Mallick

Supervisor

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Five years back, this thesis was a single, fragmented sentence in my note-taking application. The present study is a byproduct of sheer perseverance and immense desire to fulfil a dream. The hours I spent searching for an appropriate PhD position since then were priced when I came across a profile at HSS, IITG. My long search came to a complete stop when I received an email from Prof. Sambit Mallick. While my long-time dream is towards its completion today, Prof. Mallick is the first person I am grateful to. Thank you for not compromising in work yet being kind and understanding. Thank you for the thoughts and coffee we shared. You are the inspiration to complete this thesis as it is today. I express my gratitude to the members of the doctoral committee, Prof. Sawmya Ray, Dr. Ngamjahao Kipgen and Prof. Sougata Karmakar for their valuable inputs and constructive criticisms. I thank Prof. Priyankoo Sarmah, Head of the Department of Humanities and Social Sciences, for his help and support throughout the course of my PhD.

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I dedicate this thesis to farmers of tomorrow.

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Ameer Salman O M

Abstract

Digital media have become a technological necessity for farming today. The younger generation relies on various digital media technologies for their everyday farming practices. This, to a great extent has helped the new age farmers break through the bottleneck of traditional farming as the limitation of generation old farmers that weakens the potential of human capital in modern farming remains acute. Since the emergence of digital revolution in the early millennium, the Digital India movement in 2015 and covid outbreak in 2020 have made the digital technologies widely diffused in rural India. Many of the industries thereafter started integrating digital technology into business. Young farmers were also ready to adopt digital media tools to perform everyday farming practices. Even though digital media reaches all sectors, its constructive incorporation into the agricultural sector can attract a young population. Similarly, attracting a young population with strong command over digital technology can stimulate the potential of the primary sector.

This ethnographic study henceforth maps the digital media technology in the everyday of millennial farmers in Kerala, India. Recognizing the significant demographics of millennial farmers who have grown up alongside digital technologies, this study investigates their perceptions, aspirations, and challenges in navigating this digital influx within their agricultural practices and everyday lives. We focus on how young farmers born between 1981-1996, conceptualise and domesticate various digital media technologies to enhance their farming operations. It also explores the evolving relationship between millennial farmers and the digital media technologies they integrate into their everyday agricultural practices as well as how these

technologies initially disrupt and later dissolve to their everyday. Through extensive fieldwork and in-depth interviews, the thesis gets into the lived experiences of 57 respondents predominantly millennial farmers, to explore how they utilise a range of digital media, including mobile phones, the internet, and social media platforms. The study provides an in-depth, contextualised understanding of the digital media technology scenarios from the perspective of millennial farmers in a developing country setting by examining how these technologies are appropriated and repurposed for diverse purposes, such as accessing agricultural information, connecting with experts and peers, managing farm operations, mitigating climate risks, exploring new markets, and fostering a sense of community.

The findings highlight the empowering potential of digital media technologies in enabling millennial farmers to enhance their agricultural productivity, access crucial information, and overcome traditional barriers. It reveals how these technologies facilitate knowledge sharing, foster innovation, and contribute to the development of a more connected and informed farming community. Initially, many millennial farmers perceived digital media as mere tools, but over time developed broader perspectives that recognized their transformative potential as enablers of innovation, knowledge exchange, and community building.

By providing a grounded understanding of how millennial farmers engage with and shape the digital revolution in agriculture, this thesis offers valuable insights for policymakers, development practitioners, and researchers alike. The research encourages technology producers and policymakers to address the issues of persisting digital divides, digital illiteracy,

infrastructure limitations, language barriers, and the uneven distribution of access to technology. We emphasise the need for inclusive policies and targeted interventions to ensure equitable access to technology. It underscores the importance of understanding the social and cultural contexts of technology adoption and advocates design implementation for a more inclusive user-centred approach to digital development in agriculture.



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List of Abbreviations

AI	Artificial Intelligence
AIMS	Agriculture Information Management System)
ANT	Actor–Network Theory
ARD	Agricultural and Rural Development
CAPART	Council for Advancement of People’s Action and Rural Technology
CMC	Computer-Mediated Communication
DRDA	District Rural Development Agency
EAR	Ethnographic Action Research
ERP	Enterprise Resource Planning
FAO	Food and Agriculture Organisation
FB2F	Farmer Back to Farmer
GDP	Gross Domestic Product
GEN X	Generation X
GEN Z	Generation Z
GMO	Genetically Modified Organisms
HCI4D	Human-Computer Interactions for Development
HDI	Human Development Index
HRD	Human Resource Development
ICTs	Information Communication Technologies
ICT4D	Information and Communication Technologies for Development
INR	Indian National Rupee
IoT	Internet of Things
IT	Information Technology
ITU	International Telecommunication Union

KMAS	Kisan Mobile Advisory Services
MBA	Master of Business Administration
MoH&FW	Ministry of Health and Family Welfare
NetGen	Generation Next
NGO	Non-governmental Organisation
NOFN	National Optical Fibre Network
QR Code	Quick Response Code
RBH	Rural Business Hubs
SCOT	Social Construction of Technologies
SMS	Short Message/Messaging Service
STS	Science and Technology Studies
TRAI	Telecom Regulatory Authority of India
TSI	Telecom Statistics of India
UNCTAD	United Nations Conference on Trade and Development
UNESCO	United Nations Educational, Scientific and Cultural Organization
USAID	United States Agency for International Development
UT	Union Territory
VKC	Village Knowledge Centres
VSAT	Very Small Aperture Terminal

The logo of the Indian Institute of Technology Guwahati is a circular emblem. It features a central stylized figure resembling a person or a flame, composed of several overlapping circles and arcs. The text "Indian Institute of Technology Guwahati" is written in English around the bottom half of the circle, and "भारतीय प्रौद्योगिकी संस्थान गुवाहाटी" is written in Hindi around the top half.

“No country will reap the benefits of the network age by waiting for them to fall out of the sky. Today’s technological transformations hinge on each country’s ability to unleash the creativity of its people, enabling them to understand and master technology, to innovate and to adapt technology to their own needs and opportunities”.

(Human Development Report, 2001)

CHAPTER I

INTRODUCTION

1.1 Introduction

Digital technologies in the everyday of people are having a remarkable impact upon professional practices at individual and collective levels. Since its popularisation in the early 1990s, digital media and information and communication technology have shaped and continue to configure and reconfigure the everyday of people. This impact reflects on nearly all walks of personal and professional lives of individuals, especially among millennials. These younger seniors of the early twenty-first century are more likely to be engaging with digital media technologies due to having more exposure to computers and the internet in their professional and personal lives. Understanding how the millennial farmers conceptualise and position digital media technologies in their everyday lives is crucial for harnessing the full potential of technology in agriculture (Klerkx et. al., 2019; Shen et. al., 2022). The consolidation of digitisation and media convergence are considered by many media scholars as the gateway to the professional upliftment and socioeconomic development in general.

In this context, the broad agenda of this research is to tell the story of digital media technology and the young farming community of Kerala to reflect on the larger picture of socio-technological development and open new pathways to future research endeavours. However, building on the background, this research aspires to map the digital technology practices among the millennial farming community in Kerala state of India and understand how they produce

and reproduce everyday technology practices in tandem with agricultural practice. In the 21st century, the millennial farming community has been increasingly confronted with various advancement trajectories of technologies, especially digital media communication technologies. Considering the making of everyday technology practices by the millennial farmers in their lived space as the entry point, the research intends to shed light on the farmer, technology and their everyday. The study embodied in the present thesis topic assumes greater significance in the current context of the Indian agricultural sector as well as the technology advancements.

1.1.1 The Field: Kerala

Kerala is the southernmost state in India, comprising the narrow land strip bordered by Western Ghats in the east, the Arabian Sea on the west and Indian Ocean in the southern area of the Indian Peninsula. This state, having fourteen districts, is known for its natural beauty and persistent top performance in various development indexes like Human Development Index (HDI), literacy rate, and healthcare.

Table 1.1 Districts in Kerala

Sl. No.	District
1	Alappuzha
2	Ernakulam
3	Idukki
4	Kannur
5	Kasaragod
6	Kollam
7	Kottayam

8	Kozhikode
9	Malappuram
10	Palakkad
11	Pathanamthitta
12	Thiruvananthapuram
13	Thrissur
14	Wayanad

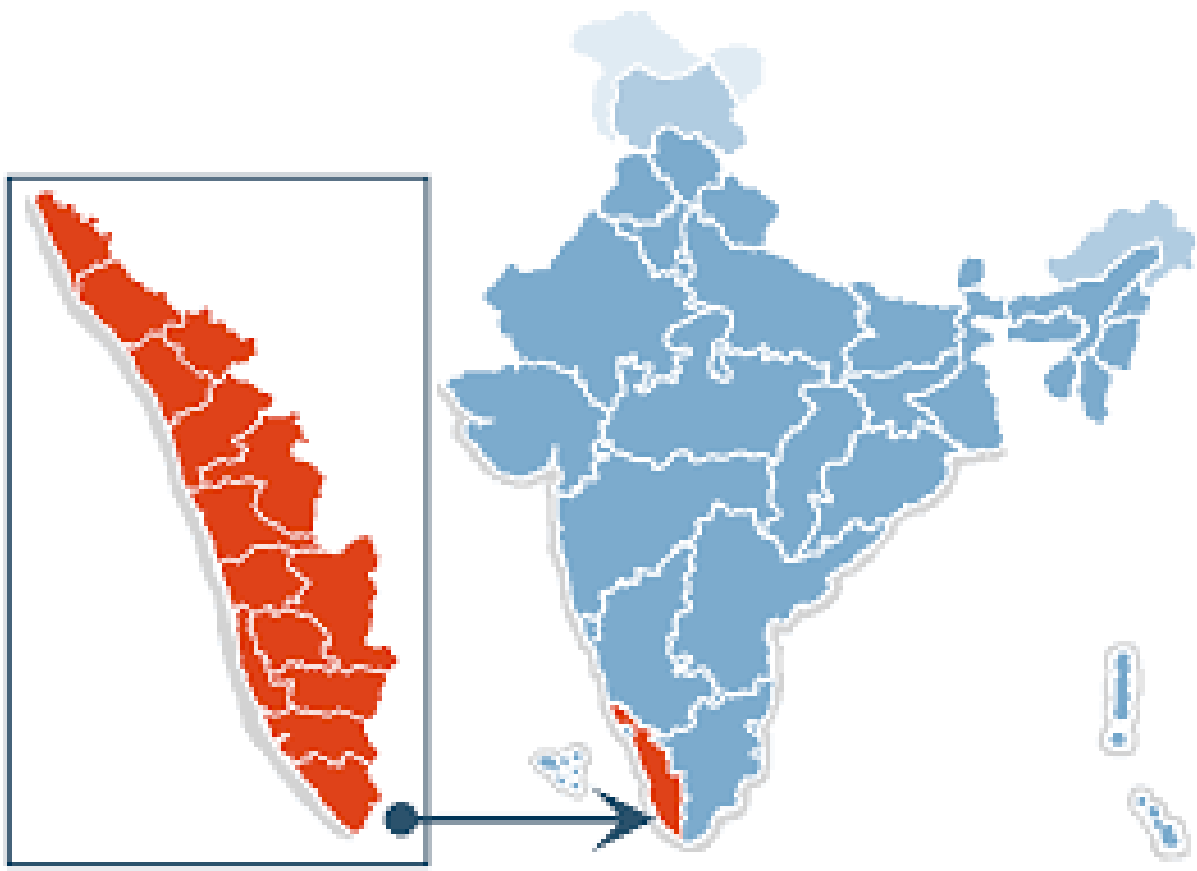
Table 1.1: *The table enumerates the 14 administrative districts of Kerala, India, providing a comprehensive overview of the state's territorial divisions.*

Besides its high performing development parameters, Kerala attained the distinction of being the first digital state in India by linking all its villages with broadband connectivity under the National Optical Fibre Network (NOFN) project. Henceforth, then President Pranab Mukherjee declared Kerala as the first digital state of the country in 2016. Subsequently, the state became India's first fully e-governed state, achieving total e-governance in 2023.

Building upon the reputation as the first fully-literate state, Kerala achieved these milestones through a series of initiatives aimed at building a digitally-empowered society. Several initiatives leveraged the expertise of the Kerala diaspora to enhance research in high-tech industries (Pandey et al., 2022). "I am also digital" Campaign, a large-scale digital literacy campaign, aimed at ensuring that the benefits of Kerala's digital transformation have reached the grassroots level. Similarly, the prestigious Akshaya Project by the Kerala government played a significant role in bridging the digital divide by establishing thousands of IT access points across the state, providing citizens with access to computers, the internet, and government services. The policy Digital Inclusion for the Differently Abled in 2023 made several efforts to make digital technology accessible to all, including the differently-abled. The

customization of training programs for visually challenged exemplifies this commitment to inclusivity. Many such programs focus on educating citizens about digital technology, online services, cybersecurity, e-governance, and responsible social media use. This focus on skills development and a robust IT ecosystem further strengthens Kerala's position as a digital leader. Aiming to achieve the status of knowledge-based economy and 100% digital literacy, the government digitised delivery of major services it provides, ensuring accessibility, inclusivity and transparency for its people. Major public services such as education, health, land revenue, public distribution system, documentation of properties, and social security payouts have been operationalized through digital ecosystems. Kerala has the highest percentage of households with computers and internet access in India. Additionally, it boasts 95% mobile phone penetration, 62% smartphone penetration, and 75% digital literacy (Ummer et al., 2021). The state has a history of early adoption of digital technology in education and health. Kerala serves as a successful model for other states and countries aiming to leverage technology for social and economic development. Its achievements in digital inclusion, e-governance, and technology integration offer valuable lessons. Therefore, choosing Kerala as the field of study can gain valuable insights into the factors driving successful digital transformation, the challenges and opportunities associated with technology adoption, and the potential of digital technology to empower individuals and communities.

Figure 1.1: Kerala in the Map of India



Source: Wikimedia Commons, the free media repository, uploaded on 18 January 2006

https://en.wikipedia.org/wiki/File:India_map_kerala.png

Figure 1.2: Map of Kerala



Source: Wikimedia Commons, the free media repository, uploaded on 28 March 2011

<https://commons.wikimedia.org/wiki/File:Kerala-map-en.svg>

As the objective of the study implies, the population of the current study is taken from the geographical area of Kerala State. Some of the major peculiarities of the state are its high share of the young population are technologically literate of these young populations combined with heritage of agriculture will be considered as respondents.

Figure 1.3: Age-group wise population in Kerala

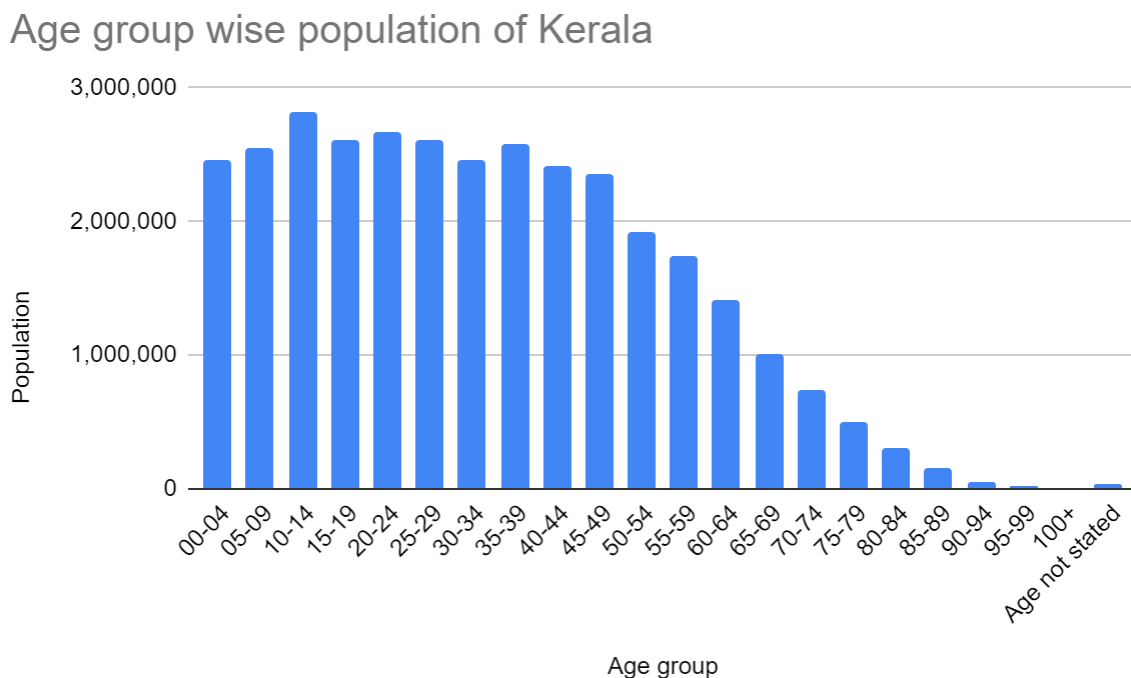


Figure 1.3: *The figure shows the age-group wise population in Kerala*

Source: Statisticstimes, uploaded on 13 Apr 2024

<https://statisticstimes.com/demographics/india/kerala-population.php>

As per the census of 2011, 30.85% of Kerala's population is between the age category of 20 to 40. The study henceforth considers millennial farmers in Kerala as respondents for extensive fieldwork to gather primary data for this study.

1.2 Review of Literature

This section comprises thematically presented state of the art relevant to broad domains of technology, anthropology, media, science and technology, agriculture and social sciences. Here I have explored various academic repositories and libraries to review works related closely to the everyday digital media technology practices among millennial farmers. Research articles, papers, journals and reports were reviewed, and relevant literature reviews are presented in the following themes.

1.2.1 The Indian Agriculture Sector

The Indian agricultural sector had a significant share in the country's Gross Domestic Product (GDP) at the time of independence. Although its contribution goes declining year by year, as in 2019, the sector employs 42.6% of the labour force while providing approximately 17% of the country's GDP and has declined by 2.8% to reach 16.5% in 2019-20 (Economic Survey of India, 2020). The majority of the Indian population is rural, and most of them are small-scale farmers. Seventy-eight percent of agricultural production in India comes from small-scale farmers, unlike other developing nations where commercial farmers contribute a major stake (Singh et al., 2009). Eighty percent of the farmers in India own less than two hectares, while the global average is 3.7 hectares (FAO, 2002). However, it is worthy to remark that the agriculture sector provides employment to around 53% of the population in India.

Indian agricultural landscapes have been undergoing modification in the context of globalisation and agricultural modernisation associated with technological reforms in the millennium. These changes created a multidimensional impact as it often made increasingly difficult for the small-scale rural farming communities to harvest benefits from the

technological reforms. Meanwhile, the country is simultaneously established as an emerging market for the use of technology to become one of the new breeding grounds for technological modernisation and its related policies, in Asia and the World (Saravanan, 2013). Different governments in India implemented various projects regarding technology modernisation and grassroot Information Communication Technology (ICTs) during the last two decades. The agricultural sector perpetually brought an indispensable stake in those projects. The ICTs powered substantial growth in agriculture is yet to be yielded. Ample studies and projects are taking place in India concerning ICTD and its various cases, especially in the agricultural sector. In light of those studies, the nature of people's adoption of these new technologies and policies in the agricultural sector has received substantial academic attention foregrounding its social, economic, political and cultural and other aspects influencing their adoption. The impact of these newly adopted technologies on agricultural development can only be understood when their use is widely diffused.

1.2.2 Omnipresent Technologies: ICTs and Beyond

ICTs and new digital media technologies marked the present and future of the new millennium as its impact in all domains ranges from professional to personal. Amidst this increasing influence of technology, the focus of academics remains whether technology determines society or society determines technology (Quan-Haase, 2016). However, in a development aspect, we need to explore beyond the immediate success of specific technologies and build a profound understanding of social, political, economic and cultural aspects regarding their adaptability and adoption.

‘Digital media platforms’ refers to online services, websites, or applications that facilitate the creation, sharing, and consumption of digital content. Examples include social media platforms like Facebook or Instagram, video-sharing sites like YouTube, and messaging applications like WhatsApp. Apps (applications) are software programs designed to perform specific tasks or functions on digital devices. These can range from productivity tools to games to social media apps. Devices are the physical hardware used to access and interact with digital media platforms and apps. This includes smartphones, tablets, laptops, and personal computers.

Technology is one of the widely used and equally confusing terms. The ever-changing nature of technology in history might be the core reason for this rising confusion. What we mean by the term technology today was not the same back in the nineteenth century. Eric Schatzberg, (2006) in his article ‘Technik come to America: Changing Meanings of technology before 1930,’ published in *Technology and Culture*, portrays the historical evolution of the meaning of technology along with its transformation. Schatzberg later, in his paper, “Technology: Critical History of Concept,” expands and deepens upon this historiography. The term ‘technology’ became common after the mid-twentieth century; by then, the conceptual confusion arises on the usage of the term in its broad or narrow senses. Academic researchers began to widely use the phrase Information and Communication Technologies (ICTs) since the 1980s (Melody et al., 1986; Silverstone et al., 1996; Stevenson, 2011). Since then, ICTs has become a popular keyword in technology studies with an ample amount of research done on various aspects, especially the developmental impact of these technologies in the world.

Regarding technology for agricultural development, Musiyarira (2013) categorises technologies as either production technologies or ICTs in his research, "Assessing the ICT-enabled agricultural commodity exchange market and its impact on small-scale farmers in

South Africa." Unlike the production technologies like the technical skills, use of fertilisers and pesticides, use of Genetically Modified Organisms (GMO) and other farming and irrigation methods, the prevalence of ICTs is now widely used in many parts of the world, and it has significantly altered the people's nature of communication and interaction. Media technologies like radio, television, satellite etc., in addition to computers and the internet, encompasses the ICTs (Keniston, 2002). Rajeshkumar, (2016) further simplified the concept of 'ICT,' focusing on these three words: Information, Communication and Technology; to promote information via communication with the help of technology, i.e., to interact with people, establishing the network and so on. This subsection reviews studies that emphasise on ICTs and their contribution to development, especially in agricultural industries and farmers around the world. More emphasis given on Information and Communication Technologies for Development (ICT4D) in the twenty-first century brought the technology discourses into its potential possibilities and future. A phase change from 'ICT4D 1.0' to 'ICT4D 2.0' and its implications are the major concerns in Richard Heeks's (2009) paper on ICTs for International Development published in ICT4D 2.0 Manifesto: Where Next for ICTs and International Development? Their paper charts the chronology and logic of ICT application in developing countries. Regarding the new models of innovations, Heeks analyses the implications of the change of phase from laboratories to grassroots innovation. Models and commentaries in this phase-change provide rich insights into the future of ICT4D. However, Venkatesh et. al., (2012) assert the importance of the valuation of essential information about ICTs and the subjects before developing any models and identify that it is necessary to have forward linkage for information collection and transmission. They analyse and review the different ICT initiatives and recommendations to improve ICT access. They propose a model that shows the feasible flow

of information and its distribution. The ICT incorporated development become the trend of the twenty-first century. Michael et al., (2012) have studied different policies on ICT training among children in Ghana and other African countries. They identify the high cost of ICTs, lack of proper electricity, internet access, vernacular and hyperlocal content, and user acceptance as the major challenges in the role of ICTs in rural development.

On the other hand, many scholars consider ICTs as ‘magic tools’ to improve the socio-economic conditions in rural areas (Khuhawar Ye et. al., 2014). This study, based in Pakistan, claims that ICTs reduce poverty in rural areas by focusing on the poverty ratio, and root causes and constraints of socio-economic development. Khuhawar et. al. proposes a model of technology for rural areas by detailing the improvement of knowledge about technology and understanding the level of rural people on ICTs that eventually leads to economic stability. Similarly, Venkatesh et. al., (2012) argues that practical knowledge helps farmers and other stakeholders for decision-making on technology. The appropriate decision leads to economic stability and the role of technologies for date delivery with effective use of the resources critically analysed. On the other side, the metaphor of ‘springboard’ (Kumar et. al., 2020) describe ICTs as a set of tools for the democratic and sustainable development of rural India. The omnipresence of technology benefits in vast arrays ranging from farming to governance to commerce. ICTs incorporate many sorts of foundations and administrations, extending from broadcast communications, for example, voice information and media administrations to particular applications. The objective of ICTs is to utilise strong advancements accessible for poor and low-income groups (Kumar et al., 2020). Thus, ICT’s effective use can bring rural communities confined to the global economic system to further improve their social and

economic situations. ICTs are undoubtedly a weapon to fight the rising challenges globally and locally, hence preparing for a substantial global change.

Similarly, focusing on agricultural development, O.D. Olorunfemi (2019) mentions the role of technological resources for natural resources management like water, weather forecasting in Nigeria. The study also shows the different smart farming initiatives for the extension services in climate change and claims that women's qualification is vital in the development of agriculture and society as a whole.

While the existing literature highlights situations that the ICTD research aims to understand and address factors like intermittent power supply, insufficient resources, poor network connectivity and inadequate knowledge and training, innovative approaches are inevitable, whether initiated by the research community or the people within the beneficiary communities. The unfamiliar baseline standards and culture often make it increasingly difficult for a foreign researcher to evaluate the situation or develop, deploy and test innovative technologies. However, the community-friendly research methodologies enable the researcher to observe the members of the community and explain the ways in which they interact with the development facilitating innovative technologies.

1.2.3 ICTs for Development in India

The studies on trials and deploying new information technologies in developing countries, especially in India, rely on the notion of extensive non-technical, which turns inadequate in ways that new approaches can address. These existing practices are highly expensive to scale or inadequately address unreliable transportation, electrical, or communications infrastructure. As a remedy to this crisis, Uttar Pradesh based Lokvani Project implements various application

ICTs as E-governance (Jitendra Kumar Pandery et. al., 2020). A survey on how ICTs empower rural life has explained analysing initiatives like community radio, community television Gyan Sanchar and Rural e-Seva. Focus on poverty, livelihood, infrastructure, facilities, and amenities as ICT facilitated developmental aspects among rural people leads to increased demand for technologies (Sushmita Mukherjee 2011). However, the technology-powered rural development does not alone fasten the development process but bridge the gap between education and technology. Years of research evinces that the introduction of new technologies will speed up rural development in a way that the traditional aid-based development programs have been unable to achieve (Brewer et. al., 2006; Ho et. al., 2009). It imparts basic challenges like finance, electricity power crisis, network connection or bandwidth issues, and most importantly, the literacy and knowledge of rural people. Knowledge and information are two key terms in the era of globalisation powered 'information society' (Castells, 1996). Gond et. al., (2015) connect Castells' paradigm to the information or knowledge about the ICTs, having potential to stimulate social, economic, cultural and political development. Tiwari et. al., (2008) show perspectives on the uses of ICTs with two folds of research; its impact in rural India and fieldwork in Madhubani district of Bihar and Dhar district of Madhya Pradesh. The overall impact of ICT initiatives and its detailed analysis is made in the same study that points out technology accessibility enhancement related issues by comparing various models of rural-based technology services. A systematic approach using linear modelling for rural development focusing on different innovations in agriculture is presented by Knickel et. al., (2008). Here farmers' inherent knowledge on agriculture along with public and private participation makes the system increasingly effective, and it all together contributes to the conceptual framework of rural development. Abhay Kumar & K. M. Singh (2015) explains various applications

systems where ICTs are playing a significant role in rendering substantial rural development focusing on the health sector in India and substantiate the omnipresence of ICT tools. Such holistic systems bring changes in the social society's demands along with improvement in social learning activity.

Having its modest anchor points on ICTD and Human-technology interactions or Human-Computer Interactions for Development (HCI4D) in particular, this research emphasises the context of understanding the user's needs or patterns to bridge the gap, suggesting the effective application of a participatory and user-centred methodological design when researching on innovation design that leads to the flawless performance of the technology in challenging contexts (Muller and Kuhn, 1993; Vredenburg et. al., 2002). The term 'leapfrog' refers to addressing some counties that often skip over the tedious and outdated, still expensive and misfit technologies and move to newer and appropriate ones (Keniston, 2003). The intended role of such adopted technologies is to supplement and possibly replace existing complex social processes (Tetty, 2000)

However, contemporary researchers possibly look more at future technologies that do not work in the field currently and may not be expected to work for 2-5 years in the future. Yet, as ICTD and HCI4D researchers examine future technologies in the right-now, everyday environments. Researchers' interventions often are prone to break these challenging environments, or else these environments put an end to technologies.

A shift in the attitude of people started receiving high academic interest in the new millennium. By now, the strategic contribution from the ICTD community for the success of ICTD projects was manifested by understanding the hyper-local context or user needs, which may not

guarantee complete success but necessary components of success. Many of the ICTD communities use change agents or ‘opinion leaders’ (Lazarsfeld et. al., 1948) as local advocates for their technologies, understanding its ‘liaison’ (Brody, 2000) potential between the ICTD community and user community. However, the added elements into long time spans have proven these intermediate measures to be insufficient. A makeshift to strategies on ICTs can be done by modelling the best practices around the world and taking guidance from them for improving the current situation (Rajeshkumar, 2016; Sambhe et. al., 2015). These scholars underscore factors contributing to rural development such as standard of living, education, women empowerment, agriculture and many more. Firstly, positive response and active participation from the rural community are necessary for implementing these factors. They portray how effectively we can use ICTs to strengthen rural areas and suggest large business investments must be made in ICTs for rural development.

1.2.4 ICTs for Sustainable Development

A more reasonable but slight shift in the academic interest from the development aspect in the ICTD studies to sustainable development was seen from the beginning of the 21st century. The World Summit on the Information Society (2003) emphasised the need for quality of life and sustainable development in an ‘information society’ where people create, access, utilise and share information or knowledge by enabling individuals and communities to accomplish their optimum potentialities.

ICTs for Sustainable Development (ICT4SD) is an unexplored area of research (Goswami et. al., 2014, p.125). They attempt to address the positive and negative impacts of new technologies on the environment, socio-economic dimensions and how people may use them

in the long run. However, the term sustainable remains a matter of debate among many scholars. ICTs bear the potential to improve the productivity, efficiency, and sustainability of agriculture by providing information and knowledge to the farming communities (Awuor et al., 2013). The World Commission on Environment and Development (1987) comprehensively defines Sustainable Development as the development that meets the expectations and needs of the present without referring to the ability of future actions to meet their own needs. Developing this notion of sustainable development, Goswami (2014) presents the core factors which may improve the sustainability dimension of development; ICTs for environmental sustainability, economic reform, social development (e-governance, information access and communication and ICT impact on education and health) and measuring sustainability with the help of ICTs. In addition, 'community participation' (Bailur, 2007) is one of the characteristics of ICTs for sustainable development. Michener (1998) also writes that 'participation', 'empowerment' and 'sustainability' are the key concepts of development. ICT-powered development is becoming unsustainable because the failure of ICTs was less discussed and instead focused on the potential of technologies for sustainable development. In the brief of new development projects on ICTs for rural development, Arijit Ghosh (2011) aims to achieve sustainable development without failures of new developmental technology.

This section of the review of literature presents reviews of the various studies made by different investigators, and researchers regarding the implications of ICTs for the development of rural societies in India and the role and significance of ICTs in development especially in rural community development. Observations made by experts, researchers and investigators suggest that ICTs play a significant role in rural development, rural community development and sustainable development. ICTs have made remarkable contributions towards the improvement

of economic and social development of societies in rural India. In developing countries like India, dissemination of ICTs at the grassroots level of rural villages is necessary to create information-rich societies, empower poor people, reduce the digital divide, and for the sustainable development of rural communities. However, whether or not the newer technologies radically interrupt how people communicate, the evolving availability of technology services and changing contexts work together to produce new and often unexpected transformations in communication methods and overcome development challenges in regions with unreliable communications infrastructure.

1.2.5 ICTs in Agriculture

ICTs have been observed as one of the major tools that help farmers to ease their tasks in several ways. The Incorporation of ICTs in agriculture has become substantial in developing countries as the sector plays a vital role in the socio-economic development of most developing countries and works as the primary contributor to economic growth and sustainability (Munyua and Adera, 2009; Bhalekar et. al., 2016). Thus, it is seen to positively influence the lives of farmers, especially in developing countries (USAID, 2010:3). The positive impact of ICTs in the livelihood of farmers was widely observed in developing countries like India, Kenya, Uganda and Ethiopia (Asenso-Okyere & Mekonnen, 2012:17). This impact is understood through various means as ICTs has been considered as an enabling technology. Though the impracticality to directly measure or observe the impact of ICTs is considered, it is also important to remark how that impact would have been without ICTs (USAID, 2010a:3). However, the scaling and sustainability of these impacts are major hindrances to the success of

ICTs in agriculture. The traditional communication and media technologies like radios, cell phones, computers, the internet, digital cameras, geographic information systems, global positioning systems technologies, etc. have been of major use to farmers (USAID, 2011). In their study, Maurya et. al. (2021) brings forth the role of visual and audio feedback mechanisms in helping semi-literate farmers. Advancement and popularisation of the internet and other digital media technologies have brought the emergence of e-agriculture or electronic-agriculture, delineated as a rapidly emerging field directed towards agricultural enhancement and rural development by incorporating advanced information and communication technologies to the agricultural processes (Bhalekar et. al., 2016). The e-agriculture involves conceptualising, designing, developing, applying, and evaluating innovative ways to use ICTs in agriculture (Chandra et. al., 2011). Thus, it disseminates vital information for the farmers through various mechanisms.

On the other hand, communication of Science and Technology (S&T) as a dynamic and multidisciplinary field of research is relatively a new practice encompassing ‘public understanding of science’ and ‘public engagement with science’ as its outcomes. In their comprehensive introduction to ‘Science in Public: Communication, culture and credibility,’ Gregory and Miller (1998) infer that public understanding of science and its entities are more complicated than its rhetoric implies. The demand for comprehensive communication of science and technology, amidst these complexities manifest in the findings of a distinguished panel of communicators, journalists and researchers in the ‘Research Roadmap for Public Communication of Science and Technology in the Twenty-first Century’ (Borchelt, 2001). ICTs introduced in the agricultural sector have offered many opportunities and challenges for the stakeholders. In this respect, the existing body of research mostly discusses the introduction

and role of ICTs in the rural sector, while they emphasise the possibilities of ICTs on several farming procedures. In her book, 'Technology and Society: Social Networks, Power, and Inequality', Quan-Haase (2013, p. 42) refers to those who support technology as 'utopians' and those who see only negative effects as 'dystopians'. The rapid advancement of ICTs has countered Quan-Haase (2013) and given rise to new applications that were then inconceivable and are likely to continue. An expert system technology can play a vital role in the farming sector. Maurya et. al. (2021) present different aspects related to agricultural expert systems. They suggest a structural view of an agricultural expert system, beneficial for farmers. Even then, ICTs were capable of playing an important role in challenging and uplifting the lives of the rural populace using an agro computer-based information system (Havlicek et. al., 2010; Cervenkova, 2010). The Adoption of ICTs enabled Information systems for Agriculture, and rural viability is a strategic issue. In the Philippines, for instance, there are several online portals, e-commerce applications and other innovative technologies used strategically to provide agricultural information in rural parts of the country (Jayaweera et. al., 2010). In their paper, E. Gelb, A. Maru, J. Brodgen, E. Dodsworth, R. Samii, V. Pesce (2008) addresses this strategic policy as 'part and parcel of agricultural and rural development policies'. Sushmita Mukherjee (2011) gives the description of the scopes and opportunities of the technology-powered development in rural farmer communities along with the challenges the communities have to bear. The advantages of using ICTs in agriculture such as getting information about a crop, its varieties, soil type, temperature, fertiliser, time of planting and maturity, pest and disease control measures, climate (Havlicek et. al., 2010; Johnston et al., 2009; Vanek, 2010; Dhaka et al., 2010; Grimshaw, 2011; Cervenkova, 2010; Jagannath et al., 2018; Khalid et al., 2022), transaction costs, increased access to markets, improvement of communication inside

the value chain (Maritz, 2011), extending social networks, wage-earning opportunities (Kala, 2023), and so forth were popular interests of research. Similarly, Sanjeev S Sannakki, Vijay S Rajpurohit, V B Nargund, Arun Kumar R, Prema S Yallur (2011) introduced an innovative approach to grade diseases on plants, reduction in transaction cost, increase in market access, easy availability of market and other crop-related info. The study by N. Agu (2013), on Nigerian women, identifies the substantial role of ICTs in addressing their information needs and other challenges they face in the farmlands. Using the Internet by means of smartphone appliances increases the possibilities to the next level. The new devices like smartphones and tablets combined with new services like Cloud Computing, Internet of Things (IoT) and Artificial Intelligence (AI) have great potential in agriculture. The result of a survey done by G. Adamides and A. Stylianou (2013) on the level of satisfaction on currently used information methods shows that 98% of farmers in Cyprus use mobile phones as the prime source of information. Mobile phones, especially smartphones in various domains, were extensively studied and still require special academic attention. Robert Szilagyi (2012) points out that Cloud Computing provides effective resource management and better cost control. Maurya et. al. (2024) used AI to compare historical data for intelligent decision making among farmers. Ample research is conducted on ICTs, automation and robotics in agriculture and related environmental issues. Innovation combining ICTs and Robotics is emerging rapidly and induces the potential to revolutionise future farming through positive impacts on productivity and profitability (Renate et. al., 2021). Advancing from there, Koukouli et. al. (2018) argue that Parallel Computing brings the core processing to low-end computers facilitating the use of huge computer power by small agricultural research units. Nevertheless, agricultural and farming communities are hesitant to adopt new ICT tools and systems to the degree required

for substantial growth in agriculture. The new ICTs altogether are not only fast developed but, in addition, are giving birth to newer systems and tools (Szilagy, 2012). Indeed, the new digital technologies are not only developing fast but constructively branching existing ICTs to give birth to newer ones (Koukoulis et al., 2013). The Internet network also has become an essential part of information and communication systems developed for agricultural processes recently. This ICT enabled system contributes to farming, and research has been employed in the field in many parts of the world.

Sushmita Mukherjee (2011) added on to Koukoulis et al., (2013) who observed that the lack of adequate access to ICTs is the most significant problem in the current scenario. Coming to the technology 'immigrants' (Prensky, 2011) farming communities, Laguna and Babcock (1997) earlier highlighted that unfamiliarity and anxiety are major factors for both younger and older users of ICTs. Dhaka et al. (2010) also made an attempt to analyse the farmers' point of view towards utilising ICTs in their everyday practices. Different opinions and attitudes of farmers towards incorporating technology in farming were measured using statistical tools. Based on the background literature, Kumar et al., (2012) outlined the level of farmers' attitudes on ICT application in agriculture in the Ramanathapuram district of Tamil Nadu. More particularly, the research carried out by Broady, Chan and Caputi (2010, p. 478) finds that older generations ('digital immigrants') are usually less comfortable and competent in the use of digital technologies. Members of the community who are experienced with technological means and functions tend to act more self-assured and self-confident, and those without tend to feel anxiety and stress when involved with technology. However, Patel and Shukla (2014, p. 378) arguably contradict these challenges by substantiating that when people follow the technology development, better they are able to be coherent within the socio-economic circumstance they

live in and defines the categories that are affected by access to ICTs, demographic, and education. Accessibility, availability and use of available ICTs among farmers in rural Meghalaya were studied by Saravanan Raj (2015). After analysing the different constraints of farmers while using ICTs, the research finds the link between two variables- accessibility of new ICT resources and usage of new ICT resources, for the development of farming sectors. Apart from the problems concerning accessibility and availability of ICTs, Ingle et. al., (2015) throw light on the problems regarding the farmers' equipment or tools for smart agriculture. How smart are the smart applications and devices they use for smart agriculture is the question that is underscored in this particular paper. Interestingly, while analysing the demographic data about using household communication devices, Robert Szilagyi (2012) finds age-wise and region-wise differences in problems with using ICTs. As technology keeps advancing, researchers keep adding to the problems faced by farming communities while using the technologies. Numerous issues emerged recently that stand as impediments for farmers in successfully reaping the fruits of ICTs. Saidu et. al., (2017) describe the problems due to inadequate knowledge about the ICTs, poor political will, insufficient power supply, impecunious internet infrastructure, lack of awareness, especially among the rural farmers, vernacular underrepresentation among internet languages, insufficient expertise to handle ICT facilities and lack of harmonisation of knowledge. Koukouli et. al., (2013) in their paper, present their experiences gained over the years, regarding the reasons for poor performance in the applicability of ICT innovations by the vast majority of farmers throughout the world. It is quite evident that the adoption of ICTs has not always been met with open arms. The rural dwellers are always sceptical about newly introduced technologies particularly because of the fear that the technologies may distort or replace their traditional practices or indignity.

Considering the aforementioned challenging factors proposed by the existing body of research, this study assumes that the Indian farming industry is a little technophobic due to the reluctance to advance from traditional farming style to digital media communication technologies incorporated farming practices; and it is the prime factor that stops the Indian farming Industry to the next level.

The rural farmers are still not able to fully adapt to ICTs. Administering two different questionnaires to 100 stakeholders, including farmers and government officials from the Ratnagiri district of Maharashtra, Leisa Armstrong and N. Gandhi (2012) investigated factors influencing the use of ICTs by the rural farmers. The study revealed that there is a massive opportunity to enhance disseminating farming-related information through appropriate media. They identified a considerable gap between the most used technology and the most preferred technology. On the one hand, Patel and Shukla (2014) have underlined the need of providing farmers with appropriate technology access in order to aid in their farming practices. O'Donnell (2013) underlines that there exists no single and best technology solution for all the circumstances. Consequently, the technology is not a complete solution on its own, but it can be used as a tool. For instance, ICTs can offer choices and possibilities that farmers can rely on to improve the standard of profession and 'gratification' (Katz et. al., 1973) and find solutions for current or upcoming problems.

1.2.5.1 Initiatives on ICTs in Agriculture

There has been a broad range of recent projects on the use of ICTs for agriculture in India and around the world. The agricultural sector is experiencing a significant transformation due to the integration of digital media technologies into farming practices (Farooq et. al., 2020; Elbasi

et. al., 2023). Almost every Indian state has introduced a new scheme for improving access to agricultural information to benefit from that (Mukherjee et. al., 2020). Millennial farmers, characterised by their technological proficiency and innovative approaches, are at the forefront of this technological revolution (Chuang et. al., 2020; Morathi et. al., 2020). However, many of these projects are technology-driven and design-focused, centred on designing working technological solutions to produce desirable results, rather than pondering the role of the technology in a system and how respective solutions or approaches affect social processes within the system. Regulative institutions, the state, respective laws, policies, and the market may only get ethnographers' attention when farmers and their daily lives are studied. Considering the socio-economic factors in farmers' decision-making, considerable academic attention has been received to adopt new technologies and major policies in the Indian agricultural sector. Mahama et. al., (2020) stated that responsible agencies have to provide a support system to the rural farmers to access the new developmental resources for the agricultural sector. Through its various projects, the government and other development agencies facilitate the growth of the agricultural sector in tandem with technological advancement. Knickel et. al., (2008) state the need for farmers to have a powerful network for the usage of ICT resources. Henceforth, the innovation policies must be equipped with motivation factors, different schemes, policies and proper measurement of incentives. The government along with different organisations can help to initiate research projects, and provide training and different extension activities or programs for the farmers. With the help of those projects, new technology as a raw commodity of the farming industries will enhance the overall development of the farmers. The positive impact of such policies on new technology for farming communities can be realised when the uses of ICTs disseminated through those

projects are widely diffused. There exist various ICT initiatives and projects taken by different researchers to examine the same. Venkatesh et. al. (2012) mentions many government portals like agmarknet.nic.in which help farmers in the management of crops, pesticides and diseases. Sushmita Mukherjee (2011) points out the training and research facilities provided by the District Rural Development Agency (DRDA) to facilitate development in rural areas. Human Resource Development (HRD) also provides functional help by offering assistance along with many more services to enhance the use of ICTs in Haryana. Haryana State Co-operative Apex Bank provides banking services, while Sindhanur Urban Souharda Co-operative Bank services provide hubs like Rural Business Hubs (RBH) in the rural area, especially for the villagers or the farmers. Council for Advancement of People's Action and Rural Technology (CAPART) is one among many projects initiated by the state government. Access to such ICT infrastructure is an essential factor in rural area development. This government-run popular initiative creates awareness among farming communities about the ICTs and helps in overall well-being progress in the farming community. Arijit Ghosh (2011) shows the communication technology-related initiatives from the government and non-government sectors as well as the projects undertaken for the development of India prior to the popularisation of new development technology and after the development of the technology. The government plays a significant role in the socio-economic development of rural areas. Most Indians reside in a rural area, and their isolation restricts them from contributing to the national mainstream, inauspiciously affecting the country's growth. Despite having a National IT policy for the Digital India program, India is regarded as 'information poor' (Gond et. al., 2015) and characterised by poverty, illiteracy, poor health services, unemployment as major hindrances to development.

For these reasons, the research and technology communities identified India as a potential ground for implementing ICT4D projects. According to Saravanan (2013) not less than 45% of the global ICT projects are in India alone. Having the highest number of information kiosks in Asia, spread across the rural parts of the country, India has some of its projects as web portals that function as digital mechanisms for information sharing through online discussions, creation, processing and dissemination of information in multiple vernacular languages. There was demand-driven, community inclusive and community-owned Village Knowledge Centres (VKCs) to provide hyperlocal vernacular content. The mobile numbers of progressive farmers, Krishak Sathis (Farmers' friends), extension officials, and input dealers are registered in a group as part of Kisan Mobile Advisory Services (KMAS), employed by most Krishi Vigyan Kendras in Orissa, in order to successfully disseminate farming-related information (Pranesh, 2016).

In their work "Information and Communication Technology in Agricultural Development: A Comparative Analysis of Three Projects from India," published in 2004, Meera, Anita Jhamtani, and D.U.M. Rao has done a comparative analysis of three different projects on the basis of monetary investment against the positive impact of farmer's community and the essentiality of investment on aspects of farmers initiatives in the future. 'Gyandoot' is the first project with an investment of Rs. 2.5 million, consisting of technological infrastructure required for agriculture. The second project is 'iKisan', an advanced project in which the Gyandoot focuses on the female farmers and the ICT initiatives taken by them for farming. 'Warana Wired Village' is the third project utilising ICTs to increase the productivity and efficiency of farmers in cooperative societies by setting up a computer network at the village level facilitation booths for providing educational, medical and agricultural information to the

villagers. The research observes that the ICT usage by the stakeholders in the three different projects is less than anticipated.

There are only a few farmers accessing these services available for them. The researchers stress on farmer's training and participation towards utilisation of different ICT resources, and the design of hardware and software of these technologies should be user friendly as the computer literacy of rural India is inadequate. Union Territory (UT) of Pondicherry has also initiated the Village Project of MS Swaminathan as part of the research foundation project, including ICT usage training for rural farmers. Various training coupled with sufficient experience is required to use the new development resources like ICTs. Agri-tech extension services like awareness and training programs, field visits, meeting with scientists, hands-on workshops and so forth are found effective for the use of ICTs by rural farmers. Ekgaon provided mobile phones to over 11,000 farmers in India, which gave them access to agriculture-related information that allowed them to get the most out of their agricultural venture (World Economic Forum, 2011). Government and non-government organisations provide different grants to farmers for purchasing ICT aids (Gupta et. al., 2014). In Uganda, Freeman (2020), notes that government projects exist to promote ICT usage among farmers in order to improve their living conditions. They developed a platform where village agents gather farmers' information such as demographics, production details, cultivation land details and CVs- using GPS function in their smartphone instead of providing them services like market prices, weather forecasts, crop insurance, and digital financial services, better economic practices etc.

Similarly, in India, Jitendra Kumar Pandery et. al. (2015) describe the details of such smart applications as part of E-Governance, Lokvani Project (Uttar Pradesh), Ministry of Health and Family Welfare (MoH&FW). Tele-Education is another national government initiative taken

earlier for rural development using technologies. The government implemented initiatives, namely Community Radio, Community Television, Gyan Sanchar, and Rural e-Seva, where ICTs that empowered rural life. A survey was also done to measure the effectiveness of various ICT4D schemes by central and state governments (Pandrey et. al., 2015). Singh & Singh (2017) implies the importance of agriculture and the different policies on technologies applicable for the farming communities. Implementations of projects on ICTs resources need more knowledge and extensive research. The increase in ICT infrastructure has been beneficial to rural communities and distant barriers were reduced over time with technological advancement (UNCTAD, 48 2009:119). India has taken advantage of these technological advancements and has invested in projects such as VSATs as well as making use of electronic displays and price dissemination through SMS to mobile phones. Mahant et. al. (2012) details several such new developmental resources and policies on ICTs and the issues related to that. The prime focus of various policies on farmers is to provide access to new technology-enabled development resources in agriculture with different recommendations to solve the issues while using them. Though Mehtha and Kalra (2006) and Mahant et. al. (2012) suggests some feasible solutions to various technical problems and establish the ways to successfully and efficiently implement ICTs in rural areas, some questions and concerns still exist on the effectiveness of individual or combined efforts made by government and non-government organisations to establish ICT projects in rural areas, or how far these projects are successful in the grassroots. Some scholars emphasise the effectiveness of these projects whereas some others find that the benefits of these projects are yet to be yielded and the technologies propagated through them are yet not widely diffused.

1.2.6 Paradigm, Approach and Methods

While there exists a huge body of research on technology and agriculture, only some of these researches have followed a qualitative approach, and of this, an even smaller portion employed ethnographic methods. Inspired by O'Reilly (2021), I understand ethnographic research methodology to conceive "social life as practice" (emphasis in original), which broadly entails. With regard to the aforementioned, O'Reilly (2021) notes that ethnographers acknowledge and research social life as a process, not as momentary fractions of time. However, short ethnographies exist, applying similar principles, rapid ethnography done using short, focused goals and interactive strategies to conduct ethnography over short periods of time (Millen, 2000; Braund and Schwittay, 2006). Nevertheless, the focus entailed by rapid ethnography may conceal broader social issues.

Ethnography has an emphasis on understanding people's behaviours during their everyday activities and ways of life; it also reflects the experience of the people who live in a specific community.

(Crang and Cook, 2007)

It also aims to observe and describe certain communities that live in a particular geographical area (Blomberg et. al., 1993, p.123). In this sense, ethnographic (qualitative) research can generate relevant findings which may be relevant for other situations through the application of theories and concepts (O'Reilly, 2021). Traditional agrarian and ethnographical anthropology have theoretical strengths in understanding farmers' knowledge, technical practice, and social organisation. Integrating social structure and socially constructed meaning into one analytical frame produce a worthy analysis of agrarian communities in a holistic perspective (Crane, 2014). A combination of agricultural anthropology with Science and

Technology Studies (STS) equally analyses the socio-cultural contexts of both farmers and scientists in the same frame. In general, the development of science and technology and particularly ICTs facilitates a wide range of communication, information and advisory services in the path of technology transformation (Keller et. al., 2014). The research community, with the help of the farming community, is grappling with the question of how best to harness ICTs to make the rural livelihood better and sustainable. Sustainability evolves out of inclusive participation and shared objectives, knowledge, organisation, decision and technology. Focusing empirically on these practices brings forth the conceptual categories of “local” and “scientific” (Almekinders 2011; Jansen and Vellema 2011), which will contribute to the generation of new insights into the factors that enable participatory production of technology. Since ideas came up from the farmers’ thoughts, experiences, views and motivations, and since they are the experts who have a comprehensive and authoritative knowledge and skills on their rural field, farmers should be determined to any future procedure in order for the ICTs to be part of their working life, within the agricultural sector. Robert Rhiades and Robert Booth in 1982 urged the “farmers-back-to-farmers” model for agricultural development where farmers’ knowledge and practice is the starting point of technological innovation as well as the endpoint– as an ultimate measure of the value of such innovations. While in this participation, Dhaka et. al. (2010) identifies a communication gap between the researcher and the farmers to mutually transform information in an effective manner. Joseph et. al. (2012) analyses a case for the use of participatory approaches among farming communities and technologists to develop and adopt ICTs in the agricultural sector. Joseph et.al. further discusses how digital ICTs developed by means of participatory learning and participatory production of knowledge can spur agricultural development. They also attempt to examine various parameters from

development-related literature and identifies four key problems in participatory technology; who defines the participation agenda? what capabilities do stakeholders have to participate and how can this be strong? what is the role of institutional conditions in enabling effective participation? and how do local participatory processes get integrated into broader networks for sustainability development? These four problems produced a framework to analyse how the usage of the new technology, i.e. ICTs establishes participation between rural development and new technology. The framework suggests that both theoretical and practical knowledge is essential for the development of rural India. It shows the integral, structural and behavioural perception for the farmers of rural regions (Puri, 2007). Based on examples, Awuor et. al., (2013) show that such frameworks must adapt to the dynamic trends in ICT tools, applications, adoption and usage. They further illustrate that the development of such frameworks addressing the aforementioned properties must focus on inclusiveness.

However, the STS very rarely addressed agricultural issues in the global South, especially farmers' own production of ("folk") science and technology (Shrum, 2000). The integration of STS and agricultural anthropology is particularly crucial in terms of examining the dynamics of participatory technology development, everyday technology practice of people and their relationship with technology. While anthropologists may be more interested in farmers' cultures, this interest may often be best served by widening the analytical focus to include the research scientists and technologists under the same research roof.

1.2.7 Ethnography on Communication and Technology

By introducing and studying the new technologies, what constitutes technology is a matter of debate among scholars. Quan-Haase (2013, p.7) describes technology as "an assemblage of

material objects, embodying and reflecting societal elements, such as knowledge, norms, and attitudes that have been shaped and structured to serve social, political, cultural, and existential purposes". However, in the case of ICTs, the aim is digital media technology (including social networks) capability, which focuses on the complete picture of the communicative ecology.

In comparison with previous years (Kánská et. al., 2012) marks social networks as a brand new domain in the agriculture economy. As these are new media that yet have no fixed form, we can and, need to, adapt them to 'local' communication ecologies. Moreover, in the case of digital media, we have to bring together traditional standalone media with different trajectories, forms and nature, and creatively adapt them to make something new and effective, and more importantly, hyperlocally appropriate.

In a UNESCO book on Ethnographic Action Research, Tacchi et. al. pose a scenario:

“in order to contact a relative in Dubai, a Sri Lankan villager may talk to a neighbour to ask to use their phone; then travel to town to send a fax to Dubai arranging a time to receive a phone call at their neighbour's house.”

(Tacchi et al., 2003, p. 17)

Communicative ecology explains that the people being participants of a communicative ecology should recognise that the multiple modes of communication may be used in combination in order to accomplish one task. The 'Braided communications' (Densmore, 2012, p.85) instead explains why this happens, why certain individual mechanisms have been selected, what this combination of channels offers those individual modes lack, and how new communications strategies are established.

While ‘everyday artifacts’ are widely used in the context of ICTD literature, (Norman, 2010) who formally developed this. As communication constraints are common, their causes range from cultural and language differences to the more fundamental barriers presupposed by technological capabilities and geographic distance. Along with the advantages, the issues of affordance and constraints help people to choose appropriate communication medium for everyday tasks (Olson and Olson, 2000; Hinds and Bailey, 2003; Kreijns et al., 2003; Nardi and Whittaker, 2002; Tang, et.al., 2020).

Regardless of technological advancement, most ethnographers still conduct studies situated in the offline social world. To continue effectively exploring major and enduring concerns of ethnographic research in the millennium (such as the nature of social worlds and their subcultures; the construction of social identity; the beliefs, values, and their world views underlying social life and human actions; and the everyday life experiences), ethnographers must incorporate the internet and the life of people on the digital world into research in order to adequately understand social life in contemporary society. The argument on this digital incorporation in ethnographies constitutes that the ‘virtual’ world is an equally prominent ‘social space’ as the ‘real world’ (Lyman and Wakeford, 1999; Ruhleder, 2000). Later, some ethnographers added that the ‘virtual’ world in ethnographic research differs greatly from traditional ‘real’ world settings (Hine 2000; Lysloff 2003). In their work ‘Racing and Queering the Interface, Gajjala & Altman (2006) used cyber ethnography as a methodology as it is rooted in an ‘epistemology of doing’. Their research is an intersection of online and offline (‘virtual’ and ‘real’) practices, where global, local and ‘glocal’ (Morita, 2013) cyberselves are shaped in the intersection of ideology, discourse, and material practice.

This research concurs with those ethnographers who argue that there is one social world that contains both traditionally and technologically advanced modes of communication and sites of social activity. In light of the existing literature on the study problem that has employed ethnographic methods, the method propelled the element of transformation that comes from the connection of social research in combination with the ethnography method. This research aims to reflect how the participants could live and change with technology within the environment they live and act in. Henceforth, the research explicitly argues that the current blending of offline and online worlds ('Real' and 'Virtual') requires ethnographers to incorporate Computer-Mediated Communication (CMC) in their study design and procedures to approach and interact with the subjects.

1.2.7.1 Visual Anthropology and Visual Ethnography

The debates on whether visual elements should endorse observational researches in social sciences historically emerged during the 1960s to 1980s. Ethnographers like Margret Mead, Howard Becker and John Collier Jr disproved the dominant paradigm that denied the use of visual anthropology, claiming that the method of data collection is largely subjective, unrepresentative and unsystematic. Malcolm Collier (1986), reprinted one of the most influential publications of his era with his article, *Visual Anthropology: Photography as Research Method*. Visual anthropology initiates discourse across the literary barrier by providing a platform for both 'voice' and 'representation' (Roy & Jhala, 1993). William Rirrenberg (1981) in his study on Buddhist rituals in central Thailand, projected his visual recordings to Buddhist monks to gather more elaborate descriptions of the practices. Such visual documentations of everyday practices of a community reveal complex patterns of interaction in the community that cannot be thoroughly described otherwise, and the ethnographers thus

gain a comprehensive understanding of the community as a whole. These visual artifacts can be useful for conducting a second study on the same community in future. For example, farmers' everyday technology practices have changed from time to time, which Oreglia (2013) marks by the term 'restudy'. The term 'restudy' is applicable in a situation where a series of (not less than two) studies on the same subjects and in a well-defined area is conducted Oreglia (2013).

1.2.7.2 Technography

The Oxford English Dictionary defines the term *technography* as “observing and descriptive stage” of the technological development cycle. Bernie DeKoven, in the 1980s, claims to have invented the terms as a method and recently, the appropriation of the long-forgotten anthropological term by the industry has been rather complete. Following DeKoven’s lead, the industry uses the word technography to describe a real-time, multi-user document production. However, the recent developments in technological potentials have induced a new anthropological and sociological concern with describing the arts and crafts of tribes and people. Goffman (1963) informed an interactionist approach to technographic work, adopted by classic texts such as ‘The Presentation of Self in Everyday Life’ (1959), ‘Behavior in Public Places’ (1963), ‘Relations in Public’ (1971) and so on and so forth. These technologically contextualised performances or behaviours in the human everyday were exemplified by researchers like Katz & Sugiyama (2006); Ling (2004); Gotved (2006); and Robinson et.al. (2010).

The contemporary interest with recent developments in technological capabilities and potentials have stimulated a fresh anthropological and sociological concern with describing “the arts and crafts of tribes and peoples.” Much of this fresh surge in what we might classify as technographic work adopts a Goffman’s interactionist approach, referencing classic texts such as *The Presentation of Self in Everyday Life* (1959), *Behavior in Public Places* (1963), *Relations in Public* (1971), and *Frame Analysis* (1974). This grounding has been helpful for numerous academics struggling to make sense of the public–private performative aspects of human “technologically contextualised” behaviour that has become particularly visible with the virtualization of experience and congruent mobilisation of electronic space (a few examples: Gotved, 2006; Humphreys, 2005; Katz & Sugiyama, 2006; Ling, 2004; Robinson, 2007; Soukup, 2006; Waskul, 2005). Although such work is unquestionably rigorous and often quite academically poignant, Goffman-informed research perpetuates an assumption that the authors in this special issue wish to contend with. That is, it continues to reify technology as a prop or dead “thing” somehow situated outside the arena of social interaction even while it demarcates the boundaries. It is not that we eschew this orientation; there is much we have learned from such work, and will no doubt continue to garner for many years to come. Rather, in the present circumstances of technological evolution, the work in this special issue seeks an approach that enables us to describe what the traditional approach cannot: the intimacy of technology, the relationships and feelings it is bound up in, and the understanding that technology contributes dynamically and dramatically to the performance of everyday life rather than one dimensionally serving as its backdrop and container.

The Actor–Network Theory (ANT) has held the mantle as a reluctantly pigeonholed “ethnography of technology” for roughly two decades. Technography as we are using the term

is not a contender for the title, but rather precedes ANT and might teleologically be considered the genre of inquiry to which ANT belongs (i.e., insofar as we trust the arbitrariness of taxonomies). Although there is much affinity between our motivation and the ANT goal of collapsing modernist inside–outside dualisms, this pushes beyond the traditional ANT approach, which emphasises attention to the abstract array of forces productive of “things.” It is not so much the array itself that holds our attention here, which suggests maintaining a macro perspective of sorts. Rather, the relationships themselves from an intimately experienced perspective are the concern, one ingredient of what Latour (1986) once referred to as the glue that holds society together. The goal here is in essence twofold: to coax socio–techno researchers to embrace the latest advances in qualitative methodologies and push them further, and to encourage qualitative researchers to reconsider traditional assumptions about “dead” space and technology. Such research will help us come to terms with some of the social ramifications of exponentially increasing technological changes, which includes everything from robot vacuum cleaners and cars that park themselves,

1.2.8 Ethnography and the Internet

Ethnography is concerned with how individuals and groups live life in social spaces (Hallett and Barber, 2013). Anthropologists who are interested in researching the Internet believes “ethnography is the best strategy to study the Internet” (Hine, 2000). ‘Virtual ethnography’, ‘digital ethnography’ and ‘netnography’ are the “modern, digital equivalent of Malinowskian ethnographic forms” (Masten and Plowman, 2003) that majorly employ same traditional ethnographic procedure, but with different approaches. The ‘Virtual ethnography’ provides an ‘internal view’ of the ‘actual contexts’ of people’s understanding and use of the Internet (Ito et. al. 2008).

The discussions about the meaning and boundaries of "field" in virtual ethnography are highly crucial (Ardévol and Gómez-Cruz, 2014). Accordingly, the 'field' here is a 'multi-sited network of intersecting offline and online spaces and ethnography of the Internet studies and how the Internet is embedded in the context of their everyday. The Internet creates a dialectic between online and offline events, perspectives, and interactions" (Wilson and Peterson, 2002). The Internet has transformed the processes of learning, ways of entertainment, and ways of doing business. "The Internet has woven together humanity in new ways" (Kirmayer et. al. 2013). Thus, the Internet has been increasingly embedded into the context of everyday life of people. Henceforth, the 'physical' and 'virtual' activities of Internet users are entangled in a new 'synthetic space'; it signifies that the daily life of people happens parallelly in 'offline' and 'online' spaces. The fact that the Internet is highly integrated into daily routines of people explains why the Internet should not be understood as "exotic and removed from real life" (Cartera, 2011). However, the effect of the advent of the Internet in people's social lives has dramatically affected the ways through which people behave, organise, and interact. A newly formed communities have shaped human relations into a rapidly expanding 'social space.' This new 'social space' altered the older forms of human relations, but it also has provided new forms of public and private communications. Wide use of Internet has made it a natural setting for anthropological research. The Internet is suitable for anthropological exploration as it assimilates social dynamism.

There are different terminologies to call this anthropological inquiry, such as "cyber anthropology", "digital anthropology" or "virtual anthropology" and each of these terms represent a certain anthropological perspective to study the Internet. In an overall view, anthropologists have encountered with the Internet through three major approaches:

- 1) studying the Internet as a "social phenomenon" with considerable social implications,
- 2) studying the Internet as a new "social space" where new social experiences and different forms of virtual culture have been emerging, and
- 3) using the Internet as a new research tool to conduct anthropological researches.

(Madani, 2015)

In a nutshell, 'the study the Internet, on the Internet and by the Internet' in anthropological inquiries has been increasingly concerned over time. Increasing attention is there to explore how people experience the Internet, and how they operate within the framework of everyday (Helen Gerth, 2009). Studying the complex relationships between real and virtual social experiences and cultural forms, among groups of people in their "natural habitat" inevitably include studying their "online habitat" as well (Hallett and Barber, 2013) and how the Internet has embedded itself into society.

1.2.9 Communication Ecology

Communication is a critical component in everyday farming as in every other aspect of human life. Without systematic or networked communication, the farming sector may feel isolated and disemployed from the social system. Effective communication enables the farmers to create and maintain working relationships despite the obstacles that occur, especially in developing regions.

A communication ecology comprises a technological layer that consists of the devices and connecting media that enable communication and interaction. A social layer consists of people and social modes of organising those people—which might include, for example, everything from friendship groups to more formal community organisations, as well as companies or legal entities. Furthermore, a discursive layer is the content of communication—that is, the ideas or themes that constitute the known social universe that the ecology operates in.

(Hearn & Foth, 2007)

Communicative ecologies arise out of an 'Ethnographic Action Research (EAR)', and it represents an attitude towards ICTs: "instead of poring on standalone ICTs and their 'impacts', an EAR approach will see the whole system of communication and information in a people's way of life" (Tacchi et. al., 2003). However, as an approach to communities and their technologies, communicative ecologies do not explain how and why different communication technologies are employed at different times, and for different tasks, rather it merely underlines that this plurality of approaches exists. By what modalities of communication do people combine, select, and ultimately adopt different technologies are to be explored. Henceforth the farmers using these digital communication technologies should acquire the appropriate knowledge in these new methods of communication in order to benefit themselves in the communication ecology and establish a symbiotic relationship with the elements of communication ecology. In setting up the foundations of ethnographic research, Tacchi (2003) states that communication technologies are a part of communicative ecology: communications involve a conflation of media and people that change over time. Building on the idea of communicative ecologies (Tacchi et. al., 2003), communication technologies including new

information technologies, exist in a complex of ecologies interweaving several aspects of the context together. The intervention of new information and communication technologies inevitably disrupt the existing ecology. Considering the conditional relations of this approach, any information technology intervention is embedded in existing communications processes (within the existing communicative ecology), involving a mix of local and available media. Various popular nodes in the communication ecologies- newspapers, radio, television, folk arts, in-person communication, and broadband internet- used to play a major role. However, now, they rarely continue to play such roles in how people in the communities share information and build relationships with each other during everyday agricultural practice.

While it is undeniable that the advent of the smartphones along with the internet is changing the roles of each of these modes of communication, the smartphone, however, is not replacing them wholesale, no more than the television replaced the radio, rather being a 'convergent media' (Jenkins, 2006) in the communication ecology.

1.2.10.1 Mobile Phones and Agriculture; New Agent in the Communication

Ecology

People around the Globe from a few years from now will be carrying a handheld computer connected to the Web to get the information about the World at their fingertips.

(Chandra, D.G. & Malaya, D.B., 2011)

Communication and farming mostly go hand in hand as development agencies deliver effective ICT services to a broad range of people in the farming communities. More recently, researchers and practitioners suggested that mobile phones increase the scalability of agricultural practices.

Remarkably, people use smartphones to overcome impediments due to poor infrastructure and high capital. Smart applications are now an effective medium for formal and informal communications, reaching even the rural farmers, where e-mail or other formal communication is not possible.

ICTs such as mobile phones can enhance the process and outcomes of agricultural development initiatives if they are selected based on: (1) their suitability to meet the project objectives; (2) their adaptability to the socio-economic condition of local communities and; (3) the availability of the needed resources (local partners can play a key role in ensuring their availability)

(FAO, 2015)

Over the last two decades in India, the markets have been flooded by mobile phones, tablets, and other pervasive devices (Cranston et.al., 2009; Cranston et. al., 2010). The mobile phone system in India has established an effective system for information dissemination. Mobile phone subscriptions grew by 73% in India between 2005 and 2006 (TRAI, 2006). There are several mobile-based services providing information, including agricultural information, mostly free of cost. Balwant Singh Mehta (2016) conducted a survey exploring the socioeconomic impact of mobile phones in rural areas of Punjab and Bihar. The survey revealed that mobile phones had reduced the cost of accessing information related to agriculture, education, employment, etc. Based on group discussions and interviews with the farmers in Rajasthan, Uttar Pradesh, Maharashtra, New Delhi, and fishing communities in Pondicherry. Surabhi Mittal et. al., (2010) analysed the impact of mobile phones on small scale farmers in India. According to the authors, the introduction of mobile-enabled information

services provides solutions to existing information issues. The study evinces that the farmers using mobile phones have increased their productivity in agriculture.

Meanwhile, the technical solutions for Indian Agriculture seem to have an almost singular focus: Smartphone applications. Smartphones as a platform provide a compromise between the specificity of our solutions and the need for a sense of commonality in what people do. They have a broad appeal to granting organisations (important!) as well as to media organisations. It is undeniable that smartphone penetration in India has been extremely rapid. According to Telecom Statistics of India (TSI), 400 million of 687.6 million internet subscribers use social media. The number of internet users and social media users in India has increased by 23% and 48% respectively (TSI, 2020) However, the hype of smartphones rings almost to the exclusion of all other communications technologies. Smartphones are frequently touted as being the appropriate and sustainable platform for rural development. They are relatively cheap, durable than other communication devices. For these reasons, mobile phones have become one of the most popular technology devices. The ICT Indicators database by ITU World Telecommunications presents the growth of mobile subscriptions during the first decade of the 21st century. The worldwide growth and popularity of mobile phone technologies happen, as seen by a rapid increase in users and improvements in its functionality. Interestingly, seventy-five per cent of the six billion mobile phones around the world are in developing countries (Peyper, 2013). Recent studies assert that smartphones became the most used ICTs within a short span of time while compared to other means of technology. Smartphones are now the highly accessed technology as well as the most frequently used device by the users due to their relative affordability and ease of use by illiterate farmers (Raj et. al., 2020). The global mobile phone connections have grown more than 10% each year from 2000 through 2010. In 2021,

981.92 million wireless subscribers out of total (1,167.71 million) subscribers were active (TRAI, 2021).

The early twenty-first century has particularly observed a sizable number of studies on various aspects of smartphones and its relation with different groups of people. Harper et. al. (2008), for instance, argues that smartphones themselves are not a driving force for social change. However, the mobile phone has transformed in its capability and affordability in the underlying hardware and operating systems. Happer's study reviews the retrospectives of ICT4D research, including mobile phone research, and goes beyond a mobile phone to mobile applications, making the mobile phone smartly designed for customised needs. Aker et. al., (2011) propose an android application- Krishi Ville-to help farmers in farming activities. The new smartphones loaded with such mobile applications have extensively penetrated all sectors; but to a lesser extent in the agricultural sector (Mittal, 2010). Subsequently, recent studies show that smartphones have penetrated almost every aspect of people's everyday life. These applications provide the farmers with important information on weather, crop information, updated market prices, and facilitate the local buying/selling with the handheld devices (Woodill et. al., 2014; Shannon, 2017). The dynamic outgrowth of smartphone communications technology opens ways for economic prosperity, social empowerment, and grassroots innovations in developing countries. Providing information and other services to rural inhabitants, the potential impact of mobile applications made new means to Agricultural and Rural Development (ARD). A study conducted in 2011 in the United States attested the rapid adoption of smartphones by farmers and, in fact, are using the devices more productively. The research showed that farmers are using smartphones more like a professional tool and then for entertainment (Karetsos et. al., 2014). Gitonga (2015) study the use of mobile phones by smallholder farmers for agricultural

transactions and find that many farmers are affected by factors such as age, literacy, gender, and the capacity to own a phone. In their work, *The Cell Phone*, Horst and Miller examined this idea in Jamaica, in which they draw how mobile phone usage gets deeply embedded in the social and professional needs of the users. He finds that the mobile phone resides in a wider 'communicative ecology' (Hearn & Foth, 2007), in which people extend social networks and cope with their everyday. As with the telephone, the Jamaicans used activities like 'link-up' to help maintain stronger ties with their friends and family (Horst and Miller, 2006). As Donner observes, these activities do not happen randomly, but are embedded with a rich set of norms and practices (Donner, 2007).

1.2.10 Leads to the Millennials

The Millennials are generally regarded as individuals born between the early 1980s and the mid-1990s, also popularised in the literature as the NetGen (Generation Next) or Generation Y (Abram & Luther, 2004). Much of the existing studies focus on characteristics of the millennials that supposedly distinguish them from former generations, and there emerge several commonalities among the findings. Frequent and more prominent assertions consider millennials as digital natives rather than digital immigrants and hence are more experienced and comfortable with technology than earlier generations (Palfrey & Gasser, 2008; Prensky, 2001; Shah & Abraham, 2009). Their attraction towards technologies allows them to have proper social interaction yet not aware of proliferation and often the existence of technology while using it, as they see technologies as an extension of everyday life (Oblinger, 2005). The intense relationship between millennials and technology is also evident in existing literature. According to many scholars, millennials approach everyday tasks by the technology-dependent world they live in (DiGilio & Lynn-Nelson, 2004; Lippincott, 2012; Weiler, 2010; Windham,

2007). The critical assessment of existing literature finds some commonly cited works that describe Millennials as ‘tech-embracing’ and as ‘digital natives in a land of digital immigrants’ and have ‘never known a day without a computer’ (Howe & Strauss, 2000).

As more of the Millennials lodge into the workforce, more researchers have studied about the unique characteristics of this cohort as professionals. Research articles in this domain follow a typical pattern while describing the characteristics of the millennials. Mooney et al. (2018) predict that the social networking and technology addiction of the millennials will drive the generation to embrace platforms and software that encourage participation and collaboration. Because the millennial generation today is almost or entirely defined by their all-embracing technology use. According to Effendy et. al., (2022), some of the main characteristics of millennials include gadget-mindedness, particularly the regular use of mobile devices, use of social media, know and grow in tandem with the latest technology, and the belief that information technology is basically an aid or an opportunity. Henceforth, investigating the millennial farmers by knowing these characteristics will provide a holistic view of the subject's behaviour and the potential of millennial farmers. With respect to the farming practices of millennial farmers in India, it was reported that they manage to organise themselves using social media and have made attempts to avoid price crashes due to the miscommunication leading to oversupply. The elder generation rural farmers participate less in the social digital technology spaces as compared to their younger counterparts. It is also observed that millennial farmers are more technology-accepting than the current generation (Sumartono et. al., 2019). Raj et. al., (2015) underline the potential of educated youngsters in the rural area to use and contribute to the development of technology services. The younger generation of farmers uses

smartphones more regularly; 71% of millennial farmers own and regularly use a smartphone, compared to an overall total of 39% (Chang and Kuo, 2013).

This review is not bounded to any particular research methodology, or to a single journal, or to any specific geographical region. It is sufficiently broad and contemporary to include the latest trends, practices, statistics and empirical discussions, and gaps in the problem area were identified to generate research questions. Literature on Agriculture, ICT4D, ICTs in agriculture, Tech-initiatives, farmer's everyday, communication ecology etc. has often narrowly pointed out certain artefacts like the mobile phone, knowledge capital and other benefits technologies can bring to farming communities in their everyday life.

1.2.11 Technology–Society Interface: A Brief Historical–Sociological Survey

According to Mills (1959: 162), ‘Unless one assumes some trans-historical theory of the nature of history, or that man in society is a nonhistorical entity, no social science can be assumed to transcend history. All sociology worthy of the name is “historical sociology”’. ‘In my understanding of history and sociology, there can be no relation between them because, in terms of their fundamental preoccupations, history and sociology are and always have been the same thing. Both seek to understand the puzzle of human agency, and both seek to do so in terms of the process of social structuring. Both are impelled to conceive of that process chronologically; at the end of the debate the diachrony–synchrony distinction is absurd. Sociology must be concerned with eventuation, because that is how structuring happens. History must be theoretical, because that is how structuring is apprehended. Historical sociology is thus not some special kind of sociology; rather, it is the essence of sociology’ (Abrams, 1982: 2). For Giddens (1984: 357–358), ‘What distinguishes social sciences from

history? I think we have to reply as Durkheim did ... nothing–nothing, that is, which is conceptually coherent or intellectually defensible’.

The earlier notion that technology is autonomous, invariant, ahistorical, independent, neutral, objective, *atemporal*, etc. – promulgated by technological determinism – is no longer sustainable. For example, according to Mannheim (1936), all knowledge, *except* scientific knowledge, is socially and culturally conditioned. This is known as the internalist account of technology – the idea that technology develops as the sole result of an internal dynamic and then, unmediated by any other influence, moulds society to fit its patterns. in an autonomous fashion unmediated by any other external influence – technological determinism (Winner, 1980). Disenchantment with demarcation between science and non-science, autonomy and cognitive authority of science and technology – internalist account of science and technology – has led several scholars to dwell upon science and technology in terms of the ways in which they are historically integrated (Kuhn, 1962) and culturally embedded (Mallick, 2021). This is known as the externalist account of technology. In other words, all knowledge, *including* scientific knowledge, is socially caused (Bloor, 1976). According to Restivo and Bauchspies (1997: 402), ‘The term “social” is not only in the “external” social and cultural milieu or context of science, but in the social organisation of science, indeed in scientists themselves. The ‘social’ in this sense is pervasive, and no more transparent than quantum or gravitational forces’. The social is historically and democratically constituted, and hence varies over time and across space.

Putting it succinctly, technology is the medium through which human beings interact with nature – encapsulating natural as well as social phenomena, intending to broaden the canvas of nature. Such conceptualization of technology is contingent upon materialist conception of

history – it is not the consciousness of men that determines their being but on the contrary their being or social existence that determines their consciousness. ... The tradition of all dead generations weighs like a nightmare on the brains of the living (Marx, 1859). We aim to capture the transition from the internalist to the externalist characterization of technological systems in the present study¹. The neutrality of a specific technology depends upon the ways in which it is designed and controlled (Williams & Edge, 1996). Machines, structures and modern material culture should not merely be examined in terms of their productivity and efficiency, positive and negative environmental side-effects but also in terms of the ways in which they embody power and authority. What matters in ‘not’ technology itself, but the social or economic system in which it is critically embedded (Winner, 1980). Two technologies have recurrently existed side-by-side, viz. authoritarian and democratic (Mumford, 1964). Authoritarian technologies are system-centred and immensely powerful but inherently unstable whereas democratic technologies are human-centred and relatively weak but resourceful, durable and sustainable. The early 1970s saw the emergence of a new approach to thinking about science and associated technological practices. Sociology of science and technology is based on two tenets. On the

¹ It is important to understand the naivety of the dichotomy between the internalist and externalist accounts of science and technology. For example, science as a dynamic force must go beyond the absolutist idealist conception of its immanent development, on the one hand, and historical relativism of those who construe science and technology as purely conventional social constructs, on the other (Bourdieu, 2003). The distinction between the internalist and externalist worlds of science is not rigid but porous (Haribabu, 1999; Mallick, Haribabu and Kulkarni, 2005; Mallick, 2006).

one hand, it insists that science is interestingly and constitutively social all the way into technical core, that is, scientific knowledge itself has to be understood as a social product. On the other hand, scientific knowledge is determinedly empirical and naturalistic. In the 1970s, the conceptual and geographical map of sociology of science remained simple and readily surveyed. Its twin centres were Edinburgh and Bath. Whereas Edinburgh was engaged in macro-social approaches to scientific knowledge (Barnes, 1974, 1977, 1982; Barnes and Edge, 1982; Barnes and Shapin, 1979; Bloor, 1976; Shapin, 1982), Bath was engaged in micro-social approaches that aimed to display the production of consensual knowledge as the outcome of contingent “negotiations” between scientific actors (Collins, 1985). This period also witnessed the emergence of other centres of sociology of science and technology, most notably the group around Michael Mulkay (1975) in York.

Nevertheless, new approaches appeared in Europe and the US in the late 1970s and early 1980s. One key landmark was the appearance of the first book-length ethnographic study of *Laboratory Life* (1979) by Bruno Latour and Steve Woolgar. The next laboratory-life book was *The Manufacture of Knowledge* (1981) produced by Karin D. Knorr-Cetina. By the late 1980s and early 1990s, a variety of STS approaches to understanding science were united by a shared refusal of philosophical apriorism coupled with a sensitivity to the social dimensions of science but differing at the same time along many dimensions. More pertinently, Sismondo (1993: 516), a leading advocate of the sociology of science and technology, has distinguished between different meanings of the term, “construction”:

- (a) the construction, through the interplay of actors, of institutions, including knowledge, methodologies, fields, habits, and regulative ideals;

- (b) the construction by scientists of theories and accounts, in the sense that these are structures that rest upon bases of data and observations;
- (c) the construction, through material intervention, of artifacts in the laboratory;
and
- (d) the construction, in the neo-Kantian sense, of the objects of thought and representation.

Meanings (a) and (b) are prominent in the work of constructivists whose concern is primarily with the construction of scientific knowledge, not just the social nature of knowledge and/or the idea of social reality is constructed, but also the thesis that social interests enter into the field of science. Construction in meaning (c) is a more radical view and figures prominently in the work of those who highlight the often drastic preparation and reconfiguring that are required to make “natural” materials suitable for laboratory investigation; whereas meaning (d), which is not always clearly distinguished from the other meanings, involves the emergent idea that objects are created by their representations, that even the natural world is to be considered a product of scientific knowledge.

1.3 Research Gap

The intersection of technology and farming is extensively studied, either as a problem to be solved or as a potential to be explored, as in the above-mentioned studies. These works focus on the impact of digital technologies in a particular community or area, mostly with a positivistic approach, either to point out the advantages, challenges or futuristic possibilities of using technology in agriculture. The remarkable gap in the discussion prevails, which lack a

study on conceptualisation and positioning of digital media technologies in the everyday life of farmers, that too in their lived space, with an emotive approach. Going deep into the conceptualisation, the review finds that the relationship and emotional aspects of millennial farmers with the digital media entities are underexplored. That, too never an attempt made on farmers in Kerala. The existing body of research consequently is unable to shed light on this unexplored area of research.

1.4 Rationale for the Study

A thick, deep narrative account of the real-life status of the everyday life of millennial farmers in Kerala is inevitable to highlight this potential technology enthusiastic new farming community in Kerala and, consequently, this will bring this area of research into the spotlight. Rather than a peripheral approach, a thorough description of the narratives will bring forth what is happening on the ground- how the innovations, initiatives and policies on technologies for farmers are reflected in their everyday lived space. The present study is significant as the millennials' representation in the agriculture sector declines even when the need for utilising the technology potential of millennials in agriculture is highly demanded. Theoretically, the study contributes to the field of digital media studies by expanding our understanding of how digital media technology becomes integrated into everyday life in agricultural contexts. Practically, the research findings will inform policymakers, agricultural extension services, and technology developers about the specific needs, preferences, and challenges faced by millennial farmers in relation to digital media technologies. This knowledge can guide the

development of targeted interventions and training programs to enhance farmers' technological skills and promote sustainable farming practices.

1.5 Research Questions

The core of this research is its three research questions

1. How do millennial farmers conceptualise and position digital media technologies in their everyday?

This question raises several related concerns as well:

- A. What is farmers' idea about technology they use in their everyday?
- B. What is the initial perception and later formed perspectives of farmers regarding the digital media technologies they use everyday?
- C. How are technologies positioned between farm and farming?
- D. How do farmers shape, redesign, domesticate media technologies for everyday use?

2. How the farmers establish and develop relationships with the technology they use every day?

- A. How farmers develop feelings (interest, intimacy, comfort, tension, anxiety, stress etc.) while using everyday technology?

3. How communication ecologies resettles/ed after the intervention of new communication technologies into farmers' everyday?

A. How do people renegotiate formal and informal processes after the introduction of new communication technologies?

B. Why are certain forms of technology more prevalent among certain farmers?

C. How does the same technology have different affordances for different stakeholders?

1.6 Objectives of the Study

Taking cues from ongoing research questions to understand the use of digital media technologies among farmers, this research proposes the following objectives:

1. Investigate and map the technology context in the everyday of millennial farmers in Kerala
2. Observe and analyse the relationship between millennial farmers and the technology they use; and how these technologies are embedded in their lives.
3. Examine what happens to existing communication ecologies of farmers after the introduction of new communication technologies

This research is carried out among the millennial farming community in the state of Kerala.

The millennial farmers living and working in Kerala participated in the research through

interviews, narrative stories, and natural responses, and the study includes observations of the researcher regarding their interactions and practices with digital media communication technologies. The study explores the everyday technology practices of millennial farmers by closely observing their day-to-day activities and often digitally recording them to produce a deliverable document for this research. As a paradigm, this research understands a social theory not as determining how the subjects see the world but as helping them to ‘devise questions and strategies for exploring it’ (Kincheloe and McLaren, 2005 p. 306). Henceforth, the aim of the research is not only to determine current situations and practices among farmers but to explore and assist future developments through questions and strategies. Thus, the research uses a bottom-up strategy to examine the impact of technology among farmers. The futuristic goal of this research is to investigate the existing significance and the potential significance that the technology can have in their everyday professional (farming) life.

1.7 Methodology

This research conducts ethnographic fieldwork among millennial farmers of Kerala to observe the shared patterns of digital media technology usage among them. The ethnographic method is employed to reflect on deep questions regarding people’s everyday behaviour and how people live their lives. As this study uses ethnography as a methodology that gives qualitative results, it will include detailed reports on life and practices of the people, inhabitants and their relations with each other, geographical position, and the impact of external factors and any other influences. The study believes in the Natural state that social life should be studied undisturbed by the research and the researcher, hence following through, it may interplay

between etic and emic approaches. Though the study follows the policy of Overt- participants are made aware of the research and the identity of the researcher by relying on the Key actors- gives the researchers with rich detailed autobiographical description about themselves and help identify the members of the community, it also seriously considers the Hawthorne Effect – the people being observed, either consciously or unconsciously change what is being measured in the observation because they are aware of the observer.

Adopting an ethnographic approach or using qualitative methods provides no room for generalisation to a larger population. However, such an empirical study generates insights to further development of concepts and theories, which apparently contribute to the existing body of research. The study will be purely multidisciplinary and carries its roots from digital anthropology, sociology, media studies, Science and Technology Studies (STS), Development Studies, Information Communication Technology for Development (ICT4D), Sociology etc. The day to day activities of the subject (farmers) will be digitally recorded and the study is proposed to observe the digital media usage of the subjects. The study reveals an active process of societal self-production through which farmers incorporate digital media technologies into their own profession and social value systems.

1.7.1 Visual Ethnography

This research aims to explore the possibilities of visual ethnography on the use of digital media technology among the millennial farming community in Kerala. A ‘thick visual description’ of the farming community and their everyday technology life is documented, to supplement and validate the research. Visual ethnography is a branch of visual anthropology, a study of humankind, employing cameras as one of the main tools for collecting data. Visual

ethnography thus has the ability to depict the practices of a community or other social institutions in a unique fashion for the purpose of documentation and further analysis. However, the visual ethnographers have a high chance to arrive at a distorted conclusion when the people they are researching may behave differently, from the way they normally do, when they are frequently filmed. Henceforth, this research does not solely rely on visual ethnography, rather it supplements the descriptive ethnography and produces a visual deliverable of the research.

1.7.2 A Brief Profile of Different Categories of Respondents

The three categories of respondents selected for the study are (i) Millennial farmers of Kerala, (ii) Government Officials of Agriculture in Kerala, (iii) and Technology Producers in Kerala. The rationale for choosing the three categories of respondents for the study is that they are the key stakeholders in studying the usage of digital media technology among millennial farmers in Kerala.

1. Millennial Farmers of Kerala: Any farmer who attained young adulthood (Eighteen years of age) in the beginning of the millennium (2000 CE), who owns, rents or facilitates a farm in Kerala. The prime income source of these people is farming.
2. Government Officials of Agriculture: Executives appointed by the government of Kerala to facilitate and promote agriculture in the state. They work with the farmers to implement government policies and execute various government projects for agricultural development. This category of respondents may include Agricultural Officer, Assistant Director of Agriculture, Secretary of Agricultural Department.

3. Technology Producers: The technology producers are a category of respondents related to the research, development, production, distribution and maintenance of digital media technologies used by farmers. This category includes web app developers, admins of portals, web developers etc.

Table 1.2 Categories of Respondents Interviewed

Sl. No.	Categories of Respondents	Number of Respondents
1	Millennial Farmers	51
2	Government Officials	4
3	Technology Producers	2
Total		57

Table 1.2 shows the category of respondents and the number of respondents interviewed as part of field study.

Figure 1.4 Categories of Respondents Interviewed

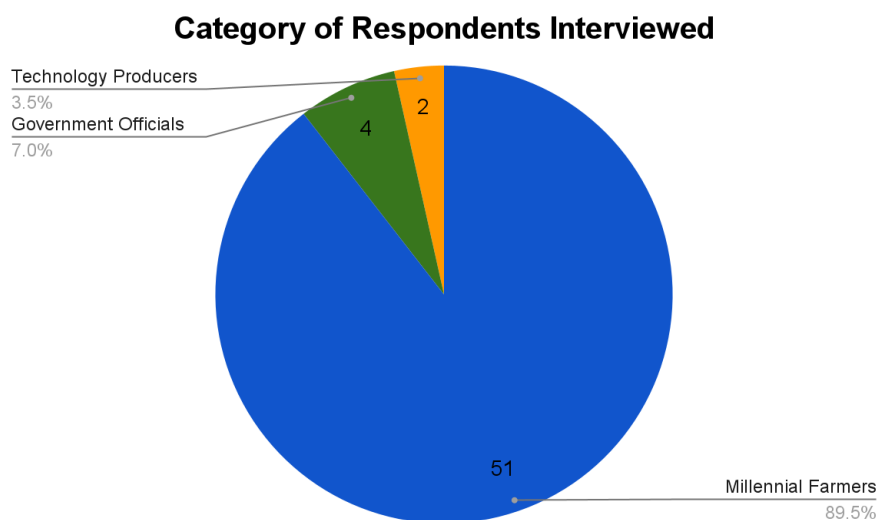


Table 1.3 Geographical dispersion of respondents

Sl. No.	Categories of Respondents	Districts	Number of Respondents
1	Millennial Farmers	Thiruvananthapuram	4
		Kollam	3
		Pathanamthitta	3
		Alappuzha	5
		Kottayam	3
		Idukki	4
		Ernakulam	3
		Thrissur	6
		Palakkad	5
		Malappuram	6
		Kozhikode	4
		Wayanad	5
		Kannur	4
		Kasaragod	4
	Total	51	
2	Government Officials		4
3	Technology Producers		2
Grand Total			57

Table 1.3 depicts the number of key respondents from each district of Kerala

1.7.3 Field Entry Process

The qualitative approach involves immersive observation and in-depth interviews, enabling the collection of rich, contextual data. The multistage ethnographic fieldwork spanned from December 2021 to January 2022, March 2022 to June 2022 and November 2022 to January 2023 and March 2023 to June 2023, allowing for comprehensive observation and interaction with 57 farmers from various farm settings across Kerala, offering a diverse view of agricultural practices and technology use. The focus was primarily on millennial farmers, defined as individuals born between 1981 and 1996. This specific age group was chosen to understand the unique digital media adoption patterns of younger farmers who are more likely to be influenced by and interact with new technologies. The study encompasses both seasoned

and novice farmers to capture a wide range of experiences and interactions with technology. A diverse mix of participants was sought in terms of gender, socioeconomic status, and farming practices. The primary data collection tool is an ethnographic interview questionnaire, containing 38 open-ended questions arranged in five categories, designed to extract detailed information about the farmers' use of technology in both personal and professional spheres. The interviews were conducted in a conversational style, often at participants' fields or homes, to foster a comfortable and genuine environment for sharing experiences.

In order to maintain the ethical standards of research and withhold the dignity of respondents, the study employed the below field entry procedure.

1.7.3.1 Field Approaching Procedure

A. 1. Read the Guidelines for the Subjects:

The research intends to get your thoughts so there are no wrong answers to any of these questions. While you answer questions or guide us through tasks, please focus on the details of how you actually do your work. It may help to think about the last time you performed the task and explain it to us as if we are going to need to perform the task just as you did. Please feel free to be honest and critical even if the way your work actually gets done is not the way you would ideally like it to be done. Everything you tell us is strictly confidential.

B. 2. Privacy and confidentiality rules and a consent statement to be signed by the interviewee

C. 3. Clear Questions and concerns before starting the interview

In sum, the study employs purposive sampling to select 57 respondents from Kerala. This non-probability sampling method was deemed appropriate owing to the exploratory nature of the present study and its focus to understand the ways in which the millennial farmers interact with digital media in the context of agriculture. Purposive sampling allowed for the selection of participants who could provide context-specific perspectives. The actual proportional difference in the category of respondents was reflected in the sampling as well. The millennial farmers of Kerala are the key respondents of the study. Technology producers and government officials were interviewed to get diverse perspectives. The uneven distribution of respondents was guided by an emphasis on capturing a wide range of experiences and perspective. Such uneven distribution of samples is contingent upon the nature of the study.

1.8 Chapter Scheme of the Study

Based on the major themes evolved from fieldwork, the research will be organised in the following chapters

Chapter-I: Introduction: The Field

The Chapter I, Introduction introduces the key aspects, including the discourses on main concepts, review of literature, research gap, rationale for the study, research questions, research objectives, methodology, and chapter scheme of the thesis.

Chapter-II: Mobilising Discourses: Millennial Farmers and Everyday Technology

The Chapter II mobilises discourses on millennial farmers' understanding and conceptualization of technology. It explores their ideas, beliefs, and definitions of technology,

as well as their identification and recognition of technologies in their farming practices. It may uncover their attitudes towards technology, how they perceive technology's role in their work and personal lives, and whether they believe technology enhances their capabilities and power as farmers.

Chapter-III: Farm, Farmer & Technology: Dynamics of an Entangled Relationship

Chapter III explores the emotional and relational aspects of millennial farmers' interactions with digital media technology. It investigates their personal and professional relationships with technology, including feelings of interest, intimacy, comfort, tension, anxiety, and stress associated with its use. It may also examine their dependency on such technology, their feelings when separated from or reunited with it, and the role technology plays in shaping their everyday lives.

Chapter-IV: Digital Media Technology: Disruption and Dissolution

Chapter IV primarily investigates the role of digital media technology as an agent of change, and what disruption the introduction of such technologies into an existing communication ecology will bring? This chapter later focuses on people, objects or institutions that digital media technology replaces in the daily life of farmers. It further analyses and narrates the unidentified, dissolved and omnipresent existence of digital media technology in everyday of millennial farmers. The chapter also looks into the communication ecology in the age of digital media technology and how these ecologies and its entities differ from farmer to farmer.

Chapter- V: Conclusion

The Chapter V, Conclusion summarises three data chapters and draws inferences based on the observations and concludes with the answer to the research question. This chapter further provides recommendations to future researchers.



CHAPTER II

MOBILISING DISCOURSES: MILLENNIAL FARMERS AND EVERYDAY TECHNOLOGY

Technologies are extensions of human faculties [...] The wheel is an extension of the foot, the book is an extension of the eye, clothing an extension of the skin, electric circuitry an extension of the central nervous system.

Marshall McLuhan (1967)

2.1 Introduction

The Chapter I provided an ample introduction to the present study. It introduced the key aspects, including the problem statement, review of literature, research gap, rationale for the study, research questions, research objectives, methodology, and chapter scheme of the thesis.

The present chapter attempts to mobilise discourses of millennial farmers' understanding and conceptualization of technology. It explores their ideas, beliefs, and definitions of technology, as well as their identification and recognition of technologies in their farming practices. It uncovers their attitudes towards technology, how they perceive technology's role in their work and personal lives, and whether they believe technology enhances their capabilities and power as farmers.

Many farmers of today, especially the younger ones concerned with organic food, raise a significant principle: ‘know what you eat’. Similarly, we have been raising a similar question, ‘know what you use’. The objective of this chapter is to explore digital media technology that millennial farmers are using everyday in their lived spaces. What do those technologies mean to them? For what purpose do they use it and what purpose does it serve? What changes does it bring to their lives? etc. Based on in-depth personal interviews with 51 millennial farmers, four government officials and two technology producers to elicit their responses towards the influence of digital media technologies on millennial farmers’ everyday practices, this chapter delineates diverse perceptions and perspectives of millennial farmers regarding the conceptualization of digital media technology in their agricultural practices and everyday lives. Through ethnographic interviews, one-on-one discussions and field observations, we have gained valuable insights into how these farmers perceive and define digital media technology, and how such conceptualization shapes their attitudes and decisions towards adopting digital media technologies. A multistage field study was carried out in all 14 districts of Kerala during 2021–2023. In this context, we attempt to problematize and clarify the concept of digital media as a professional practice among the subjects by analysing their everyday. The digital media technologies in their everyday practices produce some significant discourses namely, developmental, neoliberal, progress and Social Construction of Technologies (SCOT). Along with mobilising such discourses, some core empirical based concepts of digital media technologies as a professional practice were identified to help us clarify and define what a digital media technology meant to the millennial farmers. As a result, problematizing digital media technology as a practice helps us define digital media technologies through farmers' or users' perspective. In the 21st century, there has been a growing interest in using digital media

technologies to ease agricultural practices (Goedde et. al. 2020). Farmers are increasingly using it for collecting data, networking, marketing and other gratifications. Despite its increasing use, many farmers lack the skills and resources to use them. Thus, the focus is more on farmers' understanding about what, why and how they use it. We establish a fertile ground for research by mobilising and interrogating discourses on digital media technologies in Kerala.

2.2 Farmers' Perceptions about Technology

The millennial farmers in Kerala conceive and demonstrate a wide range of perceptions and definitions of technology, reflecting upon the multi-faceted nature of their experiences critically emanated from their socioeconomic and cultural backgrounds. A perception is the immediate contact that individuals have with nature - encapsulating both natural and social phenomenon. The challenge with generating a common idea concerning technology is that the term is conceptualised in many different ways. These perceptions are not absolute. For some, the concept of technology is associated with sophisticated machinery and advanced equipment, such as farming tools, machineries, irrigation systems, and vehicles. One could look at the dictionary for its meaning, but the lexical meaning fails to adequately capture the idea of technology that farmers conceptualise in their everyday. These individuals perceive technology as cutting-edge innovations that have the potential to revolutionise traditional farming practices. When a group of farmers were studied and asked each person to define their idea of technology, many ideas resurfaced. Therefore, farmers who hold broader definitions of technology, encompassing not only tangible machinery but also digital devices or platforms, software applications, and information communication technologies (ICTs) need to be

consulted. For these farmers, technology extends beyond physical tools to include digital media, social media platforms, agricultural apps, and online marketplaces. Their conceptualization emphasises the role of digital connectivity and information exchange in modern age agriculture.

Depending on the nature of respondents, endless possibilities emerge on how the idea of technology was formed. Does it depend on the degree of their everyday use of technology? Probably not, considering that many farmers may have full-time usage of it, if not at least once in an hour, or one with very rare usage also fits under the category of technology user and thus possess an idea about it. Does it have to do with fascination towards technology? Again, this question is complicated, because the respondents' attitudes or interest towards technology also vary in extreme, from great enthusiasm to great anxiety towards the use of technology. So, what actually builds their idea of technology? We must say it is the reward technology offers to the performance of everyday. Considering the application aspects of technology, 54 out of 57 respondents (94.74%) support this aspect of reward in their idea of technology. the collective response of their idea of technology can be conclusively categorised as,

“something eases our tasks”, “convenience” (loosely translated from the Malayalam word, ‘Saukaryam’), “anything that reduces human efforts”, “something that saves our time and energy [...] ‘in other words that makes us fast going”, [...] “expedite our life processes”, “makes thing simple”, “enhance productivity with less inputs.”

On the contrary, 3 out of 51 (5.88) farmers even reject the possibility of any such applicational aspects, abusing and cursing digital media technology for social isolation and commercial exploitation. They asserted that they want to distance themselves from these technologies

(however, they still honour their rewards by undenying their unavailability). Sanoj² (a millennial farmer from Wayanad), associates technologies with this sense of social isolation and commercial exploitation, describing them as:

“[A thing] that grabs human’s time and effort in the interest of some giant players [...] this eventually made people less committed to each other [...] more focused on self, self-gain, self-promotion or often a tool to satisfy greed.[...] yes it has advantages, but it is also is something that spoiled those old good times.”

(April, 2022)

According to Williams, (1985) even when the term technology is referred to “a popular discourse”, however, it mostly refers to ‘a thing’. This cultural tendency to envisage technology in terms of their “thingness” has serious limitations. We here are rather focused on the social perception of technology than ‘stiffness’ or ‘thingness’ of it. Meanwhile, the sociological tendency emphasizes the formulation of technology as a human-focused thing. The significance, here, is on what technology means to the humans in their everyday life. The emphasis for a sociological perspective is obvious as any ‘thing’ cannot be a technology without human perception and action. The idea of technology is seen as diversified yet supplementing, from farmer to farmer. There tend to be some thematic resemblances in farmers’ ideas of technology that turned up, though its conceptualisation and perception can be

² All names have been changed in order to maintain the anonymity.

categorized under several arm-pits. Such conceptualisations and perceptions vary significantly from the mere 'idea of technology as a tool', ranging from convenience, speed, independence, agency, control, progress, determinism, etc.

2.2.1 Speed

Therefore, the dynamic interplay between digital media technology and speed emerges as a pivotal theme in the realm of millennial farmers' everyday practices. Their narratives resonate with the idea that digital media technology significantly accelerates various aspects of their everyday agricultural activities. A recurrent motif is the swift transmission of information. As exemplified by Prashanth and Mohanakrishnan (millennial farmers from Palakkad), platforms like Google Weather forecast bestow the farmers with instantaneous climatic predictions, enabling timely and informed decisions regarding planting, irrigation, and pest control measures. This real-time data-driven approach minimises the window for uncertainty, bolstering the efficacy of their operations. According to Anoop (a farmer from Kannur), the huge farm-based network built using social media in a short period of time also underlines the idea of speed. Platforms like ClubHouse and Facebook facilitate rapid knowledge dissemination among farmers, transcending geographical limitations. Such practices result in diffusion of technologies among common people as they get the process easy and fast. For instance, the increased digital payment among farmers streamlined earlier financial transactions, bypassing the complex processes of conventional banking and expediting monetary exchanges. The synergy between digital media technology and speed is corroborated by Haleem et. al. (2022) and Bogers et. al. (2022) who underscore the transformative influence of digital platforms in augmenting the speed of information dissemination. Moreover, research by Mondejar et. al. (2021) highlights the speed-enhancing potential of digital technologies,

hastening everyday practices in agriculture and fostering sustainable development. Viewing this story through the lens of Socio-technical Systems, elucidates the complex relationship between digital media technology and speed in agricultural contexts. Technology functions within a dynamic nexus of social and technical elements, wherein the efficiency and speed of technology utilisation are determined by both the technical affordances and social practices. These days, the digital technological enabled drone cameras can monitor vast fields with remarkable efficiency. These labour-intensive tasks, earlier used to manually inspect crops and identify problem areas, consumed significant time and other resources in earlier days, when manual inspection of crops was needed to identify infected areas.

Along with managing an IT firm in Chennai, Sameer (a farmer from Alappuzha) started farming paddy in 60 acres during the 2018 Covid 19 lockdown. Enhancing the productivity using mobile applications connected to three drones, he scaled up the farmland from 60 acres to 300 acres, spending the same time he used to manage his 60 acres. This five-time productivity apparently offers him five-time speed. The narratives of millennial farmers mirror this interplay, as they harness digital media technology to accelerate information exchange, decision-making, transactional processes and many other everyday practices of farmers. Bunch of such practices converge to illuminate the symbiotic association between digital media technology with the idea of speed for the millennial farmers. It is primarily the swift transmission of information, facilitated by digital platforms, recalibrates traditional farming temporality, enabling farmers to navigate contemporary challenges with unprecedented speed and efficacy. The everyday practices among farmers herald an epoch where technology intertwines with time, reshaping the agricultural landscape through shaping the idea of technology by congruenting it with the idea of speed.

2.2.2 Control

Metaphorically speaking, when we are driving a car that moves where we direct it, we say that “everything is in control”. That implies things are moving according to our plan. Through the idea of control, the farmers mobilise many of the discourses about technology in their everyday farming. Here We bring out both dimensions of arguments regarding technology and control, but emphasise on one. Firstly, how do farmers conceptualise digital media technology as a means of control? In other words, how do these technologies offer a sense of control to farmers? Secondly, how do the farmers often lose control over technology? or whether there are times where technology takes control. The farmers typically consider the digital media technology that they use as a magic wand to gain a sense of control, initially over their limitations (as we discussed earlier), then over the environment, and subsequently over other people. Time to time, the technology has offered itself to human as a means of control when

Weapons helped humans kill game, and digging implements helped humans find roots to eat. Eventually tools helped humans systematise their food production: growing crops instead of finding them, and herding animals instead of hunting them. Construction of houses and buildings and the domestication of fire helped humans to shape the spaces in which they lived.

(Slack & Wise, 2007, p. 60)

Technologies provide humans with added advantages in many ways. Beginning from the battle for control over nature and devising ways to control each other has been paramount lately. Farmers today use digital media in many capacities and they describe how the practice and perception on the idea of control continues to play out in relation to mastery over our tools.

According to Chako (a farmer from Palakkad), the two smartphones in his hands are two slaves in his left and right, waiting for his orders. According to him, they are ready to do anything they can upon his order. Chako alone manages more than 70 acres of cultivation even when he is away from his farmland. "All the pieces of technology offer me great control over my everyday practices," he said. The farmer's command of everyday farming practices was apparent in the way he managed two farms in Palakkad while speaking to me at another farm in Kozhikode, 120 kilometres away. Another picture of the idea of control was provided by Jacob (a farmer from Pathanamthitta). He smartly uses the smartphone in order to have better control over his employees and different stages of farming. For instance, Jacob gets a picture message and a voice note in a farmland-based WhatsApp group, immediately after his workers pack the milk. He is also notified when the packed milk reaches the store and every other stages in the process of handling his products. He says, "[...] this way workers and the work process are controlled and regulated. The distractions are minimised and workers are under constant observation. They are encouraged to do their chores on time because they have to update them constantly with me." The millennials particularly emphasise their gratitude towards digital media technology and social media for giving them a sense of control and subsequently associate the idea of control with technologies. These tools, in more senses than one have turned out to be the tools of social control. They seem, for better or for worse, to give us control over nature and society. Nevertheless, in reality, control over nature has been translated into control over people.

2.2.3 Agency

The assumption is that the idea of agency, as an extension to the concept of control, ultimately lies in farmers' everyday. As the study proposes, digital media technologies are active

participants in farmers' everyday and they could be found as significant roleplayers in building the idea of agency among them. Agency refers to an individual's capacity to act intentionally and make choices that influence their own life and the social structures around them. Giddens (1984) emphasises that agency is not solely determined by external forces (such as social norms, institutions, or economic systems). Instead, it involves an active engagement of the self with these structures. Agency, in the sense of the "ability to act" (Slack & Wise, 2007, p. 146), is often attributed to the power that technology brings. Some might think of an agent as a person having power, but farmers remark that technology empower them to become that person having the power to act. Observations on the everyday practices of farmers provide this idea of agency within the conceptualisation of digital media technology. To a greater extent, farmers have got power to make their everyday choices, "personal efficacies" as per their need (Bandura, 1997). As Prakash (a farmer from Palakkad) said,

We had not much choice other than cultivating paddy here [Palakkad]. All the options put forward by the government and other bank agencies was to cultivate paddy. [...] It was when I came to know about Pomato cultivation from a YouTube video and learned more about it, my life changed. This new information changed my life and I learnt to lead rather than to follow.

(March, 2022)

This power of choice is the foundation for building farmers' agency. Among all parameters which help to build agency, none is more prevalent than digital media technology they use every day. All the other factors serve a catalytic function in the process of creating agency and

the technology remains rooted as the core of creating agency for farmers. According to Riyas (a farmer from Thrissur),

Farmers have a hard time sticking to the Krishibhavan's farming instructions and timeline. All they provide is a general instruction to address all farmers under its jurisdiction. All we need to do to succeed is to create and implement our own schedule which might be different for farmer to farmer.

(May, 2022)

Here we observe that digital media technology facilitates the creation of a self-management system individually tailored to each farmer's needs. With newfound agency, they no longer feel entirely at the mercy of nature, but rather as active participants in steering the course of their farming endeavours. The smart application of digital media technology helps people to coordinate and maintain a customised farming system for each farmer where these farming endeavours like decision on the type of crops, nature of land, appropriate climate for cultivation and the time of yielding would differ from farmer to farmer. Having the agency to practise farming in consideration with the individual differences, the agency of government and private companies, used to dictate the farm cycle is now vested on individual farmers.

The farmers further recounted how, in the past, their engagements with the market were often mediated by local intermediaries, who mostly practised unfair pricing and inadequate compensation for their efforts. Bypassing intermediaries via digital platforms has brought financial benefits through reduction in marketing and distribution costs. Beyond financial benefits, the embrace of digital marketing has cultivated a sense of agency and entrepreneurship among millennial farmers. They share heartwarming stories of how, through

their direct interactions with consumers via digital platforms, they have established personal connections with their customers and build loyal customer bases. As Sujith (a farmer from Alappuzha) passionately put it, "Digital media has allowed me to be more than a farmer and a seller. I am now a storyteller, sharing the journey of my produce from seed to harvest with the world." The process of direct marketing through digital media has enabled farmers to build distinct brand identities for their produce. They take pride in showcasing the unique qualities of their agricultural products, such as organic cultivation and sustainable farming practices, and thereby create a niche for their produce and establish a loyal customer base that appreciates the value and story behind their products. These practices transcend the conventional nature of the market, fostering a sense of agency to the farmers and building trust between the farmers and their consumers.

While we discuss conceptualisation of the idea of digital media technology among millennial farmers in greater depth, the respondents attribute technology to the idea of agency. Agency is the power and ability to do something. A farmer having more agency therefore can do more of their own choice and it is the digital media technology that helps farmers build agency and subsequently help them to get more things done.

2.2.4 Independence

According to a farmer interviewed in the present study, "I paid INR 5,000/- to a digital service provider to open a Google mail account in 2010. This may seem funny or cheating today, but it was a good deal then." At least some of us might ask, why the farmer cannot open an account by himself, wasn't it free? Yes, it was as it is now. But the farmer paid not for the email account, rather for the person who knew how to use that particular technology. A demand supply

dependence pertains as the farmer is dependent on the service provider in many aspects. There were several farmers who spent hours standing in queues in front of the Krishi Bhavan³, waiting for agri officers for getting expert advice on appropriate medicine for crop diseases. Farmers, having a hard time finding a parallel market as the wholesale buyer in the nearest market drop price, were dependent on other people or institutions for their needs. Several such cases challenge the independence of farmers and henceforth pertain to technologies that are designed to facilitate independence to farmers. The term 'Independence' is regarded as the "ability to live without relying on external help, being the opposite of dependence" (Fine & Glendinning, 2005, p. 613). Various pieces of technologies are found assisting the farmers, making them independent from other people or institutions by supporting themselves with communication, mobility, information gathering and other activities of everyday. This way, the technologies have proved their potentials by making farmers more independent. Yielding technology's potential as a solution to the aforementioned cases leads to the generation of a new idea of technology, that is 'independence'. This idea highlights the need to develop an understanding on why, how and when the millennial farmers are using digital media technologies that could make them independent. The tendency to remain independent is mostly influenced by the exploitation experienced before. Nancy (a farmer from Idukki) told,

³ The Krishi Bhavan is a government body undertaken by the Department of Agriculture in various states. It deals with the formulation and implementation of various state government programmes to augment production of both food crops and cash crops in the state.

I have sold my organic vegetables to the local retailer at almost half its market price without knowing the fact that organic vegetables have high demand and high prices [...]. I was told that no one will buy organic vegetables as no medicines are used on it and it will decay fast, that was the reason for its low pricing.

(December, 2022)

In certain times, huge losses have happened to farmers when the dependent person is unavailable at the time of need. Kabeer Ali (a farmer from Malappuram), has lost nearly an acre of Arecanut plants as he was dependent on Krishi Bhavan, which was not readily available when his plants had leaf diseases. Being independent becomes highly important for farmers who had faced such situations before. Several farmers with functional limitations (which we earlier discussed as bodily limitations) associated the idea of interdependence more with technology as they use technology to overcome the limitations and remain independent. Robin (a farmer from Kumily) says he was afraid to go to banks and do financial transactions, so that he had to pay five hundred rupees to a person to do his everyday financial transaction. Now it is seamless for him to do any kind of transaction using his smartphone. Sanal (a farmer from Malappuram) also had a similar experience while uploading photos to government portals. He had to pay hundred rupees to a neighbour boy for taking his picture with his farm in the background for the purpose of loans. Here prime concern is not for paying for service, rather it is the dependence it creates and the crisis that happens when the depentee is not available. All in all, the aforementioned cases lead to a puzzling conclusion. On one side, there is dependence solved by technology, and the other side is the dependence created by it. Many farmers have the desire to be independent and believe that digital media technology can contribute to their independence. However, these technologies do not offer the idea of independence to a few

other farmers and their desire of self-sufficiency amidst exploitations do not translate into willingness to accept the digital media technology. These few who see that they are at risk of losing their independence as they may turn more dependent on technology than they were on other people. Ramesh (a farmer from Wayanad) contemplates on the risk of celebrating technological advancement in various aspects of life.

Technology indeed is very useful for me in managing my farmlands, but I still honestly have concerns about it. Though my relationship with technology is very transactional, I will be happy even if all these pieces of technology were taken out of me. It may not be as seamless as before, but all activities will continue. [...] When electricity gets off, we are on in the real world. When we are not connected with digital media technology, we are here and now. There is no distraction, and we are more focussed. This additional comfort is creating an addiction.

(November, 2022)

This technology addiction, in another sense, is when humans become dependent on technology to get everyday tasks done. However, the idea of independence associated with technology can imply being able to perform everyday tasks by oneself, not being dependent on others. It is the digital media technologies that provides farmers “self-direction; the freedom to do what [they] want to do” (Peek, 2017, p. 44). However, the farmers’ response indicates that there are considerable variations; while some respondents assert that the digital media technology helps them to be independent to a great extent, a few others indicate rather that it does make them more dependent on technology.

2.2.5 Progress

Communication scholars Jennifer Daryl Slack and J Macgregor Wise (2005, 2007) proposed a more deep conceptualisation on the idea of technology, “as the idea of progress has been closely associated with the idea of technology, and vice versa: technology is progress, just as progress suggests more and new technology.” However, the relationship between technology and progress demands more scholarly intervention. Is more technology always better? Like Sanoj pointed out, Jennifer and Macgregor questions, Was the world a better place now than it used to be? We examine the idea of technology, as being formed by millennial farmers in Kerala. One crucial thing we observed is the close resemblance of these ‘ideas’ in the perspectives of scholars of communication or sociology (Ayres, 1996; Lucky, 2000; Rivers, 2002; Rogers, 2003; Schwarz, 2005; Rodríguez et. al., 2015; Chernogortseva et. al., 2019) as well as millennial farmers. The everyday technology practices of the subjects manifest the tendency to equate progress and growth with technology. An expensive car in the porch, a tractor in the shed, a drone in the field or a premium phone in hand are among few pieces of technologies that indicate progress of a farmer. Shivajith, a millennial farmer from Thrissur, remarks the possession of these technologies as an indication of progress.

Despite having a high yield from the five-acre cultivation and reasonable volume of bank balance, people around [friends and families] never admitted my progress. [For them,] I still remained as the old poor me [...] which in fact turned hard for me to find a girl to get married [...] and is one reason I remain single at the age of 27.

(January, 2022)

In the given context, understanding technology as an idea of progress is crucial as well as understanding the assumed role of technology in progress. As an extension to this, Thanveer Ahammed, an aquaponic based vegetable farmer from Thiruvananthapuram opines:

I use technology for progress, yes indeed, the smarter I use them, the more I progress [...] I not only use them to grow crops, I use them to grow myself, my farm, my wealth, [...], I even use technology to improve my smart use of technology, which leads to my overall progress. [...] [in addition] and in short, I use these technologies to progress and the same technology [material things/technology artefacts] to show my progress [to others].

(December. 2022)

In many cases, the technologies are widely applied as “the yardsticks of progress” as the farmers work more efficiently and take less effort to attain the same result (Wise & Slack, 2019, p.12). In examining these statements, technology conceives the idea of progress as advancing forward to a state of betterment. For example, using a tractor instead of a plough and oxen or availing services of Akshaya E Kendra⁴ instead of Government service agents are

⁴ The Akshaya e-Center is a Government of Kerala initiative started in 2002, aimed at providing digital services and information to rural and remote areas. These centres offer various online services such as internet access, digital literacy programs, government schemes registration, and online transactions, enhancing digital inclusion and empowering local communities.

indicators of progress, that it is something new and advanced, or moving forward. Because, the more technology brings progress to the farmers, the more technology is equated unproblematically with progress.

2.2.6 Convenience

The progress that farmers gained by using technology is actually brought by the convenience it brought to them. So, why do farmers use these technologies? The answer will narrow down from a broad longitudinal idea of progress to a more narrow and everyday idea of convenience. Vidhya, an award-winning farmer from Kasargod (who is a farmer and a Kudumbasree⁵ social worker) district tells:

[These days] we farmers engage with technology, they are the things that we use for our convenience, else I will have no role in the society other than a crop producer [...] now even the picture of farmers [how farmers look] has changed. I have no mud in my hand, still I am a farmer.

(January, 2023)

Despite the farm production aspect, Vidhya finds technology is the most convenient way to market her produce, and skill is what it requires to recognize which technology will be

⁵ Kudumbashree is the poverty eradication and women empowerment programme implemented by the State Poverty Eradication Mission of the Government of Kerala in 1997.

convenient to work with, and which technology will bring convenience to everyday practices (even if a technology is highly advanced or sophisticated). These conveniences the technology brings are under the assumption that when a farmer wants to “be more than that farmer in the older picture”, to whom the everyday processes of farming are convenient to the best of their ability, their technology usage has made them conveniently run their activities in addition to their profession. The inputs from many millennial farmers like Robin, Tom, Swaroop, Remya along with Sreevidhya patronage this assumption stating the enlisting of the convenience of technologies in their everyday.

Although the above perceptions about technology among millennial farmers transcend mere instrumentalism, these perceptions serve as foundational drivers for the integration of digital media technologies into their everyday. However, moving beyond initial perceptions, farmers' idea of technology has acquired a broader perspective. Here the transition from mere perception to a broader perspective is the next prime focal point. The aforementioned perceptions evokes limited conceptualisation encapsulating self-peripheral self-interpretations and viewpoints. These initial notions on technology are insufficient to formulate a holistic, contextual and deeper idea of technology. Henceforth, a broader, deeper and more comprehensive generation of ideas of technology is solicited from the farmers. While perceptions encompass the initial cognitive frameworks through which individuals interpret their environment and focus more on technologies' functional roles, perspectives involve a deeper understanding that takes into account of distinct dimensions and contextual intricacies such as knowledge acquisition, innovation and community engagement. In the realm of exploring millennial farmers' idea of digital media technology, the transition from their perceptions to perspectives unboxes farmers' understanding of technology's transformative potential, reshaping their everyday farming

practices. The progression from these initial perceptions toward a more holistic perspective that holds substantial significance because it deepens comprehension, allowing millennial farmers to recognize digital media technology's role as an enabler of innovation, knowledge, and community collaboration and many more in their agricultural practices.

In this context, it is important to combine the objectivism of Durkheim with the subjectivism of phenomenology (Bourdieu, 1977). Bourdieu developed an idea of socialisation through the concept of habitus, which emphasised the skills and ways of looking at the world that people acquire within the unequal social structures around them. It is important to see human capacities and opportunities within the particular structural fields in which they are located. Habitus, in this sense, is a set of acquired dispositions of thought, behaviour and preference to constitute the link between social structures and social practice or social action. Thus, habitus offers a possible basis for a cultural approach to structural inequality and focuses on the embodiment of cultural representations in human habits and routine.

2.3 Farmers' Idea about Technology: From Perceptions to Perspectives

Walking a long distance from aforementioned perceptions, the in-depth interviews during the field study had dug out some set of perspectives millennial farmers had built on technology over the time. The various experiences with integration of technologies in everyday has spurred diverse perspectives among farmers. However, the major themes of overarching perspectives emerged are analysed and categorised into as follows.

2.3.1 Technology as Enabler of Efficiency and Productivity

Bringing back the previously discussed notion of limitation and starting with it to explain farmer's perspective on technology as an enabler, they grapple with a constraint that seamlessly merges the confines of time and space. Physically occupying specific space at specific times had functional limitations. Yet, today, the digital media technologies bear the weight of farmers' demand to overcome these limitations, allowing them to effortlessly connect with employees, farmland or the market place irrespective of their physical distance. Enabling several other remarkable improvements in efficiency and productivity within their agricultural endeavours, the digital media technology functions as a catalyst for positive change in their farming routines. The respondents conclusively regarded technology as an essential enabler of efficiency and productivity in their everyday. Adapting digital media technologies into everyday farming practices, 48 out of 51 (94.11%) farmers reported significant improvements in various aspects of their agricultural practices. For instance, Ramesh (a farmer from Wayanad), using hyperlocal weather forecast applications enables them to plan and optimise planting schedules, leading to better yield outcomes. Additionally, access to online marketplaces for Midhun (a farmer from Kozhikode) and more, has facilitated direct dealings with buyers, streamlining the distribution process and increasing profitability. Apart from Ramesh, weather forecast applications happen to be one of the most frequently mentioned digital tools that significantly impact farmers' everyday. By harnessing the power of real-time weather data and forecasts, millennial farmers are better equipped to plan and optimise their planting schedules. With the ability to anticipate weather patterns and potential climatic fluctuations, they could strategically time their planting, irrigation, and other crucial farming activities. This technology facilitated data-driven practice subsequently helped Ramesh and

other 47 farmers to enhance resource management and minimise risks, ultimately leading to improved yield outcomes. The accessibility of online marketplaces is yet another lead in the story as its role in reshaping the marketing and distribution landscape for millennial farmers is remarkable. Conventionally, farmers had to rely on intermediaries or local markets, to sell their produce. However, with the advent of digital media technologies, particularly social media, enabled these farmers to connect directly with potential buyers, eliminating the intermediaries. Through the social media platforms that often served the purpose of e-commerce platforms, the farmers could showcase and sell their crops to a larger volume of consumers, locally and globally. In 2017, Rijesh (a farmer from Palakkad), out of no expectation, posted on his Facebook timeline saying he is conducting a fish harvesting festival. An hour after the post his phone rarely stopped ringing for more than a week. Thousands of people came to harvest 30 tons of fish in two days and eventually it was a grand success. This success story happened amidst a crisis when he was unable to find a buyer for the cultivated fish even for half its market price. Several such direct interactions of farmers not only streamlined the distribution process but also allowed them to negotiate better prices, leading to increased profitability and a more equitable distribution of profits.

Moreover, the digital media technologies facilitated knowledge sharing and skill enhancement among millennial farmers. Social media groups, online forums or communities and rarely agricultural apps served as platforms for exchanging information, ideas, skills, and innovative farming practices among each other. Prashanth (a farmer from Palakkad) says:

I am an MBA graduate, I have farming background from my family side but have no idea about modern trends of farming. [...] Something I know is that traditional farming is not going to endure and it's not what I want to do. [...]. Clubhouse [App] is what I

call my knowledge repository. [...] What our Clubhouse community is working on these days is on implementing drone facilities for fertigation. That is going to be revolutionary in Palakkad.

(November, 2022)

Through online platforms, social media groups, and dedicated farming forums, 46 out of 51 (90.19%) farmers have gained access to a diverse range of knowledge related to crop cultivation techniques, market trends, and government policies. Using these platforms, farmers seek advice from experienced experts, learn new farming styles, and stay informed about the latest trends in agriculture. This democratic participation in knowledge production and sharing enables them to make accurate decisions, experiment with novel approaches, and adapt to changing circumstances. The digital information exchange fosters a culture of learning among millennial farmers, where their experiences become shared wisdom. In virtual spaces, farmers narrate their successes and setbacks, offering valuable insights and lessons learned from their own agricultural journeys. This multidirectional exchange of shared knowledge encompasses active participation of farmers in discussions and seeking advice and guidance from their peers. This vibrant exchange mirrors as a digital replica of the tradition of oral storytelling, an integral aspect of agrarian cultures, but now transcends the boundaries of time and space.

While acknowledging the numerous and often different perspectives on digital media technology among farmers, it is essential to highlight that not all farmers in all situations have built the same perspective about digital media technologies. Along with identifying digital media technology as an enabler, 9 out of 51 (17.88%) farmers encountered challenges related to digital literacy, and some other factors, failing to build a prospective staging technology as

an enabler. Overcoming these obstacles with appropriate support initiatives, nearly 50 out of 51 (98.03) farmers have overarchingly built an enabler perspective about digital media technologies. Henceforth the enthusiastic embrace of digital media technologies by millennial farmers has yielded phenomenal benefits, positioning technology as a powerful enabler of efficiency and productivity in their everyday farming practices.

2.3.2 Integrating Traditional Knowledge and Modern Innovations

In-depth personal interviews with millennial farmers indicate that while they conceptualise digital media technologies as enablers, 32 out of 51 (62.74%) farmers having ancestral farming background and those who studied social history of farming, also emphasise the significance of preserving traditional farming knowledge and integrating it with modern innovations. They acknowledge the digital media technologies, building a perspective on technology that helps them to strike a critical balance between modern innovations and traditional knowledge systems aiming at sustainability. This perspective highlights the importance of intergenerational knowledge exchange and the value of learning from past practices to inform future technological choices. Farmers are engaged in continuous learning, seeking to understand the potential possibilities of new digital media technologies in their specific farming contexts. Ahammed (A farmer from Trivandrum) says:

I don't cater to the belief that plants just need Nitrogen phosphorus and potassium for growth. Traditionally, we used to form the same crops in different soils to get different tastes. That is the reason I don't believe in aquaponics. [...] I have spent hours and hours on Youtube and the internet for more than six months once I resigned from the job and found a sustainable systematic way to integrate traditional soil based cultivation with

modern aquaponics.

(June, 2022)

Such integration of traditional farming with modern technological innovations emerged as common perspectives in the narratives of millennial farmers. These farmers hold a strong perspective that digital media technologies help them integrate the knowledge passed down through generations, embedding it with modern innovative agricultural practices. Throughout the interviews, various perspectives of farmers articulated how they productively intertwined traditional knowledge with the transformative potential of digital media technologies. The fieldwork is carried out during the age of Artificial Intelligence (AI) and raises concerns whether AI replaces humans and human practices. However, instead of viewing technology as a total replacement for traditional practices, farmers form a perspective where technology is a complementary tool that could enhance and optimise existing methods. During the interviews, it became evident that millennial farmers had a deep appreciation for the wisdom and time-tested practices passed down through generations. As a result, they carry an esteemed legacy of traditional knowledge and simultaneously realise the vitality of their own digital media technology prowess—a language of digital media technologies. They do not use digital media technologies as a disruptive tool to obliterate traditional practices. Instead, their envisioned perspective of technology is a synergy - an augmentation of their traditional knowledge, an extension to their productivity, and a solution to previously existed functional limitations. They recognize the coexistence and symbiotism, not competition and replacement of tradition with technology. This symbiosis gives birth to a collaborative ambiance, where traditional practices and digital media technology innovation coalesce, each enriching the other. Talking about

digital media technologies, new media especially, Jay Bolter and Richard Grusin (2000) in their book *Remediation* hold the same perspective as that of farmers. They argue:

No medium today, and certainly no single media event seems to [...] works in isolation from other media, [...]. What is new about [digital media technologies and] new media comes from the particular ways in which they refashion older media and the way in which older media refashion themselves to answer the challenges of new media

Jay Bolter and Richard Grusin (2000)

This thoughtful perspective allowed farmers to create a balance between time-honoured wisdom and contemporary innovations in the digital media technology landscapes. As the research progressed, it became more evident that this perspective of balancing was not a static process, rather a continuous and dynamic interplay, influenced by factors such as technological advancements, accurate traditional knowledge, market demands, new emerging challenges, and so on and so forth. Although the farmers often had hard time balancing between both traditional practices with modern digital media technology advancements, their commitment to keep this balance exemplified their deep perspective of digital media technology. This balance echoed far beyond the boundaries of individual farms and reverberates within the fabric of Kerala's millennial farming community. Attempt to establish this balance opens a window into farmers' perspective on technology. This general perspective symbolised their desire to build upon the experiences of their ancestors while embracing progressive solutions offered by digital media technologies to address traditional as well as contemporary challenges.

2.3.3 Technology: Connectivity and Transformative

A recurring perspective in farmers' narratives was the connectivity the digital media technology offers and transformation it leads. By embracing digital media technologies, they felt more connected to the broader agricultural community, enabling them to exchange ideas, seek and share knowledge with fellow farmers. This connectivity powered transformation they experienced extends beyond mere information sharing, their everyday technology practices further lead to overcome several functional limitations and help access vital information, market trends, and best practices around the globe. Several millennial farmers, during the field study, shared captivating accounts of how digital media technology has brought transformative changes to their traditional farming practices. Adoption of these digi techs has streamlined various agricultural activities, such as pest management, crop monitoring, and irrigation practices. They shared how mobile applications enabled real-time weather updates and disease outbreak alerts, allowing them to make informed decisions and enhance crop yields. One of the most appealing aspects overcoming this limitation is its capacity to break down the geographical barriers. Sreejin, a farmer from Attappady, a remote tribal block in Palakkad district said,

Traditionally, it is not a good idea to go from here to the mainland and get access to the market, new farming practices and other farming knowledge in the outer world. That is one and main reason the indigenous agricultural practices remained for long here in Attappady. Once this part of the geography is digitally connected to the outer world, many practices around the globe are pumped in. [...] Now you can see the latest farming trends practiced here.

(December, 2021)

The millennial farmers, living in remote rural areas often find themselves in paradoxical situations while their actual physical location might isolate them from traditional sources of expertise and knowledge, but the digital media technology connects them to the community and bridges this gap. The ubiquity of smartphones ensures that they are never too far from any other resources out there. Farmers reflections resonate Fuller (1985, 2007) stating how *globalisation* has influenced scientific and technological practices. As information flows across borders, scientific research becomes more interconnected. This raises questions about cultural biases, power dynamics, and the dissemination of knowledge. Similarly, Saleem, a farmer who started farming in 2021, was stuck in his room due to Covid-19 lockdown. He had a long intention for farming but lacked any knowledge and ancestral background.

For a month and half, I was isolated in my room, I was left with nothing other than my phone and other basic needs. I have made my phone productive as I spent the majority of that time on YouTube, [...] that is why I am a farmer you see today.

(December, 2021)

Though Saleem had traditionally no access to farm knowledge, he remains connected amidst isolation. This newfound connectivity translates into direct access to experts, researchers, and databases. Using smartphones and online platforms, ranging from agricultural forums to webinars and social media groups are in hand round the clock to facilitate direct interaction with professionals who are miles away. The transformative potential of this access to information becomes evident when farmers engage with digital agricultural tutorials and webinars. Online learning empowers farmers with sustainable farming skills and knowledge.

Fuller argues that technology should be accessible and available to a broader population, not limited to experts or elites. It involves making technological tools, knowledge, and benefits widely distributed. The digital media technology connects farmers as a transformative and ensure the democratization of technology. This transformative empower farmers, their groups and societies altogether by providing equal opportunities for technological participation and innovation.

For instance, farmers eagerly shared how they acquired insights about water-saving irrigation techniques, organic pest management, and crop rotation methods. This democratisation led to transformation which in turn empowered them to explore new farming opportunities and diversify their agricultural practices, adapting to changing consumer demands and emerging trends. Such practices encapsulate the idea that digital media technologies serve as powerful tools for transcending the geographical limitations that often characterise rural farming communities. However today the farmers experience a newfound transformation, happened through developing access to global knowledge networks and a broader sense of community. It thus broadened their perspectives and empowered them to make informed decisions that positively impacted their farming operations. The farmers henceforth perceived digital media technologies not merely as tools for speed, control and agency, rather as an instrument of connectivity that led to transformation.

2.3.4 Cultivating a Hybrid Farming Identity

Once a farmer is always a farmer, the saying reflects the identity of farmers before the millennium. For generations, the identity of a farmer has been graven into the collective consciousness, passed down through time-honoured traditions farming practices. Identities are

of various types- “how a person identifies [self] in a professional sense [or] [...] among people”, (Awad & Feinstein, 2020, p. 60). Does the enhancement of digital media technology have brought a new form of “self-identity” to farmers? (Rodríguez-Lluesma, 2018). Yes, the digital age has brought a twist to the narratives when millennial farmers embrace digital media technology and find themselves at the crossroads of different identities as they reflect upon their journey in cultivating a hybrid identity. They construct and navigate multiple identities in both actual and virtual spaces through the potent digital media technologies. These identities reflect the dynamic ways in which farmers build a perspective of technology that oversteps the singular notion of being solely 'farmers.' For many millennial farmers, the lately built perspective on digital media technologies is that it serves as tools for crafting virtual identities beyond limiting to single farming identity. This altered perspective has led to the emergence of a new identity among millennial farmers - one that embraces technological integration and positions them as *digital agrarians* in an evolving agrarian landscape. Social media platforms such as Instagram, YouTube, and Facebook help them to showcase their creativity and craftsmanship. Through visually aesthetic content, they project themselves as digital artisans, showcasing skills in photography, videography, and storytelling along with agricultural practices. These virtual practices allow them to create multiple identities and connect with a wider audience by redefining their roles as farmers and storytellers. Nancy, a farmer from Idukki, noted "I never thought I'd become known for video content, but through Facebook, I share the beauty of our farm with the world. I've become more than just a farmer; I'm a vlogger of agri life." This identity as a content creator further assumes them the identity of an 'agripreneur'. Through agri vlogs, shared via social media and several other e-commerce platforms, they venture into agribusiness, selling not only their produce but also value-added

products. By doing so, they extend existing identities, assuming the roles of entrepreneurs. An Interview with Tom (a farmer from Thrissur) revealed his agripreneurial journey: "I now sell my banana and medicinal rice globally by sharing about it on Facebook and Instagram. [...] I've evolved from being just a farmer; I'm now an agripreneur."

As we discussed earlier about sharing expertise with peers, a knowledge curator identity has been created by disseminating agricultural wisdom through blogs, podcasts, and YouTube channels, and thus further extending their identity as educators and influencers in the agricultural domain. Sujith, a farmer and YouTuber, shared his motivation: "I use YouTube to share farming techniques and own experiences. People ask doubts. [...] I'm not just a farmer; I'm a knowledge curator, helping others grow." The interlinked identities of content creator, entrepreneur, curator and so forth, facilitate community building among farmers. Millennial farmers actively engaged in online forums, WhatsApp groups, and social media platforms to connect with peers, exchange ideas, and mobilise for collective action. These digital communities foster a sense of belonging and camaraderie, transcending the solitary 'farmer' identity to embrace the role of community builders and advocates. Shamika (a farmer from Palakkad), is an active member of agro based farming networks, highlighted her role: "I connect resources to solve problems, and support each other. I'm not much of a farmer today, rather a community builder." This perspective of multiplex capacities that technology offers builds a hybridity in their identities. Henceforth, once a farmer is always a farmer, but in the digital age, this identity is layered and hybrid, adopting diverse roles and positions in both actual and virtual spaces.

2.4 Digital Media Technologies: Between Farm and the Farmer

The farmers that we were interviewed engaged in various kinds of farming, viz. Paddy, fruits, vegetables, leafy vegetables, spices, cash crops, fish, etc. The land capacity of farmers ranges from 30 cents to 60 acres of land, either owned by them or under lease. Irrespective of the type of crops and size of the field they farm in, the young farmers of today position digital media technology between themselves and their farms. Having positioned so, the digital media technologies assume the role of a liaison between the farm and the farmer and thus bring the gap between traditional agricultural knowledge and contemporary practice. Placed between farm and farmer, it widens the passage through with the flow of information, knowledge, and market dynamics converge, empowering the farmers to make informed decisions and adapt to ever-changing agricultural landscapes. It also works as a catalyst that expedites the communications and exchange of ideas among peer groups. Various digital smart agritech applications, online forums, and social media networks help farmers to gain access to a vast repository of agricultural insights, market trends, and best practices. In such a way, practices like precision agriculture techniques, sensor-based monitoring systems, and IoT-enabled devices have found their place on the farm, transforming the way millennial farmers cultivate, irrigate, and manage their crops and livestock and thus optimising resource utilisation and increasing productivity.

From inducing a passion towards farming to making money and fame from farming, the new age farmers incorporate digital media technologies in all the stages of farming. Farmers' past experiences showcase how they have yielded from digital media technology in their farms. Farmers' use of digital media technology, particularly for the purpose of farm development primarily fall under the following categories.

2.4.1 Information and Idea

“You earlier asked about my idea of technology, now I will say that we get an idea about farming from these technologies”, Sreenath, a farmer from Kollam responded to my question regarding for what purpose he uses digital media technology, particularly for farming. Automated irrigation and fertigation setup, crop hanging system, and mulching sheet crop protection are some of the initiatives he implemented in his farm as he came across these ideas on various social media platforms. Midhun, A farmer from Kottayam said, “During the time of covid outbreak, I used YouTube, Facebook and other social media [...] I observed vloggers here setting a trend of rooftop farming. So, I decided to sell budded seedlings and seeds online through Facebook and WhatsApp.” Being well-informed about market trends empowers them to make appropriate decisions regarding crop selection and pricing strategies, ensuring greater profitability and market competitiveness. A highly tech enthusiast farmer like Prakash from Palakkad even plans using drones and satellite imagery to analyse crop health, monitor soil conditions, and precisely apply fertilisers and pesticides in his 40 acres of paddy and vegetable field. “I have watched a number of videos on YouTube about the use of drones in agriculture [...] I haven't seen anyone using it in Kerala [...] I can use it and rent it to other farmers as I earlier bought and rented a tilling machine for the first time in this area.” He is well informed about the functionality, specifications, price and even knows about the upcoming launch of agri-drone. He plans to purchase that for twelve lakhs from an online vendor to use it and also rent to other farmers.

These digital platforms offer them the capacity to informed decision making by accessing online databases, weather forecasts, and market analyses through their smartphones and

computers. They remain constantly updated about the recent trends and opportunities within the agricultural sector.

2.4.2 Farm Management and Administrative Efficiency

One of the main problems with scalability of farming is difficulties in farm management and administration. Farmers often have a hard time managing multiple farmlands or crop varieties simultaneously and efficiently, which in fact stops their growth from farm-to-farm business. Millennials brought exceptions in this by using digital tools from farm management and administration. Integrated farm management digital platforms like CropIn⁶, BizNext ERP⁷, Farm2Farm⁸ etc. along with other common mobile applications have streamlined farm administration for millennial farmers. These tools assist in book-keeping, financial management, inventory tracking, remote crop monitoring, scheduling etc. Automation of administrative processes saves time and reduces the burden of paperwork, allowing farmers to focus more on their core farming activities.

⁶ CropIn SmartFarm is a platform used for farm management. It is a smart agriculture solution that revolutionises farming with accurate farm predictability.

⁷ BizNext ERP is used to manage sales, purchase and other financial tasks. From crop production and planning to selling the produce, everything can be managed with BizNext ERP software.

⁸ Farm2Farm is an agritech platform used by farmers to procure and know about organic alternatives to chemical fertilisers at their doorstep. It also allows farmers to market their organic produce.

2.4.3 Climate Resilience and Risk Management

Having access to real-time data, they harness the ability to adapt swiftly to fluctuating conditions. For instance, when faced with unforeseen weather patterns, farmers like Manoharan and Shanil, among many more, promptly adjust their cultivation schedules and irrigation practices in order to enhance profit if possible, or at least to mitigate potential losses. Anil, a farmer from Kasargod, starts his day by checking weather updates on his smartphone and this helps him decide the day's activities such as irrigation scheduling and pest control treatments. Moreover, Anil recounted a critical incident when he was able to prevent over-irrigation by receiving timely weather alerts about unexpected rains. This saved his newly planted seedlings from getting washed away, which would have resulted in significant losses.

2.4.4 Sales and Marketing

Unlike the earlier generation farmers, millennials' duties being farmers are not restricted to cultivating crops. Kiran from Ernakulam has transformed his family's paddy fields into an organic farm, now cultivating organic vegetables and spices which fetch a higher market price. This shift is supported by his use of social media platforms to directly connect with consumers, bypassing traditional supply chains that often disadvantage elderly farmers. "Facebook is a marketplace for me, I don't remember if I have posted photos of mine or my family on Facebook and WhatsApp. [...] all my status and posts are about the crops I have yielded by the end of that day." Said Praveen, a farmer from Alappuzha. Once his workers harvest the crops, he posts pictures of it on Facebook and WhatsApp by adding the available quantity in the description. People place orders by replying to the post. Rahoof, a farmer from Kozhikode shared a success story where he used Facebook groups to market organic mangoes, which allowed him to get

better price per kilogram compared to local markets, emphasising the direct link between digital engagement and economic benefits. Similarly Jitesh, a farmer from Palakkad, having farms in three districts of Kerala, emphasised how access to real-time market data has empowered him to negotiate better prices and choose the right time to plant watermelon. Jitesh added:

“Farmers in this locality plant watermelons in such a way that they harvest during summer. [...] I admit watermelons have high demand in summer, but when I analysed the market in depth, I found the restaurants, fruit shops and juice shops need watermelon throughout the seasons, and relatively with a higher price than that in summer. I use online market platforms to analyse the prices and discover this hidden market.”

(March, 2023)

2.4.5 Community Building and Knowledge Exchange

Beyond individual farmers, digital media technology has facilitated a sense of collective learning and mutual support within the farming community. Online forums and social media groups have become virtual spaces for sharing experiences, insights, and best practices. These platforms foster dialogue among farmers, enabling them to seek guidance from agricultural experts and learn from each other. Particularly, social media platforms and online farming communities have facilitated knowledge exchange and community building among millennial farmers. They can share their experiences, challenges, and success stories with peers from diverse geographical locations. These virtual communities foster a sense of camaraderie and

collaboration, enabling farmers to learn from each other, seek advice, and collectively address common issues.

Millennial farmers use digital media technology in everyday farming practices to access information and expertise, market connectivity, farm management efficiency, climate resilience, and community building. For millennials, digital technologies span across all stages of farming. During the pre-planting phase, farmers use platforms for decision making, apps to analyse soil health and decide the best crops to plant in various field sections. Throughout the growing season, continuous monitoring via sensors helps in precise application of nutrients and identification of stressed plants. As the harvest approaches, predictive analytics help in determining the perfect timing to begin harvesting. Post-harvest, digital platforms assist in tracking inventory and connecting with buyers. The incorporation of digital media technologies in all stages of farming has played a transformative role by leveraging benefits to millennial farmers by overcoming many limitations of traditional farming practices and enhancing their productivity, sustainability, and overall livelihoods.

2.5 Challenges and Dilemmas

While digital media technology has brought positive changes in perspectives, it is imperative to acknowledge that this transformative journey is not without its challenges. The farmers have also built a fractional share of perspective challenges and disruptions to everyday farming practices. These candidly expressed perspectives observed during field study, underscores the complexities inherent in the adoption of digital tools within the context of traditional farming practices. Gone were the times of challenges regarding digital media literacy, initial learning

curve and poor internet. In the beginning of the millennium, the foremost among the concerns expressed by these farmers was the issue of financial investment. However, amidst the abundance of digital information lies the need for critical discernment. Farmers acknowledged the importance of validating the reliability and authenticity of sources. As they navigate this vast digital landscape, they remain cautious about misinformation that may lead to suboptimal decision-making. The upfront costs of acquiring and implementing modern digital technologies were perceived as formidable barriers to entry. Many millennial farmers, particularly those with smaller landholdings or limited financial resources, felt hesitant about committing substantial capital to adopt new technologies. Their concerns about the return on investment and the time it would take for technology to yield tangible benefits further complicated the decision-making process. But millennials having control over the technology contemplate the deeper aftermath of technological proliferation. Amidst the enthusiasm for digital media technology, millennial farmers expressed apprehensions about the initial investment costs and the complexity of integrating technology into their existing farming practices, while a few others cited concerns about data privacy and security when using online platforms for agricultural transactions. They also hold concerns about technological determinism, survival capitalism and lack of personalisation or hyper localization. Even though they are unaware about these terms, they are aware and concerned about these issues. Additionally, issues related to large investment and less return over investment emerged as hindrances, especially small-scale farmers. Farmers are deeply rooted in time-honoured agricultural practices, “farmers' time should be in the field, not in the couch”, said Prakash (a farmer from Palakkad). However, the incorporation of digital media technologies has brought a profound shift in the way farmers spend time on the field. Their hard work in the field has

turned into smart work through a smartphone. Henceforth, many farmers recounted their initial hesitancy and scepticism when faced with digital solutions. The millennials being proficient in the operation of technological devices and mobile applications, its potential apparently became the potential of the farmer in the field. The digital divide, often worsened by infrastructural disparities and accessibility limitations, poses significant hurdles, especially for farmers in remote regions or with less capital. Those possessing high end technology devices yield better than a counterpart who equally knows how to productively use these technologies. As we know, the 'smart work' on the phone is more productive than 'hard work' on the field, but this often results in losing an intimate connection with farmland. Another challenge that happened to many farmers in the initial stages is the visible outcome of digital inputs. Yielding persistently from the farm demanded sowing time and patience in the smartphone. Yet, those who persevered articulated how their efforts were ultimately rewarded with improved efficiency and resource management.

Data privacy and security lately became paramount concerns for millennial farmers and the increased engagement of online platforms brought a digital fatigue. "I used to see my father and uncle sitting tired after work in the field, today [as a young farmer,] I am tired of attending calls, sending messages, posting ads of produce on social media handles and groups", said Mohanakrishnan (a farmer from Palakkad). Farmers today are more worried about the potential misuse or unauthorised access to their data, which could have serious implications for their livelihoods and competitive advantage. The strong political legacy of the state, resisting capitalist commercial invaders, underscores these apprehensions. These challenges not only influence their decisions but also shape their perceptions of the technology's potential impact on their everyday agricultural practices.

Distraction caused due to usage of multiple digital media platforms and dealing with huge quantities of information leads to earlier discussed digital fatigue and further points to an underrated inefficiency of digital media platforms that fails to address customised needs of individual farmers. Major stake of farmers, while responding to the question on why they do not use particular agriculturally based mobile applications, commonly replied, “that is not for us”. This response points towards the research and development done prior to developing these agri-apps which fails to fit the everyday of millennial farmers. Most of these platforms have yet to realise the diversity in needs, style, timings, crops and land of farmers. The high degree of farmers’ demand for personalisation and hyper localization leaves room for these platforms to work extensively on R&D. In these platforms, a farmer can know about a particular crop, but not necessarily about their crop. A farmer can schedule the planting of a crop, but not another crop or another farmland they own. A farmer may get to know the weather of an area but not about the plot he may need. A farmer may get the potential diseases of a crop, but not the disease history of their crop. A farmer can calculate the anticipated expenses and profit of planting a crop, but never can calculate it for their plantation in given circumstances. Farmers can use different agri based digital platforms to fulfil their needs but it still remains an unaccomplished dream. The proliferated use of such platforms creates digital fatigue among farmers. They believe popular social media can be customised and domesticated to address specific use and reduce proliferation and thus digital fatigue. Overall, the conceptualization of technology among millennial farmers proved to be a dynamic aspect of their everyday lives. The various perceptions about and definitions of technology, as well as the empowering and transformative aspects, offer valuable insights for policymakers and agricultural stakeholders

seeking to promote sustainable and popular digital media technology integration to support the next generation of farmers in Kerala.

2.6 Domesticating and Redesigning of Media Technologies

As digital media technologies become central to millennial farmers' performance of everyday, the changing role of technology in tandem with everyday needs of farmers should also be considered, emphasising on how they alter uses of technology (Hartnett, 2019; Selwyn, 2005). Social media has turned into an unremarkable factor of a millennial's life. Having been born in the millennium, where social media is the norm, the digital media technologies have largely been embedded into their everyday. Indeed, the internet and social media for previous generations were novel (Turkle, 1984; Silverstone, 1993), rather for millennials', it is largely 'domesticated' (Miller, 2016, Sujon et. al., 2018). Drawing from 'domestication' (Haddon, 2011) it could be analysed how millennial farmers develop and relate to digital media technology and the role it plays in their everyday lives. When this research took this issue up by asking, how do farmers make sense of digital media technology over time in various circumstances? What role do these technologies have in their lives, and how and why have they changed their usage? Empirically conducted fieldwork understands respondents' digital media technology environments, and provides answers to these questions. Earlier works on domestication of digital media technologies (Grošelj, 2021; Larsson & Viitaoja, 2019; Livingstone, 1992; Silverstone, 1993; Sujon et. al., 2018), use the frame of domestication to understand how respondents shape technology environments. This research, demarcating earlier notions of domestication, analyses millennial farmers' experimentations with digital media technology. A notable shift in the usage of digital media technologies especially social media from a network platform to a personal service platform that confines specific needs of

everyday is seen. Indeed, the respondents demonstrate this shift marked by a thorough routinization of personalised services using Facebook, Instagram and WhatsApp, which they turn into personal service platforms rather than social network platforms. This shift not only marks the domestication of digital media technology into the background of our respondents' lives, where users rely on Facebook for scheduling, monitoring, maintaining, and organising their lives, but also a shift in the Facebook platform itself. Farmer's domestication approach conceptually and empirically performs a social shaping of technology, practising complex but deep relationships with technologies

When the domestication of technologies has been “successful,” the technologies are [seen as] comfortable, useful tools—functional and/or symbolic—that are reliable and trustworthy. This is often the case with the phone, radio and television. They have all lost their magic and have become part of the routine.

(Berker et al., 2005, p. 3)

This practice of domestication and redesigning of media technologies among millennial farmers emerge as pivotal aspects in comprehending their complex relationship with digital tools and media in their everyday lives. Domestication as referred earlier, the process through which technologies become incorporated into daily routines, imbued with ‘roles and meaning’ (Grošelj, 2021, p. 430), and reshaped to align with local practices and values. While millennial farmers assimilate digital media technologies with their everyday agricultural practices and ingeniously adapt them to suit their specific needs and circumstances, it becomes evident that media technologies, primarily smartphones and social media, have become indispensable tools for farmers. Initially introduced for communication and networking, these digital media

technologies have been domesticated by the farmers for a diverse range of purposes. WhatsApp, for instance, has transformed into a book-keeping tool for Vijith (A farmer from Alappuzha), helping him to track all financial transactions, note expenditures and tally with the revenue at the end of the day. He sends a WhatsApp message to himself immediately after spending any money, or utmost within five minutes. This includes a photo of a bill, screenshot of an online transaction or text of cash spent from hand. Even from the type of media content, whether it is a text, a photo or a screenshot, he is later able to track the mode of transaction. Likewise, domestication as a practice is deeply intertwined with the farmers' everyday practices, as they engage extensively with digital media technologies. They infuse technology with locally appropriate farming applications or cater online platforms to their specific needs. Farmers create and adapt these platforms, further reinforcing their sense of ownership over the technology, discussed earlier as 'agency over technology'. This agency emanates from the realisation that digital media technologies can be modified to cater to their specific needs, instead of being imposed upon them by external forces. For Sooraj (a farmer from Kasargod), Instagram has transformed from a social media to Amazon—an e-commerce platform. Every day, he opens the app and uploads pictures, as every regular Instagram user, not for likes but for sale. As part of these domestication processes, the farmers not only consume digital media technologies but also actively participate in shaping them. With a fusion of expertise in agriculture and technology, they democratise these platforms and repurpose them in unique ways, often challenging mainstream narratives about technology adoption in agriculture. Sensibly, the production, development and shaping of agricultural technologies shall both “start and end with farmers” (Crane, 2014, p. 45). The “farmer-back-to-farmer” (FB2F) model in agriculture by Robert Rhoades and Robert Booth (1982) encourages technology producers to

use farmers' knowledge and pattern of practices as both starting point as well as the end point. This analysis points towards the need for technology developers and policymakers to engage closely with local farming communities to foster inclusive and contextually relevant technological solutions. Drawing insights from the process of domestication, digital media technologies can emerge as ever-evolving instruments for agricultural development and empowerment of millennial farmers.

2.7 Conclusion

The attempt to map initial perceptions to later developed perspectives of technology among millennial farmers in Kerala reveals a dynamic transformation on how they conceptualise and position everyday digital media technologies. Through ethnographic interviews, one-on-one discussions, and field observations, we gained valuable insights into how these farmers perceive, define and conceptualise digital media technology, and how it shapes their agricultural practices and everyday. Initially, perceptions of many farmers were shaped in light of conventional limitations, rooted in time and space constraints, along with additional power technology brought to them. The idea of speed, control, agency, independence, progress, convenience etc. emerged as the major theme among the millennial farmers's initial perception about digital media technologies. Another key finding of this chapter is that millennial farmers in Kerala have diverse perspectives on technology, shaped by their individual experiences and contexts. While farmers primarily view technology as a necessary tool for improving productivity and efficiency, they do not deny the possibility of threats it may pose to traditional farming practices and to the larger social and environmental spectrum. These diverse

perspectives reflect the complex nature of digital media technology, and highlight the need for context-specific approaches to its integration in agriculture. As they embraced digital media technologies, and through multiple and continuous usage, their perspectives have evolved significantly. They later came to develop a perspective by conceptualising digital media technology as a potent enabler of efficiency and productivity in their everyday agricultural endeavours. They harnessed digital tools to overcome traditional barriers, seamlessly connecting with employees, farmland, and marketplaces regardless of physical distance. Weather forecast This practice of domestication and redesigning of media technologies among millennial farmers emerge as pivotal aspects in comprehending their complex relationship with digital tools and media in their everyday lives. Domestication as referred earlier, the process through which technologies become incorporated into daily routines, imbued with 'roles and meaning' (Grošelj, 2021, p. 430), and reshaped to align with local practices and values. While millennial farmers assimilate digital media technologies with their everyday agricultural practices and ingeniously adapt them to suit their specific needs and circumstances, it becomes evident that media technologies, primarily smartphones and social media, have become indispensable tools for farmers. Initially introduced for communication and networking, these digital media technologies have been domesticated by the farmers for a diverse range of purposes. WhatsApp, for instance, has transformed into a book-keeping tool for Vijith (A farmer from Alappuzha), helping him to track all financial transactions, note expenditures and tally with the revenue at the end of the day. He sends a WhatsApp message to himself immediately after spending any money, or utmost within five minutes. This includes a photo of a bill, screenshot of an online transaction or text of cash spent from hand. Even from the type of media content, whether it is a text, a photo or a screenshot, he is later able to track the

mode of transaction. Likewise, domestication as a practice is deeply intertwined with the farmers' everyday practices, as they engage extensively with digital media technologies. They infuse technology with locally appropriate farming applications or cater online platforms to their specific needs. Farmers create and adapt these platforms, further reinforcing their sense of ownership over the technology, discussed earlier as 'agency over technology'. This agency emanates from the realisation that digital media technologies can be modified to cater to their specific needs, instead of being imposed upon them by external forces. For Sooraj (a farmer from Kasargod), Instagram has transformed from a social media to Amazon—an e-commerce platform. Every day, he opens the app and uploads pictures, as every regular Instagram user, not for likes but for sale. and online marketplaces became invaluable tools, enabling them to optimise planting schedules and engage in direct dealings with buyers, ultimately enhancing profitability. Smartphones, online platforms, and social media groups helped farmers access a wealth of information and resources previously unavailable to them. This newfound connectivity enables them to engage with experts, researchers, and databases, and to acquire sustainable farming skills and knowledge. It also empowers them to explore new farming opportunities and diversify their agricultural practices, adapting to changing consumer demands and emerging trends. Through the continued technology practices in everyday, they recognize its transformative potential as a means of connectivity and information exchange. They leverage digital media technologies to access global knowledge networks, gain insights into market trends, and acquire sustainable farming skills. This connectivity transcended geographical limitations, empowering them to make informed decisions and adapt to changing circumstances, balancing this modern innovation with traditional knowledge. However, this connectivity has also brought in a set of challenges and risks. Farmers are overwhelmed by the

sheer volume of information available online, and struggle to discern reliable sources from the unreliable. Moreover, juxtaposing the millennials with the previous generation and digital enthusiast with digital “laggard” (Rogers, 2003), the use of digital media technology may exacerbate existing inequalities and power imbalances, as farmers especially the millennials with greater access to resources and education are better equipped to navigate and yield from digital media technologies. In the process, millennial farmers cultivated hybrid identities that extend beyond the traditional farmer role. They become content creators, agripreneurs, knowledge curators, and community builders, both in physical and virtual spaces. While challenges such as initial investment costs and data privacy concerns persist, these farmers display a remarkable ability to domesticate and redesign digital media technologies to meet their specific needs.

Overall, the millennial farmers' journey from initial perceptions to post experience perspectives of technology reflects their adaptability, innovation, and resilience. They have not only embraced technology as an enabler of agricultural progress but also as a means of personal and professional growth. This evolution in their conceptualization of technology underscores the importance of tailoring digital solutions to their unique contexts and challenges, ultimately driving sustainable and inclusive technological integration in agriculture. This chapter henceforth emphasises the need for a holistic and inclusive approach to technology in agriculture, one that takes into account the diverse perspectives and experiences of farmers, and that addresses the social, economic, and environmental challenges facing rural communities. Such an approach should prioritise the needs and aspirations of farmers, and should be grounded in the principles of sustainability, equity, and social justice. This chapter has mobilised discourses surrounding millennial farmers' understanding and conceptualization

of technology. It explains farmers' ideas, beliefs, and definitions of technology along with their initial perception and later formed perspectives about technology. The chapter also encapsulates how digital media technologies are placed between the farm and farmer, the challenges it poses, and how farmers domesticate certain technology into their everyday.

The Chapter III will discuss the emotional and relational dynamics established and maintained between millennial farmers in Kerala and the digital media technology they use. The emotions expressed in the upcoming chapter are not limited to the emotions generated when a farmer uses a particular digital technology, but the emotions they feel with the particular technology they use.



CHAPTER III

FARM, FARMER AND TECHNOLOGY; AN ENTANGLED RELATIONSHIP

3.1 Introduction

In Chapter II, we have discussed how the millennial farmers in Kerala conceptualise digital media technologies in their everyday. By mobilising discourses regarding technology, the previous chapter explored how the farmers form an idea about technology through their initial perceptions and later formulated perspectives regarding the digital media technologies they use in their everyday farming.

On a fine cool night in the winter, a man from Malabar⁹ Kerala, abruptly woke up from a sound sleep, mourning strangely, breathing heavily, and sweating. His sister entered the room and noticed his folded right palm appeared he was holding something. From the vague sounds of yelling, she realised it was his phone he was holding tightly from someone who was taking it away. This man, Vaseem (a farmer from Kasargod) carried that trauma for more than three

⁹ Malabar is a region in Kerala, India, which covers the geographical area north of the Bharathapuzha, stretching over parts of Thrissur, Palakkad, Malappuram, Kozhikode, Wayanad, Kannur and Kasaragod districts of Kerala (*Malabar - The Land of Spices*, n.d.)

hours even after a complete wake up from a haunting dream. This is one out of several instances we encountered during the fieldwork among millennial farmers¹⁰ in Kerala which portrays an inseparable coalescence of digital media technology with the everyday practice among the millennial farmers and pictures the degree of its penetration in their everyday practices. Yes, the discussion is about *emotions* and *relationships*. Extensive research has been conducted about human-human relationship and the role of digital media technologies in it (Ruest et. al., 2018; Habito et. al., 2021; Rubio-Tamayo et. al., 2021; Golam, 2022; Costa et. al., 2023; Min & Shin, 2023). Latest of such earlier literature revolve around establishing and maintaining relationships *using* technology, not *with* it. As the digital media technology today has permeated almost every aspect of our lives, including the agricultural sector, farmers, in particular, have become increasingly dependent on digital media technologies for various tasks related to their farming practices. The significance of this research lies in the fact that millennial farmers are crucial in the agricultural sector, and their relationship with digital media technology has turned around over time.

The primefold objective of this chapter is to explore how millennial farmers in Kerala establish and develop relationships with the digital media technology they use in their everyday

¹⁰ The study operationalizes “Millennial farmers” as individuals who reached young adulthood in the early millennium (born early 1980s to mid-1990s) and whose primary income is from farming. These farmers actively employ digital media technologies to demonstrate innovation in agriculture, highlighting a unique generational cohort shaped by social and technological factors.

professional and personal lives. This ethnographic journey unfurls a profound exploration into intimate relationships of millennial farmers *with* digital media technology. The chapter focuses on certain aspects of emotional and relational dimensions that define their daily encounters with technology, contours of their personal and professional relationships with these digital tools, a spectrum of emotions—interest, intimacy, comfort, tension, anxiety, and stress—expressed during their experiences. In today's modern agricultural landscape, the dynamic relationship between farms, farmers and technology has become increasingly entangled. This intertwining of farm, farmer and technology has brought about a significant volume of emotional affinity for millennial farmers towards technology. This relationship 'with' digital media technology goes beyond its practical applications as it encompasses emotional and relational aspects that shape their interactions with these technological artefacts. Farmers of the millennial generation have grown up in a world heavily influenced by digital technology (Novisma, 2023). Their affectionate involvement with digital gadgets evinces how technology can induce emotions in humans or how humans can use machines with emotions. Putting it succinctly, technology has moved beyond its instrumentality.

3.1.1 Context

In recent years, there has been a decline in the number of farmers in the agricultural sector, posing a significant challenge for the industry (desagri.gov, 2022). To overcome this decline, it is crucial to engage the millennial generation in the field of agriculture actively. With their familiarity and expertise in digital technologies, millennials can play a vital role in revitalising the farm industry. By combining business opportunities with the latest technology, millennials can help maintain and advance the agricultural sector. The millennial generation, also called

the digital generation, has grown up in an era dominated by digital media technology. The Era of Agriculture 4.0 has already begun, where advanced digital and biotechnological innovations are transforming the way farming is done (Miranda et. al., 2019). Digital technologies have become instrumental in addressing the market. As the digital media entered into anthropological inquiry, anthropologists applied theoretical and methodological approaches in anthropology to study the cultural practices using it. (Postill, 2009; Boyer, 2012; Slama, 2014; Hendry, 2016; Horst, & Miller, 2020).

3.1.2 Brief recap of the research question

In comparison with Gen X¹¹ and Gen Z¹², the millennial farmers particularly stand at the crossroads of traditional practices and modern digital technology. Every morning, their smartphones light up with the promise of a new day on the farm, becoming indispensable companions in their everyday. In the light of the dynamically evolving role of digital media technology from a utility tool to an emotional companion, the need to explore the emotional

¹¹ Gen X (popular abbreviation of Generation X) is the demographic cohort preceding Millennials (Generation Y). Mid-1960s the starting birth years of Gen X and the late 1970s as its ending birth years, with the generation being particularly defined as people born from 1965 to 1980.

¹² Generation Z, term used to describe people born during the late 1990s and early 2000s. Specific span of birth years of this generation range from 1997 to 2012. Generation Z follows the millennial generation, sometimes called Generation Y, which followed Generation X.

and relational aspects of millennial farmers' interactions with technology becomes paramount.

One may wonder, is it essential to study these complexities in the farmer-technology relationship? The answer lies in the very essence of their everyday. The core of our research lies in the overarching question: How do the farmers establish and develop relationships with the technology they use every day? This question is not a mere academic curiosity but a humanitarian concern while observing humans experience and expressing emotions from and towards technology. The need for this inquiry further sprouted when we consider the profound transformations occurring in agricultural practices worldwide. Technology, especially digital media technology, has penetrated the agricultural landscape, promising increased efficiency, better resource management, and enhanced market access. However, as these digital tools become integral to daily life on the farm, it is essential to understand not just their utility but also the emotional and relational dynamics they introduce. As we venture into this chapter, the significance is not primarily vested in technology but in the human experience and emotions of the millennials in the digital age of farming. Through the narratives and experiences of these farmers, we aim to shed light on the essential need to understand and appreciate the emotional and relational complexities within the entangled relationship between farm, farmer, and technology.

3.1.3 Rationale for exploring the emotions and relations

The decision to investigate the emotional and relational aspects of technology usage among millennial farmers arises from the acknowledgment that in today's digital era, technology is not merely a set of tools or devices, but rather a deeply intertwined component of their everyday.

This inquiry is grounded in several compelling rationales: :

3.1.3.1 Human-Technology Interaction Complexity: Traditional views of technology tend to emphasise its utilitarian aspects, focusing on its functionality and efficiency. However, this viewpoint fails to acknowledge the complex and diverse ways in which millennial farmers interact with technology. By exploring the emotional and relational aspects, the study remarks that technology is not a neutral tool but an integral part of the lived experience, shaping and being shaped by human emotions and relationships.

3.1.3.2 Impact on Everyday Life: Technology has become an inseparable part of the everyday lives of millennial farmers. It influences their decisions, activities, and interactions. Understanding the emotional aspects of this relationship is crucial because emotions drive actions and decisions. Farmers' feelings of interest, comfort, anxiety, or trust associated with technology significantly impact 'how' they engage with it and 'how much' they engage with it, including the extent to which they adopt, adapt, or often resist it in their everyday farming practices.

3.1.3.3 Psychological and Social Dimensions: Emotions associated with technology use go beyond individual consequences; they have broader social implications. For millennials, technology serves not just as a means of connection with the broader agricultural community and the global digital society, but something they establish an emotional connection with. How did millennial farmers express these emotions before this new emotional establishment and How the newer expression of emotions is reflected in their social ties? Exploring the emotional and relational dimensions provides insights into how technology becomes a player in the emotional interplay of millennial farmers and their surroundings.

3.1.3.4 Coping with Technological Change: Millennial farmers are navigating an era of rapid

technological change within the agricultural sector. This change can be both exciting and challenging. Emotions such as fascination, tension, or anxiety play a pivotal role in how farmers adapt to new technologies. By understanding these emotional responses, we gain insights into the factors that facilitate or hinder technology adoption, making it possible to tailor interventions and support strategies more effectively implemented by government authorities and the technology producers as well.

3.1.3.5 Holistic Understanding of Farmer Identities: Millennial farmers are not just agricultural producers but complex individuals with varied identities. Their relationship with technology contributes to the formation of these identities. Examining the emotional and relational aspects of this relationship offers a deeper understanding of how technology influences their self-concept and how they position themselves in both the farming community and the broader digital society.

3.1.3.6. Policy and Intervention Implications: Recognizing the emotional and relational dimensions of technology use among millennial farmers has practical implications for policymakers, agricultural stakeholders, technology producers and researchers. It can foster the design of more empathetic and farmer-centric interventions, training programs, support mechanisms or production of high-utility digital media technologies that acknowledge and address the emotional challenges and opportunities associated with technology adoption.

The exploration of the emotional and relational aspects of technology use among millennial farmers therefore is crucial for developing a comprehensive understanding of their everyday experiences. It recognizes that technology is not an isolated tool but a deeply entangled element of their lives, involving their decisions, emotions, and relationships. This exploration allows

for a richer and deeper narrative of their digital experiences and offers insights that extend beyond the individual to impact communities and inform policy and intervention strategies.

This chapter takes a thematic approach to answer the research question, revealing the entangled relationships between the farm, farmer and digital media technology by analysing emotions—interest, intimacy, comfort, tension, anxiety and stress—in their everyday.

3.2 Cultivating Bonds: The Emotional Aspects of Technology Use

Exploration to the emotional dimensions inherent in millennial farmers' use of digital media technology sets the stage for exploring the inscrutable relationships they forge with their devices. Vivid narratives and personal stories shared by farmers themselves bring to life the emotions they experience while engaging with technology, offering a deeply immersive and human perspective. Real-life anecdotes and reflections illustrate how technology serves as a source of fascination, driving them to explore its possibilities. Moreover, many perceive technology usage as a decree of their freedom, while others often refrain from it due to religious and cultural reasons (Kwakye et. al., 2021). However, millennials feel immersed in this virtual agricultural environment and subsequently this environment germinates emotions during millennial farmers' interactions with technology. Using social media can be like riding a roller coaster of emotions, with the highs of feeling connected and the lows of dealing with negative interactions. They experience feelings of interest, intimacy, comfort, tension, anxiety, and stress associated with its use, which are similar to the complex emotions evoked by a rollercoaster ride. These emotions arise due to various factors such as the farmers' dependence on technology, the role it plays in shaping their everyday lives, and their feelings when

separated from or reunited with it.

Saritha, a farmer from Thrissur, uses digital media technology as integral to her farming practices as much as to her life. She describes her relationship with technology as a partnership. "Digital media technology is like a trusted partner in my farming journey. [...] I made a connection with this thing, and that is how I made all the connections I have today." This digital connection not only enables her to stay updated on the latest farming techniques and market trends but also provides her with a sense of belonging and support, ensuring moral and emotional support along with a technical one. After many of such explorations, at the heart of these explorations lies the recognition that digital technology devices, for many farmers, is not just a utilitarian tool. It is a companion, a confidant, and at times, a source of solace. In addition to Saritha's case, narratives gathered from ethnographic voyages illustrate the ways in which farmers' emotions are grafted into their technological experiences, budding a vivid picture of the entangled relationship. In the fields of Kerala, technology isn't just an abstract concept; it's a living, breathing presence in the lives of millennial farmers. It offers them more than just practical utility; it weaves a complex, but deep emotional bond that shapes their relationship with the digital world. Let us embark this journey through their stories— stories that reveal the profound emotional depths of their connection.

Their narratives and personal stories suggest technology serves not merely as a tool but as a partner, confidant, and source of solace for these farmers. Emotions ranging from fascination and intimacy to anxiety and stress underscore the impact of technology on their lives, transforming it into a living presence that offers both practical utility and deep emotional bonds. This section underscores the necessity of recognizing the emotional landscapes intertwined with technological use in agricultural practices.

3.2.1 Fascination and Curiosity

As the morning dew spreads on the leaves, Prakash, a farmer from Palakkad, stands amidst his crops, smartphone in hand. For him, technology is not just a tool but a source of fascination and curiosity. He expresses, showing the smartphone in his hand, "Every time I use this, I am amazed about the things I am doing with this small thing." It sparks his curiosity and motivates him to explore new methods and ideas that can enhance his farming practice. For Prashanth, digital media technology represents endless possibilities and sparks a sense of curiosity that fuels his desire for innovation.

"[...] the very essence of technology is like a forest for me," Thameem, a farmer from Trivandrum muses.

It always shows me something to explore, to uncover its mysteries. Last season, I used a mobile app to monitor soil moisture levels. It was a revelation, like peering into the earth's secrets [...] This season, today, I use it to control the atmosphere of my plantation [...] That fascination, that curiosity, it drives me to explore deeper, to see what else I can discover.

(June, 2023)

Manav's relationship with technology also is not just functional; it is a journey of exploration, marked by the thrill of unravelling its potential. "Every time I discover a new feature or application, it's like unwrapping a gift," he says with excitement. He feels bored and unproductive when this sense of fascination and curiosity to use digital media technology is unattended.

“Lately I started loving the problems I face during the farming process [...] I have this fascination to solve these problems through newer methods [using digital media technology],” James, a farmer from Pathanamthitta told while explaining the things that make him feel like using a smartphone over and over again. James enjoys solving problems, but more he enjoys solving them in the digital way. “It's like a puzzle waiting to be solved, and I find myself drawn to uncover its potential [...] every time I get help from it, I feel loved and every time I solve a problem using it, I look at it with love,” he added.

Similar sentiments were echoed in the hearts of many millennial farmers. Ramesh from Wayanad, with decades of experience, says that his relationship with technology had evolved over time, but it had never lost its capacity to instil a deep sense of interest and intrigue. Ramesh had witnessed the transformation of his farming practices, thanks to the climate assessing technology. As he strolled through his meticulously managed paddy plantation, he recounted how technology has reshaped his approach. “Back in the day, farming was more about tradition and intuition,” Ramesh began, his eyes reflecting a blend of nostalgia and curiosity. “But now, I can't help but be fascinated by how technology has become a silent partner in my journey. It's like having a trusted advisor by my side, helping me make decisions I never thought possible.” Lifting the phone in his hand, he said, “I will be a thankless man without thanking this.” His words reflect the gratitude towards the digital device.

The fascination was not limited to experienced farmers alone. Even newcomers like Tibin, from Idukki, who had recently stepped into farming, find himself drawn into the ocean of fascination. One evening under a tree, he shared his journey into the world of agri-tech. His smartphone, now adorned with apps and tools, has become his constant companion throughout. “It's like a whole new world opened up,” Tijin exclaimed and told with excitement. “I remember

the first time I used this [smartphone] and how I am using it now [...] it is like stepping into a new thing every time."

For people like Prakash, Thameem, Manav, James, Ramesh, Tijin among many more countless others, their smartphones have become more than tools; they have transformed as sources of fascination and Curiosity. Each interaction with technology unveiled a layer of complexity, a world of possibilities waiting to be explored. It is a relationship defined by curiosity, a deep-seated interest in uncovering new domains of the digital age. In their narratives, we find echoes of a profound connection, one that transcends utility and transcends into the realm of emotional relationship.

3.2.2 Comfort and Trust

Owning a digital media device and building trust with it is a long way apart. Focusing on comfort, familiarity, and trust that farmers associate with their technology, we explore how these devices become trusted companions in their everyday lives. For many millennial farmers, their smartphones, tablets, and laptops have become trusted companions, offering a sense of comfort that transcends mere utility. In a neighbouring field, Rojin, a farmer from Idukki with decades of experience, shares his story. For him, his smartphone isn't a marvel of modern engineering; it's a trusted companion on the journey of farming life. With a gentle smile and deep compassion, by holding the phone tight, he says:

" [...] My phone is more than just a device. It's like a familiar face I see each day. It's a source of comfort, and I trust it to guide me in my farming and life.[...] It's been with me through better harvests and challenging times, a constant presence in the rhythm of my days."

(January, 2022)

For him, technology isn't just a tool; it's a reliable partner, a companion that shares the highs and lows of his agricultural journey.

Technology is akin to a trusted friend for most millennials. It offers them solace and companionship amidst the challenges of everyday farming. The digital devices, mostly the smartphones, they use become familiar faces, a source of comfort in an ever-changing world. Rahul, a seasonal farmer from Kasargod, reflects on his smartphone: "I feel like I am familiar to this like we were together for a very long time [...] that's the sort of comfort, and I trust I feel it." Similar notions were observed in conversation with Lijeesh, a farmer from Palakkad. He shared his thoughts: "When I'm out in the fields, I get lonely sometimes. [...] This thing makes me feel I'm never truly alone. I can listen to music, catch up on the news, or even video call a friend and other endless things we can do together [...] It's like having a friend with me." This sense of companionship extends beyond mere entertainment to the emotional pleasure of being together. It's akin to having a reliable partner in their everyday.

When it comes to a relationship we always say, 'sharing is caring'. Do the millennial farmers care for technology? Yes, they do. The 'caring' here is not limited to the physical protection of digital devices, but they care by sharing their everyday. We may find, when observed in a peripheral level, that farmers are sharing their everyday with the people around them they care for, but I, in a deep observation, encountered that they feel awkward not to approach a technology to express their feeling on an everyday basis. "I want to be able to share experiences. I want to be able to share my life, my anxiety, depression, good and hard, my veggies plants, my family [including smartphone], you know I share everything," said Nancy,

a farmer from Idukki, while explaining how she cares for technology. Accounts of such deep connections with digital media technology explore the phenomenon of anthropomorphism in technology use among these farmers, revealing how they attribute human characteristics to machines and digital tools, transforming their functional utilities into something akin to personal relationships. Anthropomorphism, the attribution of human traits, emotions, or intentions to non-human entities, is not a new concept (Kennedy, 1992; Khoo & Oliver, 2013; Cornelius & Leidner, 2021; Festerling & Siraj, 2021). However, exploration of its practice in modern agricultural technology brings out personal experiences. Arjun, a farmer from Kannur, referred his old tractor as *Avan*¹³ and spoke to him. Holding up his smartphone in his right hand, he said, "Today, *she's* my right hand in the fields; without *her*, the day doesn't start." Arjun's personification of both machinery and digital technology illustrates a deep emotional bond, one that underscores his reliance and affection. He describes how having *her* with during the day makes him feel supported, as though the machine understands his efforts and shares his agricultural burdens. Imran, from Thiruvananthapuram, uses Arduino¹⁴ to monitor irrigation

¹³ Avan is a malayalam word, loosely translated as, a person, particularly a male. Here addressed as a man with personal bondage.

¹⁴ Arduino Automatic Irrigation System provides hardware and software for crop protection. Using a moisture sensor, it detects low soil moisture levels and activates a water pump to irrigate the plants. Once the soil retains sufficient moisture, the pump stops.

and fertigation levels. He calls it a Karyasthan¹⁵ and states: "When the Karyasthan is on duty, I feel at ease, like someone is taking care of everything on behalf of me, ensuring everything is alright." Imran shares his experience when, once, he kissed his smartphone so affectionately when *she* alarmed a malfunction in the aquaponics system, which saved a lot of money and effort. This narrative highlights how anthropomorphism extends to even high-tech digital tools, providing farmers with a sense of security and companionship. Sajan, a farmer from Alappuzha, refers to his smartphone as *Buddy*. "Buddy keeps me company through long days. We check the weather together, decide on the fertilisers, and sometimes, watch videos during breaks," he says. This example shows how digital tools are not just aids but companions that participate in the daily routines of farming life. The emotional attachment that develops through anthropomorphism can significantly affect a farmer's daily experience. Irshad, a farmer from Kozhikode, who farms organic vegetables, has named his irrigation system as *Malak*¹⁶. He explains, "Malak has made farming easier. He works round the clock effortlessly, never getting tired." This unbeaten commitment of Malak won Irshad's heart.

Analysing several such deep emotional connections, we found that anthropomorphism helps mitigate some of the isolation felt by farmers, especially those in remote areas. By personifying

¹⁵ "Karyasthan" is a Malayalam word, loosely translated as, 'Caretaker'.

¹⁶ Malak is an Arabic word loosely translated as, 'Angel'. In Islamic belief system, Malak are those creators of God, who work effortlessly, continuously upon the command of God. Malaks are unstoppable, never get tired, never need food or drinks and work round the clock for God.

their tools, farmers create a simulated social environment, which can reduce feelings of loneliness and stress. Moreover, treating digital media technologies as human-like can lead to better care and maintenance of the devices, as farmers feel a responsibility towards their *partners*. These findings contribute to a broader understanding of human-technology interaction, suggesting that emotional attachment to machines could significantly affect productivity, technology adoption, and overall job satisfaction in the agricultural sector.

The digital routine has become a daily ritual, and this familiarity breeds a sense of ease and belonging. From checking market prices to communicating with fellow farmers, these actions have become familiar as much as the person is with digital media technology. Tom, from Thrissur, who starts his day with a cup of tea and his smartphone, described it vividly: "It's like a daily ritual. I wake up, grab my phone, and start my day by checking for updates. It feels strange when I don't do it." The digital routine has seamlessly integrated into their lives, becoming an extension of their everyday. The swiping and tapping have become second nature, signifying not just functionality but a sense of belonging to the digital world. When we talk about relationships, trust is its cornerstone. It is not different when the relationship between millennial farmers and their technologies is under discussion. They rely on these devices as advisors, seeking guidance on farming decisions to market trends to personal gratifications (Bartsch & Viehoff, 2010). The trust is not blind, it is built on a foundation of reliability. In the narratives of millennial farmers, the emotional depth of comfort, familiarity, and trust in their relationship with technology is not a one-sided reliance but a symbiotic connection that enriches their lives and empowers their farming practices. The devices are not just tools; they are trusted companions, familiar rituals, and reliable advisors in the ever-evolving story of millennial farming in Kerala.

3.2.3 Tensions and Anxieties

Yet, this emotional landscape is not without its shadows. The reliance on digital tools to express emotions is coupled with concerns about negative emotions. To find how a productive technological artefact becomes a cause of tension and anxiety among its users is fascinating. The study found that tensions and anxieties occasionally arise in the context of technology use. Issues regarding connectivity and potential technical glitches, sometimes give rise to apprehension. These emotions, too, are etched into their stories. My initial point of enquiry revolved around millennial farmers who are not tech-savvy. It is predictable to find digital 'laggards' and 'early majorities' to hold sort of tension and anxiety while using technologies (Rogers, 2003). The theory of *technostress*, a concept first articulated by Craig Brod in 1984, which describes the stress experienced by individuals when they are unable to cope with new technologies, provides a framework to explore digital addiction, referring to compulsive and excessive use of digital technologies, which can interfere with daily life. This ethnographic fieldwork substantiated Brod's findings time and again. But my thoughts kept mumbling on, whether or how the tech-savvy farmers feel stress or anxiety while using digital media technology? Yes, beneath the surface of positive emotions, tensions simmer.

Thomas, a tech-savvy farmer from Thrissur, steps out abruptly from his farm-shed. His smartphone, a symbol of connectivity and knowledge, also carries the weight of uncertainty. With a furrowed brow, Ajay admits, "There are days when the network signal is weak, and I worry about missing vital updates." He projects his dependency and the anxiety it can bring. "On a rainy evening, during a critical phase of planting, my internet went down. I felt a knot in my stomach, wondering if I could retrieve the information I needed in time." What he misses out is not just some vital updates, but some quality productive time he used to spend with the

smartphone, which he enjoyed a lot. Ajay's relationship with technology is marked not only by his idea of convenience but also by the occasional tremor of anxiety. It underscores the fragility of his digital lifeline. We also find Arjun, a farmer from Kozhikode, having a knot of tension that tightens within him when his smartphone is away, and the world beyond his fields fades. His worry isn't merely about having no utility function, but it's a deeper concern rooted in missing some quality time he spends with the digital device. " [...] its unease," Arjun shares, "when I see no phone in my pocket or hand, it's like my eyes searching for it all the time [...] even if I don't have a strong purpose with it."

The reliability of technology often dances on the farmer's mind. We met Nancy in the interior of Idukki, a farmer with a firm commitment to digital tools. Yet, a thread of anxiety occasionally questions when life becomes all about performing it in the digital space. "There are days," Nancy confides, "when I wonder if my smartphone is taking me on the right track. [...] Is it taking most of my time or saving me time? What if I do something really wrong with it? The anxiety nags at me." She acts carefully with smartphone, tensed, knowing the potential of the smartphone, that can be worse as much as it does good to her. Online payment often is another cause of stress, especially in the initial times. "It's stressful," reflects Sinoj, an experienced farmer. "The pressure till the time I went to the vendor and confirmed he had received the money I sent last week via online payment mode." The factor of risk is causing tension in this case. In addition to what we discussed about 'trust' earlier, the flip side of risk is trust. Anthony Giddens (2013) points out that trust in abstract systems is characteristic of the experience of being modern. In the present world, millennial farmers are obliged to trust digital media technologies. He labels these digital systems as "abstract", because most of the workings of these technologies are beyond our immediate perception. For instance, online transaction

works on the trust that the machine is functioning properly, that it is connected securely to the proper networks so that no theft of money and identity will happen, and that the other end of the networks to which it is connected will maintain people's account properly, and that the transaction will be 'end to end encrypted' as it is claimed.

Many others share tales of isolation—tension during the moments when they are cut off from the surrounding. Surprisingly for a farmer, the surrounding is not the long wide fields around them, but the digital world. Such instances often evoke a sense of disconnection, to losing touch with the world that is away from their fields. This isolation happens when the phone is not with them. "Once, I was harvesting fish in the pond, far from my phone," recalls Manu, a farmer from Kannur. "I wanted to get it done and get back to the shed to see the phone [...] I felt lonely and had a sense of solitude [...] No updates, but just me and the wilderness." Several narratives underscore the emotional sense of isolation when millennial farmers are away from digital media and this led me to renavigate my exploration much deeper into the scenario of reunion with digital companions after a separation, short or long. We found, for all the tensions and anxieties, there's a palpable joy in reuniting with their digital companions. Returning to the comforting glow of screens, the warmth of connectivity, and the familiar hum of technology brings relief and a sense of completeness; "Like washing face in a cold stream of water after a long work in the field during a hot sunny day", as Najeem metaphorically addressed the feeling. "When I got back," Anoop, a farmer from Kannur reminisces, "it was like meeting an old friend [...] The joy of having the connection back is hard to describe."

The narratives expose glimpses of the emotional dimensions of millennial farmers' relationships with technology. Beyond the screens and circuits lies a world of emotions—fascination, trust, and occasional tension—subtle and pronounced—enriching their connection

with the digital realm. As the sun continues its ascent, these emotional dimensions set the stage for a deeper exploration. It's not just about using technology; it's about feeling it, trusting it, and occasionally, fretting over it. It's about the complexly intertwined relationship between millennial farmers and the digital world they live in everyday.

These narratives are windows into the souls of millennial farmers. Beyond the fields and the devices they hold, there's an emotional world, rich and complex. Technology isn't just a tool; it's a companion, an enigma, a source of both comfort and concern. In these narratives, we discover the layers of emotions that define their relationship with digital media technology—a relationship that holds curiosity, trust, and the occasional moment of apprehension. These emotions are not just a backdrop to their technological engagements but are central to their daily interactions with technology, shaping the very essence of their relationship with digital artefacts. This exploration forms a foundational understanding of the emotions within which millennial farmers cultivate their bonds with technology.

3.3 Separation and Reunion: A Digital Embrace

There was a pause, a motionless silence with a slight gasp when we asked, “Will you give me your phone for a week?” We realise, the uncertainty to a straight Yes or No question is that the millennial farmers never had thought about this question before. Exploring deeper to them, we have no uncertainty, and the answer to this question is a big ‘No’. But till day, no millennial farmer we met had even a bare thought spending a day without digital media technology. The variations of the above responses to the question is conclusively evident in all millennial farmers we have come across.

The emotional experiences that farmers undergo when separated from their technology, be it

long or short, purposefully or situationally, reverberates the emotional impact of disconnection. The Joy of Reunion in the forthcoming part discourses the contrasting emotions farmers feel when reunited with their devices. Their testimonies highlight the joy, relief, and sense of completeness they experience upon reuniting with their technology. The regular phrase 'Integration of Technology into Daily Life' becomes insufficient to appropriate this phenomenon (Shaw et. al., 2018; Costa et. al., 2023; Novisma & Iskandar, 2023), rather, 'dissolution of technology' could add precision to address digital media technology's invisible being in the everyday of millennial farmers. Saying 'invisible' doesn't mean the intangible nature of software or rather undomains the 'Causa Materialis' of the digital device (Müller-Merbach, 2005), but is to show how millennials are not able to sense the existence and digital media into their everyday. It is like a spoon of salt dissolved in a glass of water. They cannot identify, crystallise, sediment, precipitate, suspend or filter the digital technology from their everyday. Hence such dissolved digital media technology offers a deeper understanding of how millennial farmers feel when they separate and reunite with digital media technologies. Being separated from their digital companions can evoke a unique sense of disconnect, when they think of themselves away from the reach of the phone or often at times with poor connectivity or without access to their devices, a feeling of unease can set in. Vijith, a farmer from Alappuzha, who once ventured into remote areas for a workshop, recalls: "I felt somewhat lost among thirty-four others [...] Then we realise, it is like leaving behind a part of myself." For him, an extension of his arm was lost. However, the joy of reuniting with their technology is equally palpable but in counter direction. The romanticised usage, 'returning to home' becomes even more romantic when they are returning to the familiar comfort of digital routines. It brings relief and a sense of completeness. "It was like meeting my old friend," said

Sudharshan, a farmer from Idukki, about accessing his smartphone after a week in remote farmlands. The joy of having access to a phone is like getting back to an important person in life. He eagerly reached for his smartphone, swiping through screens and checking the notifications that had accumulated during his digital hiatus.

The digital media technologies, once a constant presence, suddenly becomes elusively inseparable from the everyday of millennial farmers. These are moments when the rhythms of daily life are disrupted, emotionally wrecked. For Nancy, a farmer from Idukki, one such moment unfolded when she settled in Kumili, an interior area of Idukki district. The inaccessibility of her favourite YouTube reminded her that she has no one to share her experience with. What she misses is not just the viewers of her YouTube channel, but the device that observes her everyday, and a digital companion to whom she briefs her everyday farming. Nancy's smartphone sat silently in her bag and she couldn't help but reach for it. For the first time in years, her digital ally was rendered powerless, so as she is.

Similarly, Sooraj, a tech-savvy farmer from Wayanad with a penchant for exploring the latest agricultural digitechs, recalls that he had nothing to prove when he lost his phone. He described the time as an abrupt fall from the top. "Having nothing to do without my phone [...] that means I was doing everything in my life using that" While these moments of separation can evoke unease, they also reveal the depth of the emotional connection that farmers have forged with their digital devices. These are not merely tools, but mostly a member of the farming family and the love, care, attachment poured on these pieces of technologies are just like any other member of the family, often even more. As we navigate the emotional landscapes of separation and reunion, glimpse the complexity of the farmer-technology relationship prevails—a relationship that transcends utility and extends into the realm of emotional connection.

3.4 Technology as a Character in Life's Play

‘Does technology play a role in your life?’ The answer is always ‘Yes’ for millennial farmers. But the question ‘What role technology plays in your life?’ is thought-provoking and requires time to unriddle. The thoughts regarding these musters, ‘can we equate the technology to character in a movie or a play?’, like the character ‘Samantha’ in the movie ‘Her’. Roles technology plays in millennial farmers' lives emphasises that the digital media technology is not a passive backdrop but an active character in the narrative of their lives. Technology assumes roles as a friend, partner, secretary, assistant, teacher, and more. As Philip explains: "I knew nothing about farming, now I farm 60 acres with various crops [...] I have a quest to learn new things and I have an awesome teacher with me now." Technology can be a teacher, guiding with new methods and styles. In their narratives, technology emerges as a dynamic partner, enriching their experiences and supporting them in numerous ways.

Thomas, a farmer from Thrissur, inspects his fields with a phone in hand, and surveys the conditions of crops and weather. The device became an extension of his senses, offering insights beyond what the naked eye could discern. "[...] it's like a trusted advisor," Tomas explained, "helping me make decisions based on data [...] It's a partner in my daily routines." Technology's role extended beyond the fields. In the evenings, when the day's work is done, farmers, like Saran, make the smartphone play the role of a personal educator. YouTube became the classroom, where they learn about innovative farming techniques and sustainable practices. Midhun's eyes shone with enthusiasm as he shared, "I watch videos from experts worldwide [...] It's like attending a virtual university. Technology is a teacher." Pavithra, a farmer from Thrissur assumes multiple roles, "it's like having a versatile actor in the cast of my life's play [...] it doesn't just play one role; it takes on many." As she spoke, her eyes sparkled

with a sense of enthusiasm when she was reminded of her grandfather while often using technology. She shared, "I turn to my smartphone for almost everything [...] It's like my wise grandfather, telling me what to do and what not to; will it rain? When to plan? And what method to use?" Having the smartphone with her makes her feel like someone she loves is with her.

Some conversations flowed seamlessly to another role played by technology - that of an efficient secretary. Riyas, a farmer from Thrissur, describes what he feels when his smartphone connects him to buyers near and far. "[...] selling my produce was limited to the local market when I was doing it in my old style. But now, I can reach customers across the country [...] What if this is not with me." Vidhya, a farmer from Kasargod, shared an emotional anecdote of a sale that touched her deeply. "I once received a message from a family from Kochi¹⁷, [...] they were excited about buying my farm-fresh vegetables. It made me feel like my farm had expanded, reaching new purviews." The smartphone here act as the personal secretary working around cloak to expand her business. As Manal, a farmer from Palakkad, who produce and sells farm-fresh spices online, puts it, "Its like a business consultant, [...] transforms me into an agripreneur," he grins with pride as he takes a look through his store. In this role, technology is not just a mediator but a stage where farmers like Manal perform multiple roles along with the digital tools.

¹⁷ A major port city along the Malabar Coast of India bordering the Laccadive Sea. It is part of the district of Ernakulam in the state of Kerala. It is situated more than three hundred and fifty kilometres away from Vidhya's native place, Kasargod.

Beyond the roles of teacher, consultant and assistant, technology takes on an intimate character where farmers share their challenges and problems. The digital media here performs a cathartic effect, purifying the emotional tension (Florea, 2013; Khoo & Oliver, 2013). Shabeer, a farmer from Malappuram, reveals: "There will be someone to whom we share our problems, in my case it's mostly this [smartphone]. He shares triumphs and tribulations, expecting solace and solutions, resulting in a cathartic effect. It's a source of emotional support that eases the challenges of farming. As several other conversations continued, Joby's, a farmer from Thrissur, smartphone took on the role of a friend. "There are moments when farming can be challenging, brain-exhausted and tense [...] I feel better only when I turn to phone surfing wherever it takes me [...] and feel relaxed." He feels the way a good friend of his is comforting him in an adverse situation. In this role, technology is a digital shoulder to lean on, a place where farmers find camaraderie and empathy. It becomes a confidant with whom they can share the highs and lows of their farming journey.

But perhaps, most profoundly, technology also plays the role of a storyteller. It captures the essence of their daily lives, turning ordinary moments into tales of resilience and determination. Sujith, a farmer from Alappuzha, known for his farming vlogs on YouTube and Instagram, reflects on his journey as a digital storyteller along with farming, and the role of his smartphone as a fellow traveller in the journey. "There is a constant navigator with me in this journey [...] through videos and photos, this [technology] transforms me into a storyteller." He shares his farming journey with the world, never without the accompany of his phone. Here the technology's role as a chronicler of his life, documents the precious movements of his farming journey. Sanal's narrative turned into more playful 'gratification' as he described technology as an entertainer (Blumler & Katz, 1974, p. 376). "During the evenings, after a day of hard

work in the farm, my smartphone becomes my source of relaxation," he said. "I watch funny videos, catch up on some political news, and connect with friends. It's like having a stand-up comedian and a news anchor in my pocket."

As conversations conclude, technology assumes many characters in their life's play. It's a companion, teacher, assistant, consultant, friend, guardian, entertainer, communicator and many more—a versatile partner that enriches their farming experience in ways the emotions are never expressed before to a non-human entity. The relationship with smartphones is not one-dimensional connection but a dynamic, ever-evolving story. It is narrative, rich in emotion and depth, where technology assumes various roles, each adding a unique dimension to their everyday life, as explored in this ethnographic journey. Each farmer, it seemed, had a unique tale to talk about technology's roles in their everyday.

3.5 Navigating a Technological World

The overarching question of whether millennial farmers live in a technological world or whether they consider technology lives in their world, was another significant question. It sets the stage for understanding their perspective on the role of technology in life's play. It presents the perspectives of millennial farmers themselves regarding their relationship with technology. Their insights into the balance between tradition and innovation in their technological engagement are highlighted here. Farmer perspectives on whether they live in a technological world or if technology is a tool within their world vary. Some farmers perceive technology as an integral part of their everyday lives, considering themselves to live in a technological world. They believe that technology shapes their experiences, interactions, decision-making processes and overall emotions. It also sets the nature of the relationship they keep with technology. On

the other hand, there are farmers who see technology as one among the many agents contributing to their everyday. They view technology as a means to achieve their goals. Using digital media technology, they plan and improve their efficiency in farming, but they do not consider it as something that fundamentally shapes their lives' experiences and emotions. Some might think it is so futuristic to think we live in a world of 'technological determinism', assuming technology exercises its causal power of controlling human affairs (Dafoe, 2015). What else can we think when no single farmer we met starts their day without using technology in the first ten minutes after a wakeup. "Everyday starts and ends with technology," Says Jeffin, a farmer from Idukki. After a sound sleep, the first thing millennials look for is the smartphone, the screen lights replace the sunshine. And the last thing to end the day is looking at the phone. It sings them to sleep and wakes them up with the morning alarm, giving a hope to a new fresh day. Manu, a farmer from Palakkad, suggests he may have digital addiction since he compulsively checks his smartphone for updates on crop prices, new farming techniques, and even social media. "It starts as the first thing in the morning and goes on till I sleep. Sometimes, I wonder if I farm the land or my phone," he jokes ruefully. This compulsive engagement hints at the broader implications for mental health, where the inability to disconnect leads to anxiety, reduced sleep quality, and ultimately, a diminished capacity to handle the physical demands of farming (Thomé, 2018). The endless or continuous association with the digital companion adds on to the claim, 'we live in the world of technology'. "In recent years, I interact with this [smartphone] more than I interact with humans," Soorya, a farmer from Wayanad, reflects: Everything around us is digital [...] become more and more impossible to live without." Having been surrounded by devices, the surroundings have gone digital where people begin to live in the world of technology rather than the other way around. "The speed and turns of our life are

determined by the digital world [...] A new app starts, we use it.” Services in the digital world are ahead of users. Farmers reshape their everyday according to the nuances of digital advancement. Referring to the metaphor, ‘shape of water’, here a millennial farmer’s life becomes that water that shapes itself to fit into the ‘bottle’, that is technology. When the prime experience becomes digital, there is a disconnection while switching between ‘actual and ‘virtual’ (Markham, 1998). As Ansar, a farmer from Thrissur, puts it: “[...] looking through photos and having conversation online, [...] feel hard to switch and sense which is real and which is not”

In many situations, we found millennial farmers going very much with the flow of digital media technology that led them to. When we compare them with earlier generations, on whom each generation depends, defers. Unlike the earlier generation, millennial farmers depend on digital tools while the earlier generation depended on their predecessors. This difference points to the fact that millennial farmers are walking the way where technology walked before them. Even they are not sure how to find a way without the aid of technology. “It’s not me who decides what exactly I should do and where I take everything to [...] I use many of these digital apps not because I wanted to, but I have no other choice,” stated Midhun, a farmer from Kozhikode, while telling the story about how he started ecommerce and online transactions. It is surrounded, already planned, how one’s life should be tomorrow. Like the way Swaroop, a farmer from Palakkad, puts it, “I am kind of performing my life in the world of technology”. Despite countless gains, Anitha, a farmer from Idukki, has experienced the darker side of technological reliance. "At first, it was all so helpful," she remarks about her suite of agricultural apps. But over time, Anitha found herself losing control. "Every day in my life was based on the notification I received on my phone [...] I feel like I can’t do anything without it."

Her narrative illustrates how dependency on digital media technology can diminish a farmer's agency, leading to feelings of anxiety and helplessness when technological support is inaccessible. How digital media technologies are perceived as the determinant factor of millennial farmer's life and how they are perceived as escaping human control. "It's like you can never really escape [...] the market demands, the social media updates—it can get overwhelming," Lison, a farmer from Kottayam confesses. His experience highlights how constant digital engagement, while beneficial for business, fosters an environment of perpetual availability that blurs the boundaries between work and rest, apparently creates a '*mobile technostress*' leading to stress and burnout (Chen, 2015). Technostress manifests distinctly among millennial farmers. Thameem, a farmer from Thiruvananthapuram, describes his stress during technical failures. "When the irrigation system stops responding to the app, I am in panic mode until it recovers,". The reliance on technology not only adds a layer of operational stress but brings a fear of malfunction, which can adversely affect the entire agricultural process, highlighting the vulnerabilities induced by technological dependence.

After setting groundwork with these positions, we ended up with a metaphor to denote the millennial farmer and the digital media technology relationship as the 'Master and the Slave'. Through this metaphor, we address the ideas of technological determinism, technological autonomy and technological dependence. Manal, a farmer from Palakkad, makes it more evident "I lead my life as technology directs." Indeed, the ethnographic findings substantiate that digital media technology is often considered as human by its master, because the slave takes care of all the work including the emotional aspects, the master becomes dependent on

slave. “I cannot call my smartphone *Athu*¹⁸ [...] I value it as a member of my family,” Nancy underscores. In this scenario, the master-slave roles can be interchanged because the slave understands how to work with master and knows what works for master. As the farmers navigate this technological world, shaped by the digital environment, the boundary between the 'actual' and 'virtual' becomes blurred, leading to a profound impact on their daily experiences and perceptions. It becomes more fluidic to sense who lives in who’s world.

3.6 Conclusion

The study explored the entangled relationship between farmers, farms, and technology, with a focus on the emotional and relational dimensions that define the everyday practices of millennial farmers in Kerala. The research question, at the core, studied how millennial farmers establish and develop relationships with the digital media technology they use on a daily basis. This ethnographic journey exposed the intimate relationships of millennial farmers with digital media technology, certain aspects of emotional and relational dimensions that define their daily encounters with technology, contours of their personal and professional relationships with these digital tools, and a spectrum of emotions expressed during their experiences.

The findings of this research suggest that digital media technology has become an indispensable part of the everyday practices of millennial farmers in Kerala. The use of smartphones, social media, and other digital tools has brought millennial farmers into an arena

¹⁸ “*Athu*” is a malayalam word, loosely translated as, ‘that thing’. Referring to a non-human entity.

where they evoke emotional feelings in their relationship with digital media. Farmers express a range of emotions, including interest, intimacy, comfort, tension, anxiety, and stress. Being millennials (the age factor), being born with technology, technology's omnipresence, binge use, hyper utility, dependence etc. become prime factors that build and shape this emotional relationship. One of the key findings of this research is that the emotional and relational dimensions of the relationship between farmers, farms, and technology are closely intertwined with the broader social and cultural context in which they are embedded. For example, the use of digital media technology is often seen as a way to bridge the gap between traditional agricultural practices and modern digital innovation. This is particularly true for millennial farmers, who stand at the crossroads of traditional practices and modern digital technology. Another key finding of this research is that the entangled relationship between farmers, farms, and technology has both potential emotional benefits and drawbacks. While its use offers some positive gratifications, it also increases dependence on digital media technology, which often leads to increased stress and anxiety, as farmers feel pressure to be constantly connected and responsive to digital tools. The major milestones of this journey lie in the importance of understanding the complex and evolving relationship between farmers, farms, and technology in order to support sustainable and equitable agricultural practices. It is important to recognize the emotional and relational dimensions of this relationship, as well as the broader social and cultural context in which it is embedded. By doing so, we can work to ensure that the benefits of digital media technology are shared equitably, where the farmers of tomorrow have control over the technology they use and that the potential drawbacks are minimised. Exploring the emotional and relational dynamics in other contexts is vital to develop strategies for supporting sustainable and equitable agricultural practices in the digital age.

This chapter discussed the complex relationship between farm, farmer and technologies, focusing on the emotional and relational dynamics arising from the incorporation of digital media technology in agriculture. It highlights the essentiality of understanding the human experience and emotions of millennial farmers in the digital age, aiming for the transformations in agricultural practices facilitated by digital media technologies. The chapter emphasises how the millennial farmers establish and maintain emotions and relationships with digital media technologies they use. Through narratives on farmers' experiences, this chapter brings out deep emotional connections that farmers keep with their everyday digital media technologies. The chapter walks beyond human-technology interaction and explores anthropomorphic emotional and relational attributions to digital media technologies. It attempts to transmit farmers' experiences of being on an emotional rollercoaster with the digital media technologies. The analysis, based on the narrative of millennial farmers in Kerala, suggests the importance of appreciating the complexities within this entangled relationship for enhanced efficiency, better resource management and proper utilisation of digital media technologies in farming.

The fourth chapter will explore how incorporation of new digital media technologies will disrupt the existing communication ecology of millennial farmers in Kerala and how these newly incorporated digital media technologies will gradually dissolve into their communication ecologies.

CHAPTER IV

EVERYDAY DIGITAL MEDIA TECHNOLOGIES: DISRUPTION AND DISSOLUTION IN THE LIVES OF MILLENNIAL FARMERS IN KERALA

4.1 Introduction

In the Chapter III, we discussed the emotional and relational aspects between millennial farmers in Kerala and the digital media technologies they use everyday. The chapter focused on how they generate feelings and emotions like feelings of interest, intimacy, comfort, tension, anxiety, and stress while using technology and how they cultivate bonds with those technologies.

The present chapter investigates what disruption the introduction of a new digital media technology into an existing communication ecology brings and how a newly introduced technology gradually dissolves into the existing communication ecology of millennial farmers in Kerala. The chapter later focuses on people, objects or institutions that digital media technology replaces for farmers every day. It further analyses and narrates the unidentified, dissolved and omnipresent existence of digital media technology in everyday of millennial farmers.

Bringing a new piece of technology into an existing scenario is like throwing a stone into a calm water body. It indeed creates disruption- with positive and negative connotations. The digital media technology introduced especially to a settled communication ecology results in a massive reordering and reshaping of the existing communication scenario. Horst and Miller

examine this idea of the new technology tampering with the surroundings when occupied into a traditional communication setup (Horst and Miller, 2006). Donner further extends this idea, where the positioning of technology into a landscape does not occur randomly, rather embedded with a rich set of norms and practices (Donner, 2007). Tacchi (2006) in an ethnographic context, states that information technologies exist as part of a communicative ecology, where communications processes involve a mix of media and a mix of people, that shapes and reshapes itself in tandem with every incorporation to it. Tacchi explores the concept of communicative ecologies through Ethnographic Action Research (EAR) in the field of ICT for development initiatives by emphasising the importance of understanding local contexts and community dynamics. Pulling from this concept of communication ecology, this study is conducted among millennial farmers in Kerala, where traditional farming methods have sustained generations, and a subtle yet profound digital revolution is underway. The region, known for its rich agricultural heritage, has seen a significant shift with the introduction of digital technologies, altering the traditional communication ecologies that have long been the backbone of rural communities. Digital media technology, encompassing a range of tools from mobile phones to sophisticated agricultural apps, has not only changed the way the communication ecology functions but also reshaped the interactions between farmers, their practices, and the wider agricultural network. At this juncture where millennials, characterised for using new digital technology to address nearly all everyday purposes, meet with traditional communication ecology in the farmland, this chapter seeks to untangle the complex web of resultant transformation, examining how the digital invaders are re-settling the existing communication ecologies that have long underpinned the daily existence among farmers.

The heart of this inquiry lies several pivotal research questions: How communication ecologies resettles/ed after the intervention of new communication technologies into farmers' everyday? In what ways do millennial farmers renegotiate the formal and informal communication processes following the advent of these new technologies? Why do certain forms of digitechs are prevalent among specific farming demographics? How does a single technology offer a diverse range of affordances to different stakeholders? These questions aim to dissect the communication ecology of millennials in the agricultural context. Grounded in ethnographic fieldwork, this study distils the collective experiences and insights of millennial farmers in Kerala—a demographic poised between the time-honoured traditions and the modern technologies. Their voices, captured through a meticulously crafted interview questionnaire, reveal how digitechs redefine their agricultural practices, social interactions, and their engagement with broader institutional structures. The degree of engagement and interactions of farmers with the technology and with each other allow for active participation, feedback, and dialogue and further enhance engagement, promote collaboration, and create opportunities for co-creation of content and knowledge. Narratives of millennial farmers, having advantages in technology over older generations, illuminate how digital media plays along with the human actors in existing communication ecology—connecting them with authorities, aiding in problem-solving, and at times, substituting for human or physical resources.

This research thus sets the stage for an exploration of a living, breathing digital ecosystem, which co-exists with human agents and co-creates a new communication ecology that has emerged among millennials in the farms of Kerala. Here the digital interfaces complement manual implements, smartphones coexist with the sickle, and satellite data informs decisions once made through peer enquiries.

4.1.1 Purpose, Significance and Scope

The purpose of this study is to understand how digital media technology disrupts and dissolves traditional practices, focusing on millennial farmers in Kerala. This demographic represents a crucial segment of the agricultural sector, often being the first to adapt digital media technologies into their farming practices. Understanding their adoption and utilisation of digital media is pivotal in comprehending the broader impacts and possibilities of technological advancements in agriculture. The significance of this study lies in its potential to inform policymakers, technology developers, and agricultural practitioners about the potential ways in which digital media technology can be harnessed to enhance agricultural practices and improve the livelihoods of farmers. This ex post research setting, where the incorporation of technology has already happened, will help to study a causal effect relationship of digital invasion in natural lived spaces. The scope extends to market ethnography, offering users utility information to digital technology producers and thus gauge potential of digital produce to enhance millennial agricultural counterparts. Although the study particularly focuses on how traditional practices are being replaced or modified in the wake of digital advancements, studying the end users in the perspective of producers stands out as yet another focus of scope.

4.2 Resettlement and Renegotiation

Referring back to the analogy of throwing a stone into a calm pond, bringing in a new piece of digital media technology will create prolonged omnidirectional ripples in the serene communication ecology. Communication ecology refers to the study of communication systems within a specific environment or context, emphasising the interrelationships between various elements that shape communication processes. It involves examining how different

forms of communication, such as media technologies, interpersonal interactions, and cultural practices, interact and influence each other within a given setting. The incorporation of a new communication technology can have various effects on the existing communication ecology of a community or society. In the context of millennial farmers in Kerala and their everyday use of digital media technologies, communication ecology encompasses the broader communication system into which a new communication technology is integrated. This integration has precipitated a significant reshaping of communication ecologies among the farmers. Though this integration initially raised scepticism and curiosity, later it led to a period of disruption and gradual adaptation. The adaptation phase reveals a dynamic shift, where traditional communication channels begin to intertwine with digital platforms, fostering new patterns of information exchange. For instance, Arjun, a farmer from Thrissur, pulled an evident case of WhatsApp groups becoming the new 'village square' for discussing market prices and weather forecasts, replacing older, more informal gatherings. Here the newly incorporated digital communication technologies are both shaped by and shape social structures and practices through a recursive relationship. When a new communication technology is introduced, it interacts with existing social structures, norms, and routines within the communication ecology, influencing and being influenced by these elements. Eventually, the community reaches a new equilibrium, where the new digital technology is fully integrated into the communication ecology. The old elements may still exist, but they occupy a different place in the hierarchy of communication tools. For instance, traditional farmer gatherings might still occur but less frequently, supplemented or sometimes entirely replaced by digital communication platforms like messaging groups, social media, or dedicated agricultural apps. Farmers engage in a process of structuration, wherein they adapt their behaviours and practices

in response to the technology while also shaping the technology through their interactions and interpretations (Giddens, 2013). These new patterns have not only altered the way information is disseminated but have also impacted community dynamics. While many farmers readily adopted these changes, others remained apprehensive, leading to a dichotomy in communication practices within the community. However, a continued renegotiation of both formal and informal processes was practised during the process of technology adoption. In formal settings, such as interactions with government bodies or market transactions, digital media created disruption sets a positive mark by raising levels of efficiency and transparency previously unseen. Saran, a farmer from Malappuram, said “[...] one reason I keep myself in this profession these days is the seamless disposal of government subsidies, [...] the AIMS¹⁹ portal and Supplyco²⁰ portal becomes a real game changer”. He described how online government portals have simplified subsidy applications, a process that used to entail numerous visits to local government offices. The government, through these online platforms, aims to

¹⁹ The AIMS (Agriculture Information Management System) is an integrated system developed for the Department of Agriculture & Farmers Welfare, Government of Kerala, to provide departmental services efficiently to farmers with the help of Information Technology. SMART is the major component of AIMS which provides workflow based claim processing suite for processing farmer applications to avail benefits from Government.

²⁰ The Kerala State Civil Supplies Corporation Limited, abbreviated as and known better by its brand name Supplyco, is a Government of Kerala-owned company headquartered at Kochi, India. It acts as the execution arm of the Department of Food and Civil Supplies of the Government of Kerala.

simplify farmers' tasks and save their time. The process of settling down a newly introduced technology into an existing communication ecology is therefore understood as a dynamic and iterative process of negotiation, adaptation, and transformation. Many farmers like Saran, highlighted the "unseen" disruptions that have revolutionised the way they interact with the market, government, and agricultural experts. This subtler form of disruption is often overshadowed by more tangible technological adoptions. The existing communication ecologies of farmers are equipped with interconnectedness of various communication channels and technologies among them. The need to integrate new communication technology into existing communicative structures and systems intend to enhance its efficiency, by considering how different media serve different purposes and how they interact with traditional communication methods. However, this incorporation of new digital technology creates a disruption in the conventional communication ecology and it gradually resettles after continuous negotiation of farmers with those newly incorporated digital media technologies. When the farmers become more familiar with the technology and its affordances, they develop routines, norms and rituals within their communication ecology.

Conversely, in the informal processes, the digital media redefined social interactions and became prevalent in farmers' everyday. Manoj, a farmer from Palakkad, uses Facebook to connect with other farmers across different regions, sharing tips and advice. This digitization of informal networks has not only sustained but also expanded the support system among

farmers. A total disruption in Mohan's everyday was brought by Google Pay.²¹ It changed his entire financial transactions and its subsequent transaction network. "I met a lot of people when I go bank, [...] now I realise what brought all those changes," He added. Maneesh, a farmer from Palakkad, attributes all the disruptions to Smartphones, "I remember how it was before this [raising his phone in hand] [...] now can't even imagine a day without it." Here, the incorporated digital platform resettles in the previously existing informal communication system and refashions it rather than replacing the whole communication ecology. Major changes in communication ecology have happened with the incorporation of smartphones into farmers' everyday communication. It leads to improved market linkage and increased bargaining power, which in return, positively affect their livelihoods. As adaptation ensues, a notable shift emerges: traditional, oral communication channels begin to merge with digital platforms, creating new, hybrid forms of information dissemination. For instance, the case of Arjun, a young farmer, is illustrative; he described how digital platforms like WhatsApp have supplanted physical gatherings. Settlement of these digital advancements into the traditional communication processes is an ongoing process. Changes in the communication patterns among farmers is a dominant effect of incorporating digital communication technology into their existing communication system. The adoption of a new communication technology leads to shifts in how individual farmers and farming peer groups communicate with each other. As the farmers' narratives propose, the introduction of social media platforms changes the way

²¹ Google Pay is a mobile payment service developed by Google to power in-app, online, and in-person contactless purchases on mobile devices, enabling users to make payments with smart devices.

people interact and share information, potentially altering traditional communication patterns. However, in some cases a balancing between existing and adopted communication mechanisms are observed. For example, while some farmers leverage technology for market-related information, they still rely on face-to-face interactions for local community decisions, exemplifying a hybrid model of communication. Successful integration of these new digital media technologies requires alignment with existing communication ecologies and practices. Understanding how the new technology fits into the broader communicative ecology of farmers is crucial for ensuring its effective use and sustainable impact. The link between existing methods of communication, farmers' communication ecology and newly incorporated communication methods are crucial to gain knowledge on how this new communication technology negotiates and settles into a communication ecology. Digital media's role in resettling communication ecology within agricultural settings is evident, as the role of millennial farmers in renegotiating their formal and informal communication processes with digital media technology. These technologies reshuffle communication networks, market accessibility, and knowledge exchange practices. Such changes have a considerable impact on the autonomy and efficiency of the farmers. This is a phenomenon that redefines the communication ecology, altering how millennial farmers engage with each other, with market forces, with government entities etc.

A new digital media communication technology introduced into an existing communication ecology must negotiate with the pre-existing communication setup backed by a socio-technical system. This negotiation involves various aspects such as integration with existing practices, cultural adaptation, social acceptance, and economic viability. The process is gradual yet deep which involves the following stages.

1. Introduction and Initial Access: A new digital media technology introduced to farmers, often through schemes by governments, NGOs, or private sector initiatives, initially faces resistance due to unfamiliarity or scepticism about its perceived benefits. In this phase, the characteristics of existing communication ecology dominate and are reluctant to incorporate the new technology. This is due to the risk of uncertainty that occurs when a smoothly functioning set of communication channels is altered. A sense of cultural inertia leads farmers to resist changing their longstanding communication habits. New technologies that disrupt these habits are seen as a threat to the community's way of life, thus facing resistance. The introduction phase leads to open initial access to the technology. Accessibility is the step that overlaps the later introductory phase, where the newly introduced digital media technology begins making inroads into the existing communication ecology.

2. Experimentation: Some tech enthusiast farmers begin experimenting with the newly introduced technology in this stage. Their experiences, if positive and beneficial, encourage peer farmers to try them as well. These 'early adopters' begin employing the new digital media technology and demonstrate its utility. Early adopters begin using the digital media technology, disrupting established communication ecology and possibly displacing older technologies. Their success stories and visible improvements in efficiency, cost-saving, or social connectivity attracts more farmers to adapt the new technology (Rogers, 2003). As awareness grows, there's a phase of exploration and excitement where the potential and limitations of the technology are tested. This phase is where the most direct negotiation with the existing communication ecology occurs, as new processes and usage patterns start to take shape. More farmers become willing

to experiment with a new digital media technology if it gains popularity within their influential social circles. It is where the linkage between characteristics of news communication technology with the existing communication ecology has been established through negotiations and renegotiations. The experiment stage involves the process of negotiation of the terms, experimentation with the terms, rectification of the error after the trial of terms, and renegotiation if required.

3. Cultural and Social Adaptation: Once the negotiations and renegotiations happen, a technology truly begins to integrate into the communication ecology by adopting its cultural and social characteristics. For instance, Prakash and his team developed a platform to monitor weather in their hyperlocal farm areas in Wayanad. The success of such initiatives rely on whether these digital media technologies become compatible with local languages, symbol systems, and moreover communication habits of the farmers. If the technology supports existing cultural practices or enhances them, it's more likely to be embraced. There was a massive cultural adaptation of PhonePe²² app in Kerala when it began to use the vernacular language, Malayalam, for its transaction announcements. As the newly introduced digital media technology becomes more

²² PhonePe is an Indian digital payments and financial services company headquartered in Bengaluru, Karnataka, India. It is a digital wallet & online payment app that allows its users to make instant money transfers with UPI, recharge mobile, DTH, pay utility bills & much more.

pervasive, the socio-cultural context of the communication ecology begins to adapt to it. This process involves learning how to use a certain piece of digital technology, understanding its features, and integrating it into farmers everyday. In this phase, a greater adoption happens where the new technology starts gaining traction beyond early adopters, influencing a broader audience to adapt. Over time, this technology becomes normalised within the existing communication ecology and the reliance on previous communication technology diminishes. Here is where the *Theseus paradox*²³ effect happens to the existing communication ecology. With every introduction of a new digital communication technology, some elements of the previous communication setup get excreted or replaced. Therefore, there is no such turning point where an old communication ecology becomes a new communication ecology.

4. Integration: Integration is a prolonged process. It is complete only when the newly introduced digital media technology becomes a regular part of farmers' communication ecology. Crucially, this includes the modification of the technology to better suit local needs of farmers, as well as changes in the local practices of farmers' communication ecology to accommodate the newly introduced technology. Here the newly introduced communication technology starts to intersect with other existing technologies and

²³ The Ship of Theseus or Theseus Paradox questions whether an object remains the same if all its original components are replaced over time. Imagine Theseus's ship: as parts decayed, Athenians replaced them. Is it still the same ship? Philosophers debate identity and continuity in this intriguing puzzle.

media forms, converging into a convergent communication ecology. The distinctions between older and newer media blur as hybrid forms emerge. Therefore, the practices within the existing communication ecology significantly influence the integration of newly introduced digital media communication technology to enhance socio-cultural compatibility. Socio-cultural Compatibility is the degree to which the newly integrated digital media technology aligns with the existing socio-cultural norms and values. A higher socio-cultural compatibility will facilitate its integration. If the newly adopted digital media technology resonates with the farmers' way of life and communication habits, it is more likely to be integrated faster. Conversely, technologies that pose a challenge to socio-cultural norms may face further resistance, other than experienced in the Introductory phase. In case of such misalignments, significant effort is required to integrate those digital media technologies. Apart from the compatibility factor, extension of existing practices also contributes to integration. Technologies that extend current communication practices rather than completely replacing them are easier to integrate. For example, farmers like Sidharth, Rasheed, Mohan etc, who used to share information through community meetings, find transitioning to online forums or messaging apps more natural as these digital platforms are seen as an extension of their traditional gatherings. "I tried using different applications, especially those made for farmers. I am not using any of them now. Nobody is using [...] WhatsApp is better, everybody is using it, [because] it is easier," said Surjith, a farmer from Pathanamthitta. The ease with which a technology can be adapted to suit the specific needs of farmers will influence how well it integrates. Flexible technologies that can be modified for local languages, literacy levels, and content relevant to them will integrate more

naturally into existing communication ecologies.

5. Settling: Once the Integration state is complete the settling stage begins. The Settling happens when the technology is no longer seen as new, but as a standard tool within the farmers' communication ecology. Here the presence of newly introduced digital media technology dissolves into the everyday communication practices of farmers. In this stage, a reinforcement finally happens. A newly introduced digital media technology gets reinforced through consistent use and additional functionalities. Here the farmers become dependent on the newly introduced digital media technology for certain communication needs, ingraining it into daily routines. The farmer's communication ecology thus evolves to a point where the new digital media technology becomes the primary mode of communication, and previous methods become historical or cultural vestiges. During the process of settling, the role of the digital media technology within farmers' communication ecology stabilises as it finds its niche alongside other media. However, these digital media technologies become so embedded in daily life that its impact is hardly noticed in the foreground but highly significant in the background.

6. Evaluation and Feedback Loops: Ongoing evaluation and the feedback loop ensure the technology continues to meet the needs of the community. In this phase, the technology developers make adjustments based on farmers' feedback or the community developing new uses for the technology that the developers had not anticipated. This phase is backed by the concept of *Farmers back to Farmers* (Rhoades & Booth, 1982).

Farmers domesticate technologies to fit into their everyday usage, other than what that piece of technology was intended for. Such a way, competing technologies emerge, as they evolve through updates and enhancements to meet user demands.

Throughout this process, a balance is maintained between the traditional communication practices and the benefits of new digital technologies. A continued negotiation and renegotiation is done to keep this balance. The notion of resettlement here implies a dynamic equilibrium where both traditional and new systems coexist, sometimes in a hybrid form, redefining the communication ecology within which farmers operate.

4.3 Differing Technology Affordances

The same digital technology offers different affordances to various stakeholders within the agricultural sector. For instance, Simplify Agri, a local agri-tech startup portal, provides market insights to farmers, while offering data analytics services to agricultural suppliers. The role of technology as both an enabler and a barrier were distinctly observed, which in turn often fails to offer a level playing ground. The concept of affordance refers to the potential actions and possibilities that a digital media technology offers to its users based on its inherent characteristics and features. Considering the affordances of a digital media communication technology, such as speed, reach, interactivity and personalisation, we understand how these qualities shape and reshape the communication ecology of millennial farmers. Nevertheless, the communication technologies act as mediators in communication processes, influencing the way messages are transmitted, received, and interpreted. The affordances of technology, such as speed, reach, interactivity and personalisation can shape the dynamics of communication

interactions. For tech-savvy farmers like Prashanth, the portal was invaluable for accessing a custom-made farm ERP and online farming book-keeping. However, for less tech-savvy farmers, these technologies remained underutilised or inaccessible, illustrating a digital divide within the community. Adaptation and customization of technologies to suit individual needs are prevalent. A convenient practice from Rajesh, a farmer from Wayanad, who adapted a common messaging app to coordinate irrigation schedules with his employees and fellow farmers, showcases how farmers sometimes repurpose technologies beyond their intended use to serve their unique requirements.

The incursion of digital media into the lives of millennial farmers henceforth leads to significant shifts in communication ecologies, through the disruption it causes. The adoption of the new tech inhabitant and its scaling up further increases the disruption. The process continues in cycles as a new tech inhabitant emerges, it gets adopted, causes disruption, settles, use case scenario scales up, results in higher disruption, resettles and later gets dissolved into the existing communication ecology. Access and Inclusion therefore turn out to be another important effect of digital media technology integration. It improves access to information and tools to facilitate communication among individuals who were previously marginalised or excluded from traditional communication channels. This can promote the social inclusion of farmers along with enhancing farm productivity. Furthermore, this incorporation also brings cultural changes among farmers as they adapt their communication practices to incorporate the new tool. This often leads to the emergence of new norms, values, and behaviours in the existing communication ecologies.

4.4 Replacement by Digital Media

While investigating the replacement done by digital media, we would like to begin with the concept of 'Remediation', by Bolter and Grusin. "What is new about new media comes from the particular ways in which they refashion older media and the way in which older media refashion themselves to answer the challenges of new media" (Bolter, 1999). In analysing the changes in media consumption, researchers have applied the theory of media displacement (Lee and Leung, 2008; Newell et. al., 2008; Nimrod, 2019), which suggests a disruption caused by digital media alters the existing communication ecology centred on traditional media and it will be replaced by new media. These studies envisage either a total replacement (Kim et. al., 2020) in which newly incorporated digital technology replaces the existing one (e.g. replacing the regular meetups to regular WhatsApp chats) or a partial refashioning of the functionalities of an existing digital media technology. The latter would result in the coexistence of new invaders and existing inhabitants along with the millennial farmers. Instead of focusing on whether one technology replaces or refashions an older communication technology as a theoretical framework, the study proposes the concept of digital media technology replacing people, things or institutions. In this context, we are not referring to 'remediation' as it focuses on what a newer form of media technology does to an earlier form and effect possibly encountered in the adoption of the newest media formats.

The replacement here in an agricultural setup, everyday communication processes practised by millennial farmers, focuses on how communion practices and tools in the existing ecology are being replaced by newly introduced digital technologies. This replacement is not merely a substitution of one tool with the another but represents a significant paradigm shift in the way

farming is conceptualised and executed. The fieldwork discovered diminishing reliance on conventional methods and an increasing dependence on digital counterparts. This shift is particularly notable in areas such as traditional knowledge exchange, manual record-keeping, and even in the interpersonal dynamics of the farming community. The millennial farmers majorly highlight cases where digital media has replaced physical marketplaces, traditional weather forecasting methods, and even certain roles within the farming community functions. While this replacement brings efficiency and a broader reach, it also raises questions about the decay of conventionality and the implications of over-reliance on digital technologies. Digital media technology replaced traditional human roles and processes are abundant. Introducing new digital media technologies requires individuals to acquire new skills or adapt existing ones to effectively use the technology. This leads to changes in the workforce and the types of expertise valued within the communication ecology. For example, digital marketplaces and e-agriculture services have largely supplanted traditional middlemen and local marketplaces, fundamentally altering the agricultural supply chain. Here a shift of power dynamics happens when online platforms enable direct communication between consumers and producers and challenge the authority and control traditionally held by intermediaries in the existing communication ecologies. Farmers like Mini now use apps to directly connect with buyers, bypassing the traditional market system and its associated human intermediaries. Sangeeth, a farmer from Kollam provides the following example:

A few years ago, my mother lost her typist job to a computer. She had worked for a private finance firm for nearly fourteen years before being unceremoniously “scrapped” within a couple of days. The computer created jobs for less-skilled workers and eliminated those of the more-skilled people, like my mother, [...] for whom “retraining”

would have meant unlearning. [...] She was too old to “relearn” anyway. So there she was, at home on a Monday ever since years.

(May, 2022)

Similarly in today’s farmlands, sweeping changes in technologies are digitally mediating most of the everyday communication and activities that were formerly done the other way. In contemporary farming, farmers operate computer-controlled machines that execute most of the routine work. They retool their production machines by changing the computer software. Millennials having a higher edge on technology proliferates its use in all aspects where silent unnoticed replacements take place. Digital technologies are displacing traditional jobs even in the delivery of services. They bank with apps, talk to digital assistants, pump water using a tap on their phone, shop online almost everything, and use QR codes to automate inventory management without inventory clerks. The digitally mediated activities of everyday, now increasingly convert the everyday communication ecology.

Objects replaced by their digital counterparts are in abundance. In Vijith’s (A farmer from Alappuzha) office, prescription notebooks he used to carry for years, almost disappeared from the picture, digital apps in particular obscured it by the functions for which it was developed and to which it is put. Here, these apps are chosen to function the role of the yellow sticky notes. For Mini, what she is not using her books rather keeps her regular reading intact. Kishnan, a farmer from Palakkad, was a regular reader of newspapers and a visitor of various expos. “[before having YouTube and Instagram] I visited expos and showrooms to get information on recent agricultural trends.” Moreover, he no longer reads newspapers but does read news digitally. Mahesh extended it further by adding files, chequebooks, papers and notes

in the list of replaced objects. After a deep thought, Philip Chako, a farmer from Palakkad, checked his pocket and said, “yeah, i don’t have my wallet and cards [though] I just made the payment for our drinks.” Right after unconditionally saying ‘Yes’ to the question, whether digital media replaces any objects or institutions, the answer was initially ‘No’ to the question of whether the same replaces any person they had in their life. However, further a long thought, and often a few discussions, they reluctantly uncover the reality that digital media replaces individuals. Swaroop, a farmer from Palakkad, had an interesting take on it. “It indeed replaced myself, [...] that busy myself running to purchase seeds, rushing to the bank for completing financial transactions done before bank time [...] I see a lot different me now.” Farmers explore and experiment with new communication technology to understand its capabilities and limitations, leading to the emergence of new communication practices and norms within their communication ecology. Once the new technology is widely adopted and becomes integral to the community’s communication practices, it starts to push out the older technology. This might not mean that the old element is completely abandoned, but its usage becomes more specialised or limited to specific contexts. Musfir, an agripreneur from Malappuram, told the story of how he lost his designer friend Anas. For years Anas was his official designer, used to make sale cards, posters of crops etc, payment to which was a regular entry in his balance sheet. When Musfir learned Canva²⁴, he thinks Anas is no longer needed. This dual nature of technological disruption was encountered. Thanveer, a farmer from Thiruvananthapuram,

²⁴ Canva is a free graphic design platform that lets you create invitations, business cards, flyers, lesson plans, Zoom backgrounds, and more using professionally designed templates.

shared his experience of automating irrigation systems with the help of digital platforms. While this technology significantly reduced his manual labour, it also led to a reduction in employment opportunities for local labourers, a concern echoed in several interviews. Digital media technologies that promote automation and precision agriculture, reduce labour demands on farms, requiring fewer manual labourers and more skilled technicians. This changes the social fabric of a community and affects employment patterns.

Digital media technology which replaces objects and humans, can also replace institutions. They also draw distinctions between what they do and the work of individuals or institutions. For example, Sujith, a farmer turned vlogger shares his “honest and vulnerable lifestyle” as an influencer (he shares mostly his lifestyle: everyday farming, crops, farmland, food, buyers and farm hacks) he has over 229,000 followers, and he considers his job as an influencer (and the power that comes with it) very seriously. “I wrote articles after articles to prominent media channels for coverage, [...] now I no longer need them,” he told how he replaced earlier inaccessible prominent media institutions. The adoption of new digital media technologies also impacts power dynamics within a communication ecology. It re-authorizes control and distribution of information, influences decision-making processes, and reshapes social hierarchies based on access to and proficiency with the technology. “Krishi Bhavan was a regular place for me, when I used to farm with my father, [...] now I don't remember going there, I don't even know who the Agricultural Officer is there,” stated Prashanth. For Prashanth, a farmer from Palakkad, having the Krishi Bhavan services online, not only replaces just that institution but the entire step-by-step process including people and objects used for visiting Krishi Bhavan. It usually takes more than a half day to visit there and get the services done.

He, henceforth, underlines that the digital technologies replaced the time, and use of his old scooter which he used to travel there.

In the cases of many farmers we met, the digital advisory services have replaced local agricultural experts to a great extent. Sunil, a farmer from Pathanamthitta, noted how he now relies on a combination of agricultural apps and online forums for crop advice, a role previously filled by older, more experienced farmers or local agricultural officers. This shift is reflective of a broader trend where digital solutions are increasingly taking over roles traditionally held by individuals, reshaping the social and professional landscape of farming communities. These scenarios illustrate not just the replacement of older communication mechanisms, but the disruption caused by new digital media technology in the communication ecology and its resettlement. It gives rise to the emergence of new forms of social and professional interactions, driven by the unique affordances of these technologies. The newly introduced digital media technology disrupts the status quo by offering a more efficient or effective means of communication. This leads to the gradual or rapid replacement of older methods in the communication ecology. For example, farmers replace traditional methods of in-person meetings or written communication with new digital alternatives, due to their immediacy and reach. Elder-generation farmers with a preference for face-to-face communication are slower to adopt the newly introduced digital media technologies that replace direct interaction. Whereas the transition and replacement are much smoother for the millennial farmers who are already comfortable with indirect communication. The introduction of new technologies to an existing communication ecology brings changes in the objects, people, and institutions that constitute the ecosystem. These changes involve the replacement of traditional communication tools with digital alternatives, the redefinition of roles and responsibilities for individuals, and

the transformation of organisational structures and power dynamics within the communication ecology. These time-to-time replacements and transformations are essential for effectively managing technological transitions and ensuring the sustainable growth of communication ecologies through the integration of new technologies. However, technology doesn't always outright replace something; often, it transforms roles, enhances capabilities, or creates new opportunities for collaboration and employment. It is also important to consider that the extent to which digital media technologies replace or transform aspects within the communication ecology of millennial farmers varies widely depending on several factors, such as socioeconomic context, cultural acceptance of technology, and individual adaptability.

These themes collectively paint a comprehensive picture of the deep omnidirectional disruption caused by digital media technology in the agricultural sector in Kerala, especially in the lived experiences of millennial farmers. They reflect a transition from traditional to digital, underscored by the omnipresence of technology, its role as a transformative disruption, and the consequent replacement of older practices and tools. This exploration offers valuable insights into the evolving landscape of agriculture in the digital age, highlighting both the opportunities and challenges faced by the millennial farming community.

4.5 Omnipresence and the Digisphere

The omnipresence of digital media in the daily lives of millennial farmers in Kerala emerges as a central theme from the fieldwork. This pervasive influence extends far beyond conventional communication methods, infiltrating various aspects of agricultural practices. The study reveals how digital media has become an integral component, facilitating information exchange, market access, weather forecasting, and even social networking among

the farming community. This integration of digital media into everyday farming operations signifies a profound shift from traditional agricultural practices. The data collected illustrates a landscape where smartphones, social media platforms, and various agricultural apps are no longer luxuries but essential tools for modern farming. This change reflects a broader societal transformation, where digital media is not just an adjunct but a vital element of the farming ecosystem, offering new opportunities and challenges. Even as the technology becomes ubiquitous, it continues to evolve or gets redefined as part of a communication ecology. To show the depth of digital omnipresence among millennials, We like to quote a farmer we met, “I am someone who cannot poop without Instagram”. No farmer we met takes more than ten minutes to check their phone after waking up and ten minutes before they sleep. Giving to and taking back from social media, the millennials are more tuned as social media animals than social animals. Social media platforms have reshaped the way individuals and communities interact, network, and maintain relationships, creating digital social spaces that exist alongside or even replace traditional physical ones. Farmers’ social media profiles, popularity of their usernames, and digital interactions contribute to expressions of their identity, reputation, and status in a digital space. The digital presence is observed everywhere; it is there in the bed, in the toilet, in the kitchen, while having food, while talking to family, while working, studying and driving. The smartphone along with wearable devices mark the digital presence in almost everywhere and everytime in millennial farmers’ everyday. From a personal conversation, we were surprised to know about the digital presence of millennials while having sex. The widespread availability of the internet and mobile technologies has allowed for continuous connectivity and instant communication, leading to an always-on culture. Whether in hand, in contact with the body or not, they experience the omnipresent aura of digital media technology.

Drawing from the concept of the cyborg and simultaneously refitting it, this study states that a digital device does not have to be an extension of our body or connected to the human body in order to be a part of the human. because the omnipresence of digital media technology has led to the development of a 'digisphere,' a term that can be understood as a digital sphere. Here the millennial farmers live in a 'digisphere' - an atmosphere created by digital media technologies and experienced by humans. It is a digital environment where human activity is heavily mediated by digital devices, platforms, and networks. The digisphere thus serves as a new kind of public sphere where people engage in discussions, political activism, and civic participation through digital platforms (Habermas, 1991). In essence, this digital sphere encapsulates the pervasive and seamless integration of digital media technologies into the everyday life of farmers and its impact on various elements of communication ecology. The digisphere, an environment or atmosphere that is thoroughly dissolved by digital technologies, extends beyond the mere physical presence of gadgets and devices to signify a comprehensive digital immersion. The digisphere characterises a state where digital media is not just an external tool or accessory but becomes a collection of digital experiences. The digital sphere enables unprecedented access to information and knowledge through online search engines, digital libraries, and content-sharing platforms. The ubiquitous presence of smartphones, social media platforms, and specialised agricultural applications exemplifies the digisphere's centrality in modern farming ecosystems.

In order to explain the digisphere in the context of millennial farmers and their everyday farming practices, a comparison with the elder generation of farmers is substantial. In the timeline of everyday, the elder farming generations had a specific time frame for consuming every media and communication technology. For instance, they spend an hour in the early

morning on the newspaper, some time on radio during their work in the evening or while having tea with coworkers, and an hour or two on television in the night after work and a shower. My etic approach found an observable shift among millennials, which is yet not observed by them. Earlier, it was more crystallised, but now it is rather dissolved. In fact, no time is allocated by millennial farmers to use digital media technology!, which means, there is no specific time for media usage, rather they use it everytime. There was no specific answer to the question, what time of the day do you use these digital media technologies? Farmers' utilisation of digital media across various contexts—be it in personal, familial interactions, gratifications or professional tasks—underscores the digisphere's encompassing presence. Those digital media technologies which demonstrate strong utilities, such as increased efficiency, cost savings, or improved access to information, are more likely to dissolve more in farmers' communication ecology. Henceforth, the farmers' communication ecology transforms to a digisphere environment. This environment transcends physical spaces, manifesting in both the visible engagement with devices and the invisible, constant connectivity that influences thought patterns, behaviours, and decision-making processes. The digisphere is characterised by integration, interactivity, and immersion, with digital media technologies being ingrained into almost every aspect of farmers' communication ecology. This pervasive adoption of digital media reshapes cultural, political, and social structures, creating new opportunities and challenges as farmers navigate between digital and physical elements in the communication ecology. The creation of virtual spaces through digital platforms enables interactions and experiences that are not confined by physical location, allowing individuals to be virtually present in multiple places at once. The digisphere represents a paradigm shift in human-

environment interaction, characterised by the indistinguishable integration of digital media technologies in everyday of millennial farmers.

4.6 Implications

Foregrounding practical and theoretical consequences of the study bridges the gap between the research data and its broader impact on society, policy, technology adoption, and academic discourse. The study thematised the following implications.

1) Enhanced communication strategies for agricultural development: How digital media technology reshapes communication ecologies among millennial farmers, offering insights for agricultural extension services and policymakers. By understanding these evolved communication patterns, strategies can be designed to effectively disseminate crucial information, such as market trends, weather forecasts, and sustainable farming practices. This is especially significant in regions like Kerala, where agriculture plays a pivotal role in the economy and societal structure.

2) Customised Technology Solutions for Diverse Needs: The variability in technology adoption and its different affordances among farmers suggests the need for more personalised digital tools. Technology developers and agritech companies can utilise these findings to design user-centric applications that cater to the specific requirements of different farming communities, enhancing usability and adoption rates.

3) Empowerment through Digital Literacy: The research underscores the importance of digital literacy among farmers for maximising the benefits of technology. Educational initiatives and workshops focusing on digital skills can empower farmers to leverage digital tools for improved decision-making, problem-solving, and networking with authorities and markets.

Several government initiatives by Krishi Bhavan²⁵ and Akshaya-E-Kendra²⁶ focused more on yielding better from digital technologies to improve crop yield. The interaction of these factors can determine the pace and extent to which a digital media communication technology is adopted and integrated into farmers' communication practices. Adaptation to these norms, as well as strategies to ease the transition such as training or the involvement of community leaders, are necessary to ensure successful technology adoption.

Apart from the practical implications of this empirical study, the theoretical implications are the following:

(4) Contribution to Communication Ecology Theories: The study provides empirical evidence supporting the dynamic nature of communication ecologies in the context of technology adoption. It expands the theoretical framework by illustrating how digital media not only disrupts but also dissolves into traditional communication patterns, offering a new perspective on the communication practices.

²⁵Krishi Bhavan is the government body in India undertaken by Department of Agriculture in various states. Krishi Bhavan deals with the formulation and implementation of various state government programmes to augment production of both food crops and cash crops in the state

²⁶ Akshaya e-Kendra in Kerala is a statewide network of public Internet access points providing various e-governance, educational, and digital services to rural and urban citizens, enhancing digital literacy and accessibility.

(5) Insights into Technology Adoption Models: The differentiated use of technology among millennial farmers contributes to existing models of technology adoption. The earlier adoption models highlight the role of socio-economic factors, cultural context, and individual preferences in shaping technology use. Challenging this by changing these factors to differences in communication technologies, its diversity, depth, and emotional dependency of millennial farmers and the need for change become more niche factors contributing to existing adoption models.

4.7 Conclusion

The integration of digital media technology has significantly reshaped the communication ecologies of millennial farmers in Kerala, leading to a dynamic shift in traditional communication practices. The incorporation of new digital media technology has created prolonged omnidirectional ripples in the serene communication ecology, initially sparking scepticism and curiosity, followed by a period of disruption and gradual dissolution. This phase has fostered new patterns in existing communication ecology, intertwining traditional communication channels with digital platforms, thereby dissolving the newly incorporated digital media technology to existing settled communication ecology and later a resettlement.

The findings of this chapter highlight the dichotomy in communication practices within the farming community, with some farmers readily adopting the changes brought about by digital media technology, while others remain apprehensive. This ongoing renegotiation of both formal and informal processes during the technology adoption process has been a key feature of the transition. The study also underscores the need for continued adaptation and negotiation

in both formal and informal communication processes as technology continues to evolve. It is evident that the disruption caused by digital media technology in the communication ecology has apparently altered or influenced community dynamics, necessitating a nuanced approach to technology adoption and utilisation within the farming community. Based on the key findings of this study, it is recommended that stakeholders and policymakers in the agricultural sector recognize the evolving communication ecologies shaped by digital media technology and develop targeted interventions to support the effective integration of technology into traditional farming practices. This may involve providing training and resources to facilitate the adoption of digital media technology, particularly for farmers who may be more apprehensive about its use. Additionally, there is a need for continuous research and dialogue to understand the evolving needs and challenges faced by millennial farmers in leveraging digital media technology for their professional and personal lives. This study has introduced the concept of digisphere, which refers to the comprehensive digital immersion experienced by farmers in their everyday. The digisphere is characterised by the indistinguishable integration of digital media technologies in everyday life, extending beyond the mere physical presence of gadgets and devices to signify a comprehensive digital immersion. The ubiquitous presence of smartphones, social media platforms, and specialised agricultural applications exemplifies the digisphere's centrality in modern farming ecosystems.

The implications of this study are far-reaching, with practical and theoretical consequences that bridge the gap between research data and its broader impact on society, policy, technology adoption, and academic discourse. One of the key implications of this study is the need for enhanced communication strategies for agricultural development. Another implication of this study is the need for customised technology solutions for diverse needs. The variability in

technology adoption and its different affordances among farmers suggests the need for more personalised digital tools. Technology developers and agritech companies can utilise these findings to design user-centric applications that cater to the specific requirements of different farming communities, enhancing usability and adoption rates. This can help bridge the digital divide within the farming community and ensure that all farmers can benefit from the opportunities offered by digital media technology. The findings suggest the need for enhanced communication strategies for agricultural development, customised technology solutions for diverse needs, and digital literacy initiatives to empower farmers to leverage digital media technology effectively.

This chapter discussed the disruption caused when a new digital media technology is introduced into farmers' communication ecology and how this newly introduced digital media technology dissolves into the existing communication technology over time. It details the process through which a new digital media is settled and resettled into the communication ecology of millennial farmers in Kerala. The chapter highlights factors like how the same technology can have different affordance among different farmers, how a newly introduced digital media technology replaces an object, institution or person existing in the communication ecology and how omnipresence of digital media technology in farmers' life does create a digisphere. The chapter also enlists the academic, industrial, and developmental implications as well as concludes with major findings regarding the research question under discussion.

In this context, the next chapter provides a summary of the chapters along with findings of the study, limitations of the study and scope for further research in the field.

CHAPTER V

CONCLUSION

In Chapter IV, we discussed the disruption caused when a new digital media technology is introduced into an existing communication ecology of millennial farmers in Kerala. This chapter later focuses on people, objects or institutions that digital media technology replaced from farmers every day. It further analyses and narrates the unidentified, dissolved and omnipresent existence of digital media technology in everyday of millennial farmers.

This last chapter, Conclusion will recap the core concept of this thesis in general and research questions in particular. The present chapter of the thesis provides a summary of all chapters. It also summarises the findings, states limitations of the study and recommends scope for further research in the field.

The integration of digital technologies in agriculture holds immense promise for improving farm productivity, efficiency, and sustainability. This research altogether has provided a comprehensive examination of the digital agriculture in Kerala, India, with a specific focus on the perspectives and experiences of millennial farmers. The attempt to map the digital media communication practices in the everyday of millennial farmers in Kerala through an ethnographic fieldwork has brought immense amounts of insights into this academic domain. This study is presented in five chapters.

5.1 Summary of Chapters

The first chapter of the PhD thesis introduces the research topic, objectives, and methodology. It begins by highlighting the need to understand the usage of digital media technology among

millennial farmers in Kerala, India. The chapter establishes the rationale for the study, emphasising the significance of technology in agriculture and the unique context of millennial farmers who have grown up with digital technologies.

The Introduction chapter presents a comprehensive review of literature related to technology use in agriculture, visual ethnography as a research method, and the concept of everyday life. It discusses the existing research on technology adoption in agriculture and identifies gaps in knowledge, particularly in the context of millennial farmers. The chapter also explores the theoretical framework used in the study, drawing on concepts from everyday life theory and visual ethnography. The chapter outlines the methodology that employed a multistage ethnographic fieldwork approach in order to address the research questions. The chapter also describes the field entry procedure employed to maintain ethical standards and uphold the dignity of the respondents. The chapter concludes by presenting the chapter scheme of the thesis by outlining and briefly describing the organisation of the thesis chapters. It introduces the key themes evolved from fieldwork and provides an overview of each chapter's content. Overall, the first chapter of the PhD thesis provides a solid foundation for the research by establishing the context, reviewing relevant literature, outlining the theoretical framework, and describing the research methodology. It sets the stage for the subsequent chapters.

The chapter two, Mobilising Discourses: Millennial Farmers and Everyday Technology, outlines farmers' perception of technology and its applications in their everyday. It examines how the millennial farmers conceptualise and employ digital media in their farming practices. It highlights discourses around the critical engagement and mobilisation of technology by these farmers, who increasingly use digital media to enhance their agricultural practices in various aspects. The prime effort of this chapter is to crystallise diverse initial perceptions and 'Idea of

Technology' by examining various ways millennial farmers perceive technology. Some see it as advanced machinery, while others view it as digital tools that revolutionise farming. A significant focus is placed on digital connectivity, emphasising its role in modern agriculture. Farmers acknowledge digital media technology for making tasks easier, enhancing productivity, and saving time, though some criticise it for contributing to social isolation and commercial exploitation.

Millennial farmers in Kerala relate speed and efficiency with the use of digital technology, which they believe revolutionises their farming practices. Technology allows them to perform tasks quicker, from obtaining real-time weather data to engaging in rapid information exchange via social media platforms. This shift towards faster and more efficient practices is seen as a transformative influence of digital technology in agriculture. Farmers express a sense of control and agency afforded by digital tools, enabling them to manage their agricultural activities more effectively. They describe technology as a means to control their environment and enhance their productivity. Additionally, technology fosters a sense of independence, helping farmers make more informed decisions and reducing their reliance on traditional agricultural practices. The concept of independence is crucial, where technology provides farmers the tools to operate autonomously and efficiently. However, this also introduces a dependency on technology itself, which some farmers view critically. The idea of progress is intertwined with technology, where advancements are seen as indicative of personal and professional growth. Farmers value the convenience that technology brings to their daily operations, allowing them to manage their activities more effectively and maintain a competitive edge in the agricultural sector. This convenience is not just about ease of use but also about enabling farmers to achieve greater efficiency and productivity in their practices.

The evolution of farmers' views from initial perceptions of technology as a tool for improvement to a broader understanding of its role in enhancing efficiency, productivity, and sustainability in agriculture is marked in the second chapter. This shift from seeing technology as merely a functional tool to recognizing its transformative potential marks a significant change in how millennial farmers engage with digital tools. The following perspectives are formed after repeated and continued usage of digital media technologies. Farmers report that technology has significantly improved various aspects of their agricultural practices, including planting schedules and market access, which have enhanced their productivity and profitability. This change is largely attributed to the integration of digital tools like weather forecasting apps and online marketplaces. There is a strong emphasis on balancing traditional knowledge with modern technological innovations. Farmers value the preservation of traditional practices while integrating new technologies to enhance these methods. This balance helps them maintain sustainability and efficiency in their farming operations. Digital technology provides farmers with unprecedented connectivity to the broader agricultural community, enabling knowledge exchange and access to new markets. This connectivity has transformed traditional farming practices, making them more information-driven and responsive to market demands. The chapter concludes by reflecting on views on technology among millennial farmers in Kerala. It highlights how their perspectives have evolved from seeing technology as a simple tool to viewing it as a critical enabler of modern, efficient, and sustainable agricultural practices. This transformation underscores the importance of considering local contexts and individual experiences when integrating technology into agriculture, ensuring that it benefits all stakeholders involved.

The chapter three, Farm, Farmer, and Technology: An Entangled Relationship, investigates the deep and complex relationships that millennial farmers in Kerala have developed with digital media technology. It explores the emotional and relational dimensions that shape their daily interactions with these technologies, highlighting how these tools become more than just functional; they are integrated into their everyday, influencing their feelings and actions. The millennial farmers not only use but emotionally engage with their technological tools. The Chapter revolves around various emotions—interest, intimacy, comfort, tension, anxiety, and stress—those millennial farmers experience in relation to their use of technology. These feelings highlight the complex, sometimes contradictory ways farmers interact with digital tools. Technology serves as a partner and companion in their farming endeavours, influencing their decisions and shaping their daily routines. Farmers express a sense of wonder and curiosity about the capabilities of their digital tools. This fascination drives them to explore new applications and to incorporate these technologies more deeply into their farming practices. For many, technology is not just a means to an end but a source of endless discovery and innovation. However, farmers possess a never-ending curiosity to experiment and experience newer advancement in the digital media technology sector. Digital devices are seen as reliable partners in the farmers' daily lives. They provide a sense of comfort and familiarity, making them indispensable in both personal and professional contexts. The chapter discusses how farmers build trust with their devices, relying on them for information, advice, and even emotional support. In simple terms, a mobile phone is one 'who' knows all about them and never gossips. Despite the benefits, the use of technology also brings in tensions and anxieties. Issues such as connectivity problems, technical glitches, and dependency on digital tools can cause significant stress. Farmers express concerns about the overreliance on technology and

the potential for it to disrupt traditional farming practices and personal connections. The chapter concludes by reflecting on the integral role played by technology in the lives of millennial farmers. It is not merely a set of tools but a character in the play of their lives, assuming multiple roles such as a teacher, partner, advisor, and friend. This emotional relationship underscores the impact of digital media technology on their personal and professional identities. The research highlights the necessity of understanding the emotional and relational aspects of technology use in agriculture. It argues for a holistic approach to integrate digital tools in farming, one that considers not only the economic and functional aspects but also the emotional and social dimensions. The chapter calls for policies and interventions that support farmers in managing the complexities of this relationship, ensuring that technology serves as an enabler rather than a disruptor of traditional farming practices. This chapter provides a comprehensive look at the intertwined relationships between millennial farmers and technology, emphasising the importance of considering emotional and relational factors in the adoption and use of digital technologies in agriculture.

The chapter four, Everyday Digital Media Technology – Disruption and Dissolution in the Lives of Millennial Farmers in Kerala– examines the integration of digital media technology in communication ecologies of millennial farmers in Kerala, India, and the resultant disruption, negotiation, and dissolution processes. Through an immersive qualitative approach, the chapter further examines the different affordances of the same technology for various stakeholders, as well as the impact of different individual characteristics on adoption and implementation. The introduction of digital media technology among millennial farmers in Kerala has significantly reshaped traditional communication ecologies, creating a complex interplay between old and new practices. This technological shift has resulted in a dual phenomenon of disruption and

adaptation, where traditional communication channels are being renegotiated and resettled in the context of new digital capabilities. Millennial farmers have begun integrating digital platforms such as WhatsApp, Facebook, and various agricultural apps into their daily routines, fundamentally altering how they receive and share information. These platforms have effectively replaced traditional gathering spots like the local village square, where farmers would meet physically to discuss issues like market prices and weather conditions. The digital tools offer a more efficient, immediate, and wide-reaching method for exchanging information, which is particularly beneficial in the dispersed and varied geographical landscape of Kerala. For example, Arjun, a young farmer from Thrissur, illustrates this shift by noting how WhatsApp groups have become the new hubs of community interaction among farmers. These groups allow for real-time sharing of crucial farming data, advice, and support, bypassing the logistical challenges of physical meetings. This change is not merely about convenience but also represents a broader transformation in the social fabric of farming communities, where digital media becomes a central element in maintaining social and professional networks. The adoption of digital media has also impacted both formal and informal communication processes. In formal settings, such as interactions with government bodies or commercial transactions, digital technologies have introduced higher levels of efficiency and transparency. Sanal, a farmer from Malappuram, remarks on the ease brought by government portals for accessing subsidies and other services, which previously required multiple, often cumbersome, visits to government offices. However, the transition has not been seamless for all. Some farmers express apprehension and scepticism towards the reliability and impersonality of digital interactions. There remains a segment of the farming community that is less comfortable with or has limited access to digital technologies, highlighting a digital divide that needs

addressing. The integration of digital technologies in agriculture has revealed varying levels of technology affordances for different stakeholders, influenced by factors such as technological literacy, access to resources, and personal preferences. For tech-savvy farmers, digital platforms are invaluable for optimising farming operations, accessing markets, and obtaining crucial farming information. However, for those who are less familiar with technology, these new tools can represent significant barriers, limiting their ability to benefit from the digital revolution in agriculture. This disparity suggests the need for targeted interventions to ensure equitable access to technology benefits. Replacement by Digital Media is one of the key focus areas of this chapter. The phenomenon of digital replacement extends beyond mere tools to include roles traditionally held by individuals and institutions within the farming community. The research finds extensive evidence of digital media replacing traditional methods and roles. Digital marketplaces, for instance, are supplanting physical markets, allowing farmers like Vani to bypass traditional supply chains and directly connect with buyers. This shift not only changes the economic dynamics but also affects the social interactions that were a staple of market gatherings. The displacement is also seen in the reduction of reliance on local agricultural experts and intermediaries, as digital applications and platforms begin to provide services that were once the domain of human experts. This transition, while increasing efficiency, raises concerns about the erosion of local knowledge and the potential for increased unemployment among those who previously held these roles. The integration of digital media technology in the agricultural sector of Kerala represents a profound shift in the communication ecologies of millennial farmers. While it brings efficiency and new opportunities, it also challenges traditional practices and requires ongoing adaptation and negotiation. The findings underscore the importance of considering both the potential and the pitfalls of digital media

integration in agriculture, emphasising the need for comprehensive strategies that support all farmers in navigating this new digital landscape.

The integration of digital media technologies into agriculture transforms the sector profoundly, offering new opportunities and challenges for millennial farmers in Kerala. This research has provided a deep understanding of how these technologies are conceptualised and integrated into the everyday lives of these farmers, reflecting broader socio-technological developments in Indian agriculture. This study uncovered that the millennials among the farming community are at the forefront of adopting digital media technologies, leveraging them to enhance agricultural productivity and sustainability. These technologies have become blended in their daily routines, influencing decisions from crop selection to market strategies. This integration is influenced by both the accessibility of technology and farmers' conceptualisation of it, which collectively foster a more informed and responsive farming practice.

5.2 Summary of the Findings of the Study

The backbone of this thesis is its three research questions. Three chapters excluding the introduction and conclusion, are formed by addressing each research question, which includes the analysis and findings of each. The findings of each chapter is unique by its own and can be treated as standalone research. However, the core of each chapter lies in the intersection of digital media technologies and millennial farmers in Kerala. Henceforth, all chapters of this study equally contribute to the mapping of digital media technologies and everyday of millennial farmers in Kerala.

The first research question sought to answer how the millennial farmers conceptualise and position digital media technologies in their everyday. As this is a broad question, this question

raises several sub-questions such as, What is farmers' idea about technology they use in their everyday?, What is the initial perception and later formed perspectives of farmers regarding the digital media technologies they use everyday? How are technologies positioned between farm and farming? and how do farmers shape, redesign, and domesticate media technologies for everyday use? The second chapter entitled "Mobilising Discourses: Millennial Farmers and Everyday Technology," primarily focuses on the first research question and its sub questions.

Through the analysis, the study finds that millennial farmers in Kerala have integrated digital media technologies into their everyday agricultural practices to a significant extent. This integration has led to shift in how farmers perceive and utilize technology in their everyday. Initially, farmers viewed technology through a lens of practicality, for them the initially formulated idea of technology focuses on its ability to save time, increased control over farming processes, and facilitate their progress in farming, or something that makes everyday more convenient and provides greater independence. They saw technology as a tool to enhance productivity and efficiency. However, as they integrate these technologies into their everyday, their perspectives evolve beyond this initial utilitarian view. Through the extensive, prolonged and continuous use of digital media technologies, these initial perceptions have developed into more deep perspectives. Through everyday usage or by integrating digital media in their daily life, farmers realise that technology act as an enabler in their everyday; it helps them to execute traditional farming knowledge more scalable. Like never before, the farmers feel connected to the larger population in the world. Farmers build a global, local and glocal set of connections in their everyday. The technology-enabled connective world, henceforth lead them to formulate the idea that the connectivity element of technology acts as a transformative agent. Upon some thoughtful questions, the farmers contemplated on the new hybrid farming identity that the

digital media technologies provide them. They no longer remain solely farmers, but influencers, trainers, marketers, coaches, content producers, facilitators and much more. In essence, the initial perception of technology as a practical tool evolves into a more comprehensive perspective that recognizes its potential to transform various aspects of their lives, from individual farming practices to the social-economic life.

As every farmer has a unique style of performing their everyday, we have gathered a wide array of field data on the various ways farmers use digital media technologies. The technologies unfortunately are not competent enough to address these unique requirements of farmers. The farmers, therefore, domesticate those technologies to tailor fit their needs, like the way they domesticate animals. They use instant messaging applications for bookkeeping, social media as a marketplace, cameras as reminders and so on and so forth. The specialised agritech platforms are found not completely useful to farmers as these platforms are either designed for a specific use case style or not flexible.

The digital media technology assumes the role of a liaison between the farm and the farmer. The digital media technology becomes the source of farming related information and ideas. It helps in farm management and enhances farmers' administrative efficiency, helps them come up with climate resilience and manage potential risks. Apart from positioning the digital media technologies in between farming operations, the farmers are extensively using it for post post-crop stage. Unlike the previous generation, the digital media technologies are well positioned in the sales and marketing of agricultural goods produced by millennial farmers. The digital technologies directly help in the pre-cropping, cropping and post-cropping stages. Apart from these, these technologies are positioned in the social life of farmers. Digital media become a primary dependee of millennial farmers for community building and knowledge exchange.

The second research question digs further deep into the emotional aspects in the process of mapping digital media technologies in the everyday of millennial farmers. It focuses on how the farmers establish and develop relationships with the technology they use every day and how farmers develop feelings (interest, intimacy, comfort, tension, anxiety, stress etc.) while using everyday technology. Apart from the utilitarian functions explored as part of the first research question, the findings of the second research question present the establishment of a deep emotional bondage of farmers with the digital media technology they use. They experience various emotions such as interest, intimacy, comfort, tension, anxiety, and stress while using everyday digital media technology. For farmers, the digital media device they use is not *something* like a tool or an object rather is *someone* like a friend or a partner. The study found that the farmers relate their smartphones to their friends, partners, teachers, guardians, assistants, companions and so on and so forth. Thus, the farmers establish a relationship with the digital media technology and these technologies influence their decisions and shape their everyday. Being a reliable partner, digital media technologies provide uncompromised comfort to the farmers. No farmer is willing to go to their farmland without any of these digital media technologies. Moreover, no farmers we interviewed take more than an hour to use their phones after and before bed. Despite several emotional advantages of using digital media technologies, they bring tension and stress while using it. A malfunction, damage or a lack of proper knowledge to use it brings an ample amount of stress and tension. Digital media technology plays the role of an important character in the life of millennial farmers.

The third research question enquires how the communication ecologies of millennial farmers resettles/ed after the intervention of new communication technologies. When a new digital media communication technology is introduced into a stable functioning communication

ecology, it will initially disrupt the communication ecology and as time moves, it gets dissolved into the existing communication ecology. During the process of dissolution, the newly introduced technology will negotiate and settle to the existing ecology through various stages. The stages involved in the process of negotiation and settlement are 1) Introduction and Initial Access, 2) Experimentation, 3) Cultural and Social Adaptation, 4) Integration, 5) Settling, and 6) Evaluation and Feedback Loops. During this process, millennial farmers also undergo continuous negotiation and renegotiation to maintain a balance between the traditional communication practices and the benefits of new digital technologies. A dynamic equilibrium where both traditional and new systems coexist, sometimes in a hybrid form, redefines the communication ecology within which farmers operate. During the process of integration, a newly introduced digital media technology can replace another communication agent in the existing communication ecology. The popular smartphone applications have replaced objects, institutions and even people, or at least made them irrelevant to a great extent. Even further, digital media technologies replace more and more objects, institutions and people, as the presence of digital media technologies in the lives of millennial farmers becomes more evident. The presence of earlier communication technologies in the everyday was more crystallised. There was a specific and limited time to read newspapers, watch TV and listen to radio. However, the new digital media, especially the smartphone, appears invisible in the everyday as it is more dissolved. There is no specific time allocated to consume or engage with them. The new digital technology is omnipresent in the everyday of millennial farmers. It is everywhere in their everyday. That brings the millennial farmers in Kerala to a Digisphere, where they live in a digital sphere.

5.3 Limitations of the Study

This study's main limitation lies in its focus on a specific demographic and geographical area. While the insights are profound, they are not necessarily generalizable to older generations of farmers or those in different regions. Additionally, the evolving nature of technology and the pace at which new tools are introduced could outdate some findings, paving the need for continuous research to keep the data relevant and updated.

5.4 Scope for Further Research

Future research could expand to include a comparative analysis between different generations of farmers or between regions with varying levels of technological adoption. Additionally, as new technologies such as AI and IoT become more prevalent, their impact on agriculture could provide valuable insights into further optimization and sustainability of farming practices. At many points, this study assumes industrial agricultural ethnographic research, contributing to the research of technology producers who try to understand what people do with their technology artefacts or what end users expect from them. The scope for further research in this domain falls in the category of industrial ethnography as well.

The integration of digital media technologies in agriculture holds promise for significant improvements in productivity and sustainability. However, for these benefits to be fully realised, it is crucial to address the existing barriers to technology adoption, such as digital literacy and infrastructure. By continuing to explore and understand the socio-technical dynamics in agriculture, stakeholders can develop more targeted interventions that support farmers in their transition to more technologically integrated farming practices. As such, the ongoing evolution of digital technologies and their application in agriculture presents a fertile

ground for future research, offering new opportunities for enhancing the livelihoods of farmers and the sustainability of agriculture in India and beyond.



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Web Resources

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<https://statisticstimes.com/demographics/india/kerala-population.php>

<https://traf.gov.in/about-us/annual-reports>

<https://desagri.gov.in>

<https://www.keralatourism.org/malabar/introduction/2>

<https://openknowledge.fao.org/server/api/core/bitstreams/4dfa99e0-fc68-43c2-b67615d3de019bd5/content>

APPENDICES

Appendix I: Ethnographic Interview Questionnaire

Interview Guide Protocol

Ideal Duration: 90 Minutes

Subjects: Millennial Farmers in Kerala

The main focus of this interview is to understand the everyday uses of digital media technologies among millennial farmers. The goal is to identify how the millennial farmers conceptualise technology in their everyday professional lives. The unstructured interview session takes around ninety minutes.

Field Approaching Procedure

1. Read the Guidelines for the Subjects:

The research intends to get your thoughts so there are no wrong answers to any of these questions. While you answer questions or guide us through tasks, please focus on the details of how you actually do your work. It may help to think about the last time you performed the task and explain it to us as if we are going to need to perform the task just as you did. Please feel free to be honest and critical even if the way your work actually gets done is not the way you would ideally like it to be done. Everything you tell us is strictly confidential.

2. Privacy and confidentiality rules and a consent statement to be signed by the interviewee:

3. Clear Questions and concerns before starting the interview

Interview Question Guide

This questionnaire constitutes four different sets of questions in order to obtain different data about the experience of millennial farmers while using digital media technology in their professional and lived space. This ethnographic research merges interview, one on one discussion with immersive observation in order to arrive at the most authentic research outcomes.

General Overview Questions:

1. Can you tell me a little about your background and what made you choose the farming profession?
2. How does a typical day of your professional life look like?
3. What all other activities you do on everyday basis?

Specific Tour Questions:

4. What advantages do you think you have over the elder farming generations?
5. What is your idea of technology?
6. What all comes to your mind when you hear the word technology?
7. What are the technologies you think you are using on an everyday basis?
8. Why do you think those are technologies? On what basis you identify them as technologies?

9. What is the picture of your annual expenditure looks like? How much do you spend on media technologies?

10. What are the technologies you purchased last year? And what was the motive behind them? Tell the story.

Guided Tour Questions

The following questions will be asked based on the technologies listed by the farmer.

11. Please tell me some experiences from your personal and professional life where you use technology and for what purpose you use it.

12. How long you use them?

13. How popular technology is with you? What do you think is the most popular form of technology you use every day? And what makes it so popular?

14. How do you think technology is helping you with your everyday activities?

15. Do you think your everyday technology has something to do with your idea about technology?

16. Do you think any technology you use for a purpose is intended for another purpose?

Task and Experience Related Question

17. Do you think technology adds power to you? How does it happen?

18. Do you believe technology can help you with your everyday works?

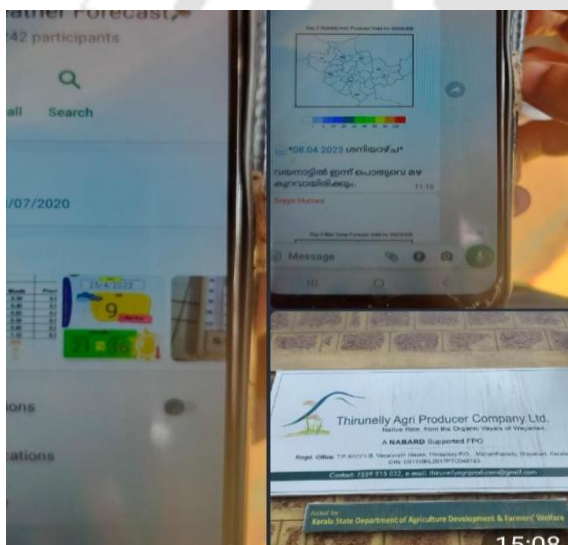
19. How does a typical day of your technology life look like? Can you narrate a day of your life by mentioning all the possible uses of technologies?
20. Can you explain some situations where you seek help of technology for your everyday work?
21. To what extent you think all these technologies are helping you in your professional life?
22. How does using technology for your personal things help or disrupt your professional life?
23. Do you think technology replaces certain people or certain objects in your everyday practice?
24. Suppose someone you seek help from, or you call daily is not available. Then how do you manage that situation with the help of technology?
25. Do you benefit from various technology initiatives by the government or non-government agencies? If yes, can you tell me how? And if no, can you tell me why?
26. What do you expect from these technologies or their makers?

Questions of emotions and feelings

27. Do you think you are in a relationship with technology?
28. What kind of relationship do you establish and maintain with technologies?

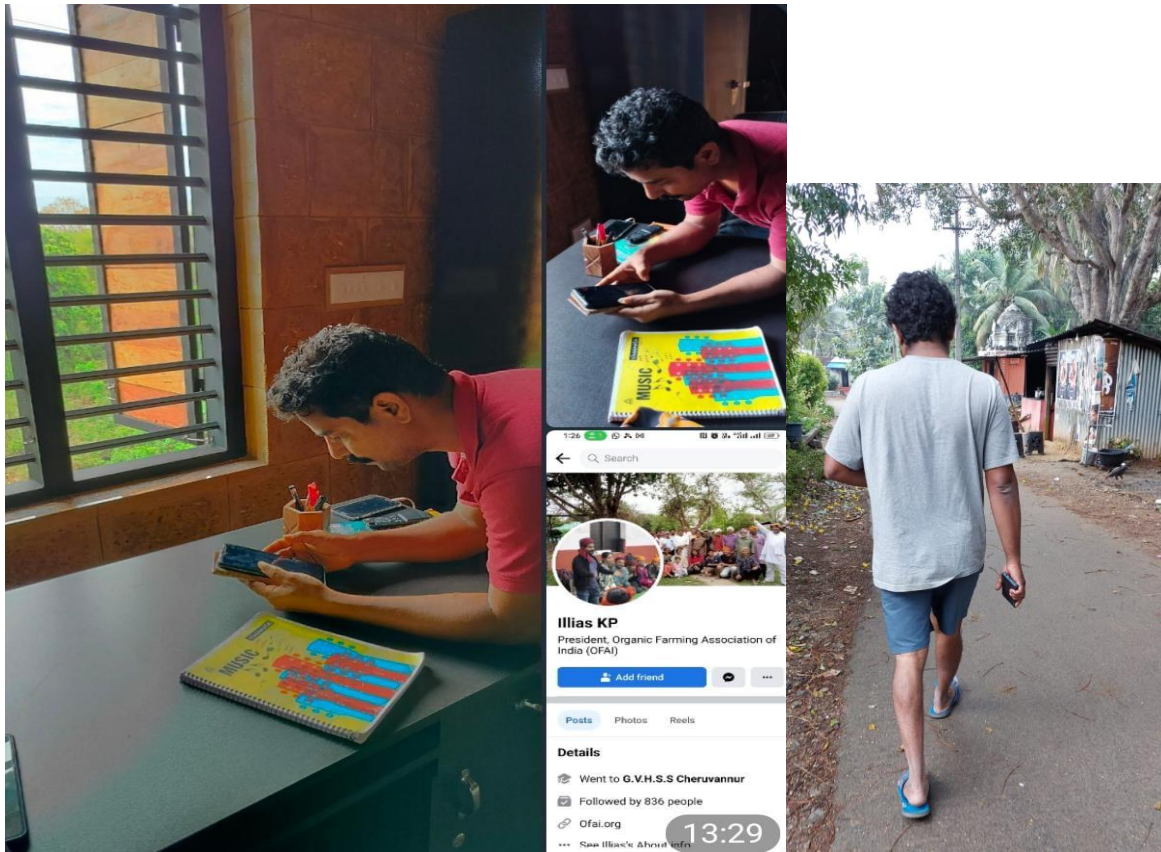
29. How do you feel if you have to stay away from all these technologies? And what do you feel if you get back with all these technologies? Can you share some instances?
30. How do you develop feelings (Interest, intimacy, comfort, tension, anxiety, stress) while using everyday technology?
31. Have you faced any sense of curiosity to know about and use any forms of technology?
32. Suppose your everyday life is a play, so what role does technology play in it?
33. Do you think you live in a technological world or technology lives in your world? Why?
34. Do you think you make use of technology more for professional life than before? Why it could be?
35. Do you remember a day in your life, totally isolated from technologies? If yes how was it?
36. Can you think of a day, where you are completely isolated form the technology? How the day could be?
37. What changes a new communication device can bring into your communication systems?
38. What is the most popular technology you are using and why?

Appendix II: Photographs from fieldwork.





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Sanal Sanal
10 May 2018

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