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Learning to speak to an elephant and other stories of decentralised digital futures

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Publication date:
2021

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Document Version
Publisher's PDF, also known as Version of record

Link to publication in Discovery Research Portal

Citation for published version (APA):
Clarke, L., George, B., Raj, R., Rogers, J., Singh, N., Skelly, M., & Thomas, P. (2021). *Learning to speak to an elephant and other stories of decentralised digital futures*. University of Dundee.

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Learning to speak to an elephant and other stories of decentralised digital futures.

ಆನೆಯೊಡನೆ ಮಾತಾಡುವ ಬಗ್ಗೆ ಮತ್ತು ವಿಕೇಂದ್ರೀಕೃತ ಭವಿಷ್ಯದ ಕುರಿತು ಇತರ ಕಥೆಗಳು

We want a future where locals are
validated and their stories are valued

TB Dinesh

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Foreword John Thackara

This book is about accentuating the positives among rural communities in Karnataka, India. It explores the possible roles that mesh networks, the Internet of Things, voice-enabled Internet, machine learning, and artificial intelligence might play in enhancing daily life practices that are already successful: ecological agriculture, forest conservation, water management, and place-based education.

Designing for change, in this book, is not all that much about single, problem-solving 'solutions'. Instead, the focus is on ways to improve existing social practices. Social systems based on kinship and ways to share resources, have deep roots right across South Asia and beyond. In the North, the sharing or Peer-to-Peer economy has been presented as a novelty in recent times – but people in other cultures have collaborated and supported each other in times of difficulty over generations. Many such collaborative systems have now atrophied in cities - but they remain present within the 'undeveloped' communities featured in this book.

Technology can play an important role as the supporting infrastructure needed for these social relationships to flourish. For instance, electronic networks can make gift-exchange easier to re-emerge. Mobile devices and the Internet of Things can make it easier for local groups to share equipment and space, or manage trust in decentralised ways. Technology can also help reinvent cooperative practices – sharing, bartering, lending, trading, renting, gifting, exchanging, & swapping – in which money is just one means among many of holding or exchanging value.

The futures explored in this book may be local, social, and decentralised - but they can inspire and guide us all. The world can learn from these practices that are community-centric, ecologically-balanced, and culturally-respectful. Whenever we encounter an opportunity for change in our own context and ask: 'Who has answered a similar question in the past? How might we learn from what worked before?', the rural communities and people featured here will be one place to look.

Thinking ecologically, as people do here, gives new meaning and purpose to the concept of growth. Instead of measuring progress against abstract measures such as money or GDP, growth can be reimagined to mean observable improvements to the health and carrying capacity of the land and to the resilience of communities. Value is created by the stewardship of living systems rather than through the extraction of 'natural resources'. The language used, too, is one of system stewardship rather than 'productivity'. The design practices you will encounter within this book are more relational than transactional. They understand and respect human embeddedness in the natural world, while being respectful, socially relevant, ecologically sound, and culturally appropriate.

Multi-cropping for soil health in a small organic farm in Magadi, Karnataka

A discussion of the how as well as the what of innovation is this book's novelty. Potential uses of technology are explored in tentative, experimental ways. The actors directly involved learn gradually and reflect as they go along. Space and time are reserved, in this process, for diversity; several different possible outcomes are often explored at the same time.

In the new economy emerging from these turbulent times, the word 'development' is taking on a profoundly different meaning. Its core value is stewardship rather than extraction. It is motivated by concern for future generations; not by what 'the market' needs in the next few months. It cherishes qualities found in the natural world, formed over millions of years of natural evolution. It also respects social practices – some of them very old ones – of other societies, begun in other times.

This new kind of development is not backwards looking – it embraces technological innovation too. But technologies are evaluated against the higher purpose that innovation should support. Living lightly on the planet is the most important 'new' purpose for us all. Living lightly happens to be second nature for poor people who cannot rely on the high entropy support systems we've become used to in the cities. The resource-light ways with which rural communities meet daily life needs are usually described as poverty or a lack of development – but, in 35 years as a guest in what used to be called the 'developing' world, I've come to this startling conclusion: people who are 'poor' in material terms are highly accomplished at the creation of value in ways that do not destroy natural and human assets.

This is not to trivialize the extreme challenges faced by poor people on a daily basis: financial precarity, threats to land rights, disrespect for grounded local knowledge, promotion from the centre of inappropriate and poor-quality technical solutions. But, to the extent that a resilient economy is based on local production, human labour, and natural energy, it is abundantly clear that the 'poor' rural people of the world are far ahead on the learning curve than the rest of us in the 'developed' world.

“ಡಿಜಿಟಲ್ ವಿಕೇಂದ್ರೀಕರಣ” ಎಂಬ ಈ ಯೋಜನೆ ಸ್ಕಾಟ್ಲ್ಯಾಂಡಿನ “ಡಂಡಿ ವಿಶ್ವವಿದ್ಯಾಲಯ” ಮತ್ತು ಭಾರತದಲ್ಲಿರುವ “ಕ್ವಿಕ್ಸ್ಯಾಂಡ್” ಕಂಪನಿ ಜಂಟಿಯಾಗಿ ನಡೆಸಿದ ಯೋಜನೆ. ಈ ಯೋಜನೆಯಡಿ ಸ್ಥಳೀಯತೆಯಿಂದ ಪ್ರಭಾವಿತವಾಗಬಲ್ಲ ಡಿಜಿಟಲ್ ಭವಿಷ್ಯದ ಸ್ಥೂಲ ರೇಖೆಗಳನ್ನು ಅರಸಲಾಯಿತು. ಇಲ್ಲಿ ಕಲ್ಪಿಸಿರುವ ಆಶಾದಾಯಕ ಭವಿಷ್ಯವು ಈಗಿರುವ ಮುಕ್ಕಾಲುಪಾಲು ಕಲ್ಪನೆಗಳಿಗಿಂತೆ ಬಹಳಷ್ಟು ಬೇರೆಯಾಗಿದ್ದು, ಸದ್ಯದ ವಿಶ್ವದಲ್ಲಿ “ಮೌಲ್ಯ”ವೆಂಬುದರ ಬಗ್ಗೆ ಪ್ರಶ್ನೆಯೆತ್ತುತ್ತದೆ.

ಈಗಿನ ರೀತಿನೀತಿಗಳನ್ನು ನೋಡಿದರೆ, ಪಾರದರ್ಶಕತೆ ಮತ್ತು ದಕ್ಷತೆಯ ನೆಪದಲ್ಲಿ ತಂತ್ರಜ್ಞಾನದ ತಿಳಿವಿಲ್ಲದ ಸಮುದಾಯಗಳ ಮೇಲೆ ತಂತ್ರಜ್ಞಾನವನ್ನು ಹೇರುವುದೇ ಹೆಚ್ಚಾಗಿ ಕಂಡುಬರುತ್ತದೆ. ಲಾಭ ಪಡೆಯಬೇಕಾದ ಸಮುದಾಯದ ಜನರಿಗೆ ಆ ತಂತ್ರಜ್ಞಾನವನ್ನು ರೂಪಿಸಲು, ನಿರ್ಮಿಸಲು ಮತ್ತು ಬಳಸಿ ಬೆಳಸಲು ಕಚ್ಚುಕಡಿಮೆ ಅವಕಾಶವೇ ದೊರಕುವುದಿಲ್ಲ. ಆದ್ದರಿಂದ, ಆ ಹಿಂದುಳಿದ ಸಮುದಾಯವೊಂದಕ್ಕೆ ಸಹಾಯ ಮಾಡುವ ಪ್ರಯತ್ನಗಳೆಲ್ಲ ಮತ್ತೊಂದು ಬಗೆಯ ಹಿಂದುಳಿದ ಸಮುದಾಯವನ್ನು ಹುಟ್ಟು ಹಾಕುತ್ತವೆ. ಅರ್ಥಾತ್, ಯಾವ ಜನರು ಈ ಹೊಸ ತಂತ್ರಜ್ಞಾದಿಂದ ಅಭಿವೃದ್ಧಿ ಹೊಂದಬೇಕೊ ಅವರು ಈ ತಂತ್ರಜ್ಞಾನದಿಂದ ದೂರ ಉಳಿದು ಅದರಿಂದ ರೂಪಿಸಬಹುದಾದ ಭವಿಷ್ಯದ ಕಲ್ಪನೆಯಿಂದಲೂ ವಂಚಿತರಾಗುತ್ತಾರೆ. ತಂತ್ರಜ್ಞಾನವೂ ಸ್ಥಳೀಯತಯನ್ನು ಮೈಗೂಡಿಸದೆ ಸಪ್ಪೆಯಾಗುಳಿಯುತ್ತದೆ. ಅಷ್ಟೇ ಅಲ್ಲದೆ, ಕೆಲವೊಮ್ಮೆ ಸಮುದಾಯದ ಜ್ಞಾನಸಂಪತ್ತ ಭಂಡವಾಳಶಾಹಿ ಜಗತ್ತಿನಲ್ಲಿ ಬಳಕೆಯಾಗುತ್ತದೆಯೇ ಹೊರತು ಅದರ ಲಾಭವನ್ನು ಮಾತ್ರ ಆಯಾ ಸಮುದಾಯ ಅನುಭವಿಸುವದಿಲ್ಲ.

ನಮ್ಮ ಉದ್ದೇಶ ಸ್ಪಷ್ಟವಾಗಿತ್ತು: ನಮ್ಮ ಮುಖ್ಯ ಸಹಭಾಗಿಗಳ – ಉದಾ. ಎಮ್ಮೆ ಸಮೂಹ, ಜನಸ್ತು, ಬ್ಲ್ಯಾಕ್ ಬಾಜಾ ಕಾಫಿ – ನೆರವಿನಿಂದ ಕರ್ನಾಟಕದ ಕೆಲವು ಸಮುದಾಯಗಳ ಜೊತೆಜೊತೆಗೆ ಕೆಲಸ ಮಾಡುವುದು. ಹೀಗಾಗಿ, ನಾವು ಒಂದಿಷ್ಟು ಬೇಸಾಯ ಮಾಡುವ ಮತ್ತು ಬುಡಕಟ್ಟು ಸಮುದಾಯಗಳನ್ನು ನಮ್ಮ ರಚನಾಕ್ರಮದಲ್ಲಿ ಸೇರಿಸಿದೆವು. ಇದರಿಂದ ಅವರವರಿಗೇ ಅವರ ಭವಿಷ್ಯವನ್ನು ಕಲ್ಪಿಸಿ ರೂಪಿಸಲು ವೇದಿಕೆ ಕೊಟ್ಟೆವು. ಇದಕ್ಕಾಗಿ, ನಾವು ಡಿಜಿಟಲ್ ತಂತ್ರಜ್ಞಾನದ ಸಂಕೀರ್ಣತೆಗಳನ್ನು ಸರಳಗೊಳಿಸಿ ಅರ್ಥೈಸುವ ಅಗತ್ಯ ಬಂತು. (ತದನಂತರ, ನಾವೆಲ್ಲರೂ ಭವಿಷ್ಯತ್ತಿನ ತಂತ್ರಜ್ಞಾನದ ಕುರಿತು ಚರ್ಚಿಸಿದೆವು.) ಉದಾಹರಣೆಗೆ, ಮಣ್ಣ ಅರಿವುಕದ (ಸೊಯ್ಲ್ ಸೆನ್ಸರ್) ಬಗ್ಗೆ ಮಾತಾಡದೆ ನಾವು “ಅರಿಯುವುದು ಎಂದರೇನು?” ಎಂಬ ಪ್ರಶ್ನೆಯಿಂದ ಶುರು ಮಾಡಿದೆವು. ಏನನ್ನು ಅರಿಯಬಹುದು? ಹೇಗೆ ಅರಿಯಬಹುದು? ಅರಿಯುವುದರಲ್ಲಿ ತಂತ್ರಜ್ಞಾನದ ಸ್ಥಾನ ಏನು? ಇತ್ಯಾದಿ ವಿಷಯಗಳ ಕುರಿತು ಪ್ರಶ್ನೆಗಳನ್ನೆತ್ತಿ ಅವರಿಗೆ ಭವಿಷ್ಯದ ಬಗ್ಗೆ ಯೋಜನೆ ಮಾಡಲು ಪ್ರೇರೇಪಿಸಿದೆವು. ಈ ಪುಸ್ತಕದಲ್ಲಿ ಈ ಚರ್ಚೆಗಳಿಂದ ಹುಟ್ಟಿದ ಕೆಲವು ಯೋಚನೆಗಳು, ಯೋಜನೆಗಳು ಮತ್ತು ವಿನ್ಯಾಸಗಳು ಸೇರಿವೆ.

ಭಾರತೀಯ ರೈತರ (ಅದರಲ್ಲೂ ಸಾವಯವ ರೈತರ) ಅನುಭವಗಳು ಮತ್ತು ರೀತಿನೀತಿಗಳು ನಮ್ಮನ್ನು ಸುಸ್ಥಿರ ಕೃಷಿಯ ಕಡೆ ಒಯ್ದುಕೊಂಡು ಹೋಗಬಹುದು. ಹಾಗಾಗಿ, ಅವರ ದೃಷ್ಟಿಯನ್ನು ಕಡೆಗಣಿಸದೆ ಭವಿಷ್ಯಯಕ್ಕಾಗಿ ಡಿಸೈನ್ ಮಾಡುವಾಗ ಸಕ್ರಿಯವಾಗಿ ಬಳಸಬೇಕಾಗಿದೆ. ನಾವು ನಿರೀಕ್ಷಿಸಿದಂತೆ ಭಾರತೀಯ ರೈತ ಒಬ್ಬ ಪ್ರಯೋಗಶೀಲ, ಅನುಭವಿ ಮತ್ತು ಹೊಸತನ್ನು ಅರಸುವವನು. ಹಾಗೆಯೇ, ಮಹಿಳಾ ರೈತರೂ ಏನು ಕಮ್ಮಿಯಲ್ಲ. ಪಾರಾಂಪರಿಕವಾಗಿ ಬಂದ ಎಷ್ಟೋ ನಾಟಿ ಬೀಜಗಳು ಅವರ ಶ್ರಮದಿಂದಲೇ ಉಳಿದಿವೆ. ನಿಜ ಹೇಳಬೇಕೆಂದರೆ, ವಿಜ್ಞಾನಿಗಳಿಗಿರುವ ತಾಳ್ಮೆ

ಈ ಹೆಣ್ಣುಮಕ್ಕಳಲ್ಲಿದೆ. ಮತ್ತೊಂದು ವಿಷಯವೆಂದರೆ – ಪ್ರಾಚೀನ ಕಾಲದಿಂದಲೂ ರೈತ ಒಂದು ಅವಿಭಾಜ್ಯ ಸಮಾಜದ ಅಂಗವಾಗಿದ್ದು, ಆ ಸಮಾಜದಲ್ಲಿ ಗೊಲ್ಲರು, ಕಮ್ಮಾರರು, ಇತ್ಯಾದಿ ಪಾಲುದಾರರ ಜೊತೆಗೆ ಹೊಂದುಕೊಂಡು ಬಂದಿದ್ದಾನೆ. ಈಗ, ರೈತನು ಭವಿಷ್ಯಕ್ಕಾಗಿ ಮಾಡುತ್ತಿರುವ ಡಿಸೈನ್ ಯೋಜನೆಗಳಲ್ಲಿ ಭಾಗಿಯಾಗಿ, ಅದರ ತಂತ್ರಜ್ಞಾನವನ್ನು ಮಿಕ್ಕ ಸಮಾಜದ ಒಳಿತಿಗೆ ಕಲ್ಪಿಸಬೇಕಾಗಿದೆ. ಹಳ್ಳಿಗೆ ಹಳ್ಳಿಯೇ ತಂತ್ರಜ್ಞಾನದ ಹೊಣೆಗಾರರಾಗಬೇಕಾಗಿದೆ. ಇದರಿಂದ ಮಾತ್ರ ತಂತ್ರಜ್ಞಾನದ ಅನುಕೂಲವು ಎಲ್ಲರಿಗೂ ಸಿಗುವಂತಾಗುತ್ತದೆ. ಇದು ಎಟುಕದ ಆಕಾಂಕ್ಷೆಯಾಗಿ ಕಂಡರೂ, ಭಾರತ ಮತ್ತು ಇತರ ದೇಶಗಳಲ್ಲಿ ಇಂಥ ಚರ್ಚೆ ನಡೆಯುತ್ತಿವೆ.

ಈ ಯೋಜನೆ ನಡೆಸುತ್ತಿರುವಾಗ, ನಮಗೆ ಹಲವಾರು ಕಾರ್ಯನಿಪುಣರ ಭೇಟಿಯಾಗಿ, ಅವರಲ್ಲಿ ಕೆಲವರು ನಮಗೆ ಸ್ಫೂರ್ತಿದಾತರಾದರು. ಸಾಮಾನ್ಯವಾಗಿ, ಡಿಸೈನ್ ಎಂಬುದು ಪ್ರಶ್ನೆಗೆ ಉತ್ತರ ಒದಗಿಸಲು ಮಾತ್ರ ನೋಡುತ್ತದೆ. ಆದರೆ, ಭವಿಷ್ಯವೆಂಬುದು ಸುಧಾರಿಸಬೇಕಾದಂಥದಲ್ಲ. ಡಿಸೈನ್ ಕ್ಷೇತ್ರವು ಜನರನ್ನು ಪ್ರಯೋಗಶಾಲೆಯ ಪ್ರಾಣಿಗಳಾಗಿ ಪರಿಗಣಿಸಬಾರದು. ಅವರ ಭವಿಷ್ಯದಲ್ಲಿ ಅವರನ್ನು ಪಾಲುದಾರರನ್ನಾಗಿಸಬೇಕು.

ನಾವು ಬೇರೆಬೇರೆ ಸಮುದಾಯಗಳ ಜೊತೆ ನಡೆಸಿದ ಸಂವಾದವನ್ನು ನಿರುಕಿಸಿದಾಗ, ನಮಗೆ ತಿಳಿದಿದ್ದೆಂದರೆ – ಅವರು ಹಲವಾರು ಕಷ್ಟಗಳ ಮಧ್ಯೆಯೂ ಇಟ್ಟುಕೊಂಡ ಆಸೆ. ತನಗಲ್ಲದಿದ್ದರೂ ತನ್ನ ಮಕ್ಕಳು ಮತ್ತು ಮೊಮ್ಮಕಳಿಗೋಸ್ಕರ. ಈ ಆಸೆಯೇ ನಮ್ಮ ಯೋಜನೆಗೆ ಬುನಾದಿಯಾಯಿತು. ನಾವು ಆಶಾದಾಯಕ ಭವಿಷ್ಯದ ಸಹಕರ್ತೃಗಳಾಗಿದ್ದೇವೆ ಎಂಬ ಮಾತು ನಮಗೆ ಖುಶಿ ತಂದುಕೊಟ್ಟಿತು.

ಆಸೆ ಇಟ್ಟುಕೊಳ್ಳುವುದು ಮನುಷ್ಯನ ಸ್ವಭಾವ. ಆದರೆ, ಆಸೆ ಈಡೇರಿಸುವ ಶಕ್ತಿ ಎಲ್ಲರಲ್ಲೂ ಇರುವುದಿಲ್ಲ. ಈ ಅಸಮಾನತೆಯನ್ನೇ ಡಿಸೈನ್ ಎಂಬ"ಯಂತ್ರ" ನೀಗಿಸಬಹುದು, ನೀಗಿಸಬೇಕಾಗಿದೆ. ಡಿಸೈನನ್ನು ಈ ಬಗೆಯಲ್ಲಿ ಅರ್ಥೈಸಲು ಅನೇಕ ಘರ್ಷಣೆಗಳು ಆಗದೆ ಇರುವುದಿಲ್ಲ. ಡಿಸೈನರ್ಸು, ಹಣ ಕೊಟ್ಟು ಅವರನ್ನು ಪೋಷಿಸುವವರು, ಡಿಸೈನಿನಿಂದ ಲಾಭ ಪಡೆಯಬೇಕಾದವರು – ಈ ಮೂರು ಗುಂಪುಗಳ ನಡುವಿರುವ ಭೇದಗಳನ್ನು ಅಲ್ಲಗಳೆಯುವಂತಿಲ್ಲ. ಈ ಅಸಮಾನತೆಗಳನ್ನು ಕಣ್ಮುಂದೆ ಇಟ್ಟುಕೊಂಡೇ ಜನರ ಬೇಕುಬೇಡಗಳಿಗೆ ಸ್ಪಂದಿಸಬೇಕು. ಡಿಸೈನರುಗಳೇ ಎಲ್ಲಕ್ಕೂ ಉತ್ತರ ಕೊಡುವುದಕ್ಕಿಂತ, ಜನರಿಗೆ ಬೇರೆಬೇರೆ ಸಾಧ್ಯತೆಗಳನ್ನು ತೋರಿಸಿ ಪ್ರತಿಕ್ರಿಯೆ ಪಡೆಯುವುದು ಒಳ್ಳೆಯದು. ಹಾಗೆ ಮಾಡಿದಾಗ, ತಂತ್ರಜ್ಞಾನಕ್ಕೆ ಒಂದು ಸ್ಥಳೀಯ ಸ್ಪರ್ಶ ಒದಗಿ ಜನರಿಗೆ ಆತ್ಮೀಯವಾಗುತ್ತದೆ.

ಆಸೆ ಭವಿಷ್ಯವನ್ನು ಉತ್ತಮವಾಗಿಸಬಹುದೆಂದು ಗುರುತಿಸುತ್ತದೆ. ಹಾಗಾಗಿ, ಭವಿಷ್ಯದ ಕಟ್ಟಡಕ್ಕೆ ಆಸೆಯೇ ತಳಪಾಯ. ಆ ಆಸೆಗೆ ಸ್ಥಳೀಯತೆ ಮತ್ತು ಜನರ ಅನುಭವಗಳೇ ಬೇರುಗಳು. ಆದರೆ, ಆಸೆ ಯಾವತ್ತೂ ಎಟುಕದ ಚಂದ್ರನಂತಿರದೆ, ಕೈಗೆ ಸಿಗುವ ಹಣ್ಣಾಗಿರಬೇಕು. ಬೀಜ ಬಿತ್ತುವುದು ಸಸಿ ಮೊಳೆಯುತ್ತದೆ ಎಂಬ ಭರವಸೆಯಿಂದ. ಅಂತೆಯೇ, ನಮ್ಮೀ ಯೋಜನೆ ಉತ್ತಮ ಭವಿಷ್ಯದೆಡೆಗೆ ಇಟ್ಟ ಮೊದಲ ಭರವಸೆಯ ಹೆಜ್ಜೆಗಳು.

A farmer holding a sapling in Bhovipalya village outside Bangalore, Karnataka

Design for hopeful futures

On 1 January 2016, the United Nations' 17 Sustainable Development Goals, or SDGs, officially came into force. Their aim is simple - to ensure that "no one will be left behind" and to "endeavour to reach the furthest behind first". Simple, as any Indian farmer will tell you, does not mean easy. The work detailed in this book was funded by the Global Challenges Research Fund (GCRF) and the Scottish Funding Council. GCRF is the UK's funding scheme aimed at applying cutting-edge research to the complex challenges facing all countries in responding to the SDGs. As researchers with a long history of exploring the opportunities and challenges posed by emerging digital technologies, we were struck by the discord between the aims of the SDGs and the ways in which major technology companies such as Google, Apple, Facebook and Amazon have developed business models that extract value from the billions of people that use them while directing economic rewards to a small elite. Ironically, these elite are the very people with the capacity to enable the kind of changes needed to address the SDGs.

Decentralising Digital, or DeDi, was our response to this discord: a two year long collaboration between the University of Dundee and the Indian design research agency, Quicksand, that explored the contours of a future in which digital technologies are inspired and informed by local contexts and considerations. These hopeful futures present a sharp contrast to the way most digital technologies are being imagined, designed and manufactured presently and raises questions about the purpose of innovation and the ways in which we measure and create value.

Today, in countries like India, technology is often imposed upon people whose needs were never actively considered by the designers of those technologies. This technological imposition, which the state machinery often touts as the panacea for every intractable social problem, is invariably accompanied by buzzwords such as 'transparency' and 'efficiency'. "If only agriculture in India could be made more transparent and efficient" goes the common refrain, not just among elected representatives but also among bureaucrats, technologists, retailers, suppliers, and others. In our research, working with small and marginal farmers, we found these claims of increased transparency and efficiency to be tenuous at best; more importantly, our efforts showed us that these technologies are often disconnected from the realities and aspirations of the people forced to adopt them. A small scale organic farmer can make little sense of the excel sheets and forms that need to be filled on her behalf to keep track of her farm's 'inputs and outputs'. Similarly, an indigenous coffee grower is unlikely to understand Blockchain technologies being explored to ensure the 'authenticity' of his produce. In such situations, enforcing the adoption of technologies among people – who have little to no understanding of their workings, purpose or efficacy and, who, more concerningly, have had no

opportunity to engage in the planning, design, implementation and development of such technologies – simply creates a new class of marginalised people whose agency is severely curtailed.

To be unfamiliar with technology can also often mean that one has no avenue to engage in modern creative processes. As most sectors, ranging from agriculture to conservation and from water management to education, adopt digital technologies, those unfamiliar with these technologies cannot participate in imagining a future for themselves or the sector. Not only are existing digital technologies not designed with them in mind, they are also permanently shut out of any design process that can contextualise these technologies with and for them. This means that in many cases individuals and communities that have a deep experience and connection with a practice cannot become a part of imagining its future. For example, in India many small-scale farmers with generations of practical knowledge around farming cannot (and will not) be consulted or included in co-creative processes that seek to address the multitude of challenges that Indian agriculture is facing today. Similarly, indigenous people who have coexisted with forests from the beginning and have unique, valuable perspectives on conservation are not allowed to participate in imagining conservation in the future. It is true that small scale farmers and indigenous people were rarely consulted even before the arrival of digital technology – but, rather alarmingly, digital technologies as they are today and as they might be in the future (if the current trajectory is not changed), preclude the involvement of these people in imagining, creating and maintaining a more hopeful future for themselves. Unfamiliarity with these technologies can also allow for the extraction of valuable data from marginalised populations, (like small-scale farmers or indigenous people) with impunity and with no compensation to its providers. For example, as precision agriculture is adopted more widely in the future, one of its promises is to accumulate data from farmlands across the world, thereby improving its ability to predict and guide. Unfortunately, a future where the data of small-scale farming communities is ruthlessly appropriated by multinational corporations is not hard to imagine in India.

Our effort was to engage a small selection of such small-scale communities through some key partners in rural South India. We interacted with a number of farming communities and some Soliga members to engage them in a creative process – that of re-imagining digital technologies not as something imposed on them but as an open-ended platform to build tools and systems that align with their vision for a hopeful future. This was a challenging exercise, not least because it meant breaking down the complex structures of modern technology into its components in order to better explain it to those unfamiliar with it. The members of the community were invited to put together these pieces in ways that were intuitive and meaningful.

The research team in the field with farmers in Magadi, Karnataka

Sensing workshop with the community in IruWay farm in Tumkur, Karnataka

For example, instead of engaging with a soil sensor, we chose to engage with the idea of sensing itself; and nudged our participants to think of what could be sensed, what should be sensed, and how technological systems and protocols could be imagined around their vision of a digital future. This book illustrates a number of concepts, ideas and design briefs that we evolved with our partners and the communities we worked with.

The project ran for two years and followed a set of participatory research methods (including design research, interviews and workshops) and a research-through-design approach that used design artefacts and products to conduct research. The results show up in various ways all through this book. Reflections from our partners offer rich insights into peoples' lives, livelihoods, environments as well as the project approach. Illustrated comics depict hopeful decentralised digital futures; they are supplemented by speculative artefacts that provide more details about these futures. Together, they demonstrate an increased respect for and a recognition of the value of biodiversity, indigenous knowledge, and local ways of making. A range of different responses from Indian artists, crafts people, designers and writers present an expansion of these hopeful future stories. We hope that this book brings to life our research with our community partners. This includes our learnings about ecological and nutritional approaches to farming, indigenous ways of sustainable living with the forests, and our understanding of how rural and decentralised technology practices that engage thoughtfully and respectfully with marginalised communities can enable them to articulate their own stories. These point us towards a future that already exists, in distributed and localised forms of development, with extraordinarily resilient ecosystems that are safe, efficient and powerful. All told, these provide a sustainable blueprint for how we might engage differently with technology and artificial intelligence. And invariably this would be anchored in decentralised design and manufacturing. For us, these are pathways to a future that is more hopeful, sustainable, ethical and inclusive.

The agricultural sector in India is in deep trouble. The backbone of this sector, the small-scale, independent Indian farmer, is finding it increasingly unviable to remain in agriculture. Decades of focus on increasing productivity – which has only accelerated in recent years – has left large parts of India barren: hardly anything of value can be extracted from the soil anymore. Organic farmers, who are leading sustainable farming movements across the country, rarely get the value they should from markets as middle men continue to proliferate. The conservation of forests and forest-based sustainable commerce are both under threat. Conservation policy in India today involves the voluntary and involuntary eviction of indigenous people from the forest, while large swathes of India's forests are increasingly absorbed by the agricultural, mining, and tourism industries among others. Sustainable agriculture

and foraging are promoted in many areas, but with insufficient consideration to local biodiversity. In any case, these activities rarely provide a way out of abject poverty for the many indigenous peoples of India.

For many farming communities, organic or natural farming is a way out of the crises facing Indian agriculture. Natural farming in India has deep roots and farmers don't see the switch from chemical farming to natural farming as a big transformation. For them, it is a return to more traditional farming; which, unlike in much of the developed world, is not a lost memory but a practice that has fallen into disuse. We learned that many farmers and farming communities are acutely aware of the changing climate, the degradation of their soil and the loss in biodiversity that has accompanied modern farming.

Farming collectives, often led by proto-democratic governance bodies are crucial entities that allow farmers to collectivise and address their environmental, financial and legal concerns in more focussed ways. Organic farming collectives, like the ones we interacted with through the course of our research in South India, are at the forefront of agro-ecological approaches to farming. They are concerned with the equity, dignity, and financial sustainability of farmers. They are also concerned with preserving biodiversity and soil health in the face of climate change. In our interactions with these organisations, what was striking was their holistic approach to tackling the plethora of crises facing Indian farming in particular and rural society in general. These collectives can be, and in many situations already are, powerful platforms towards the proliferation of sustainable agriculture in India. Given the rapid growth of industrialised farming, such collectives may quickly become one of the few viable pathways towards adapting to climate change and ensuring the survival of small-scale Indian farmers.

While many farmers and farming collectives have bet on natural farming, the state is betting very heavily on technology. For the central government as well as many state governments, ubiquitous digitisation has become the panacea for India's agricultural woes. This digitisation is happening via highly centralised technologies that do not collaborate with the farmers at all. Increasingly, technological systems are being imposed on farmers; who have no choice but to work within them as the consequences of opting out are usually severe. One organic collective that we visited had to maintain tedious digital records to receive an 'organic certification' from the government. For the farmers themselves, who don't understand this kind of record-keeping, there is no way of meaningfully engaging with this technology. The collectives buffer the farmer by maintaining data-entry staff whose sole job is to input the farmers' assessment of their activities (which is usually roughly recorded data) into a centralised system. A visit to these collectives quickly convinces one of the futility of this exercise, which is completely incomprehensible to those

A flycatcher in a farm in Belgaum, Karnataka

Lentil seeds being sown after the rains in a natural farming process in Magadi, Karnataka

people (the farmers) to whom it matters most. On the other hand, the deep experience of the farmers, their ability to understand the health of their soil, and their care and consideration for the preservation of biodiversity is largely ignored by the state – which remains stubbornly convinced that the answer to everything lies in 'development' through technology. We also spoke to several people belonging to the Soliga tribe in Karnataka, who nurture a deep connection with the forest. As small-scale coffee growers living on the edge of the forest, they are in the crosshairs when it comes to the imposition of technology. For example, Blockchain technology is being seen as a silver bullet to establish the authenticity of their produce. These technologies make little sense to the Soliga farmers – not simply because they are not trained to understand it but also as a conceptual idea in itself. In other words, neither the operations nor the objectives of a Blockchain resonate with the Soliga farmers. And yet, it is not an exaggeration to say that in a few years, their livelihoods may depend on adopting technologies such as Blockchain.

A crucial challenge with these technologies is that they have not been designed with the Indian farmer or the Indian farming context in mind. These include both manual record keeping, data collection and entry (for example, a daily record of what the farmer put in his/her soil) to more modern technologies - moisture sensors, automated irrigation and big data analysis. They have not been imagined in collaboration with the farmers, who are the experts in the field, and are largely disconnected from their hopes and aspirations.

Another challenge with these technologies is their centralising tendencies. Valuable farming data that should, by all accounts belong to the farmer, is fed into government or privately owned databases for essentially no cost. Once the farmers opt into this regime, (and they often have little choice), they lose all control over their data. This is even more true for sensor-based regimes, which automate collection and storage. It would seem that no other ownership model has even been explored. This again points to a design and development process that totally excludes farmers and, in turn, restricts progress towards the goal of more sustainable farming.

The experience and values of Indian farmers, especially organic and natural farmers, can drive innovations towards sustainable agriculture. Their perspective, instead of being ignored, should be actively sought within any kind of design process that informs future technologies. We learnt that Indian farmers are, unsurprisingly, experimental and innovative besides being huge storehouses of experiential knowledge. Women farmers have long been experts at preserving heirloom seeds that have adapted to local conditions and are resistant to drought and pests. Like scientists, these women are also incredibly patient. Indian farmers are also surrounded by a vibrant community who have traditionally played their part in the agriculture ecosystem - from the local blacksmiths to the water stewards and nomadic cattle rearers.

Given all this, it is not difficult to see that a desirable future is one where farmers are part of the design process, where they engage with technology and mould it to meet their needs and visions, and where the larger community of the village too plays a role in the design, manufacture, and maintenance of the technology. Once these technology systems reflect the values and experiences of the Indian farmers, our bet is that they will be by nature more sustainable and inclusive. This might appear out of reach today, but small steps being taken across the world and in India are moving the conversation in the right direction.

Our aim was to enable and support marginalised communities like small-scale farmers and Soliga coffee-growers to express their own vision regarding more inclusive technology-based futures. Through the course of this engagement, we met a number of individuals who are at the heart of these efforts and our work has been both inspired by and is a testament to their stories and practices.

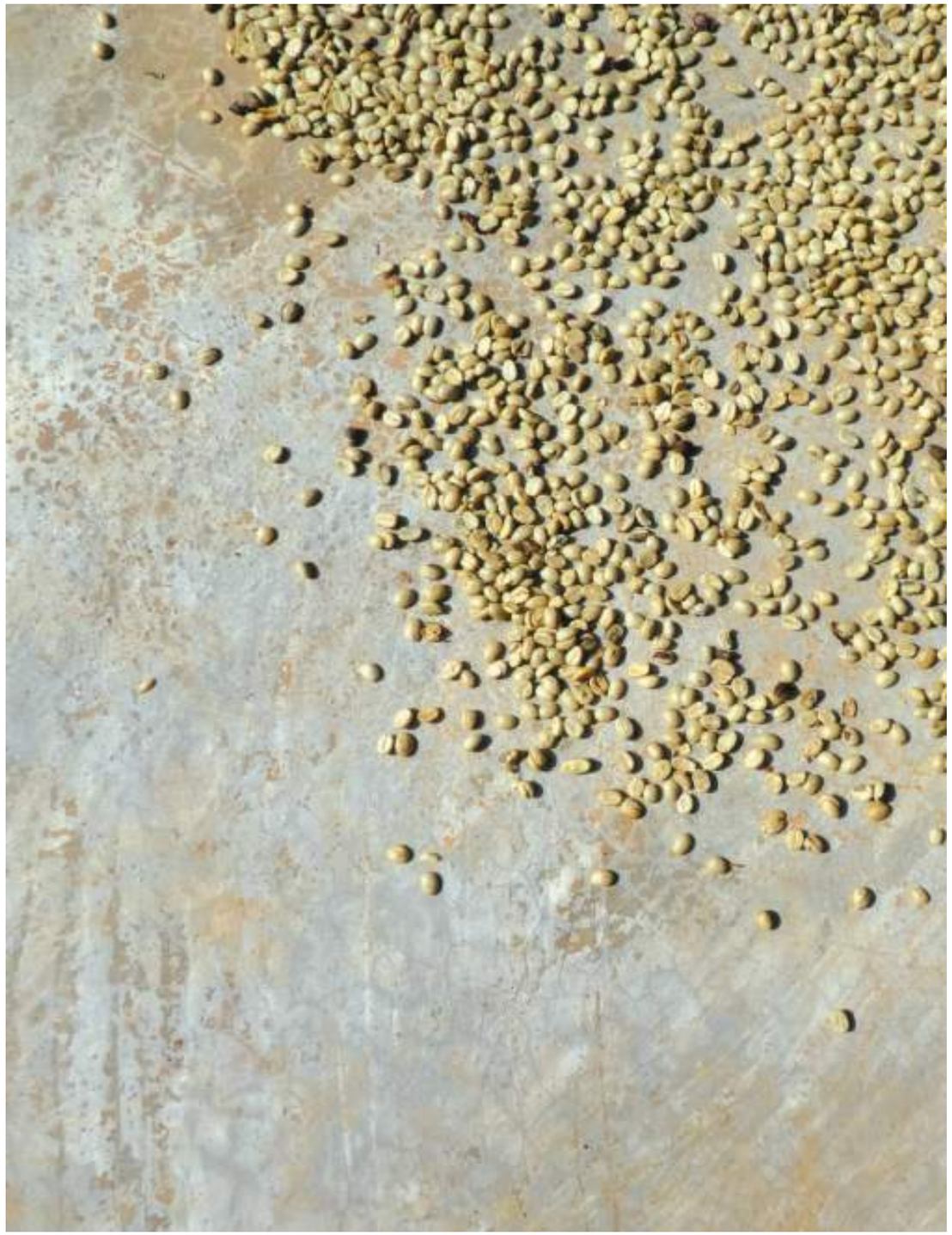
As we have highlighted, the exclusion of such communities from meaningful discourse around design and technology leaves them struggling to work with modern technology. Including them in the discourse was, for us, the central challenge of the project.

To address some of these challenges, we partnered with organisations that have worked with these marginalised communities for decades, helping them empower and represent themselves. Our work with these partners was critical to the project. The organisations we worked with include Buffalo Back Collective, Black Baza Coffee and Janastu, all of whom have established strong links with rural communities, especially those in Karnataka. The work of these organisations is embedded in these communities and their work with them tackles complex issues like sustainable small-scale farming, issues of certification and peer support, livelihoods, access to markets, biodiversity, and inclusive technology tools. Through all this, an emphasis is placed on the values of justice, respect, and co-creation. Our relationship with our partners ensured that we were situating our work in appropriate and respectful ways; ways that allowed us to ask the right questions while engaging these communities equitably. Their guidance through the course of our project was vital and helped us work with communities to build relevant and meaningful future narratives.

At the heart of our engagement was the idea that design could be used as a tool to enable people to imagine and articulate their hopes for the future. Formally articulated or not, the future is, and has always been, a core strand in the DNA of design. It wraps around the processes and outcomes of design, a philosophy that could perhaps best be summarised as the belief that a better lived experience is achievable.

Yet we know that, for the most part, this aspect of design is an illusion. Since the Industrial Revolution, critics have highlighted design's complicity in unbridled economic growth and the

Pulping to remove the skin from harvested coffee beans in BR Hills



Soliga producers drying coffee in BR Hills

concomitant destruction of the natural world, but their critiques also contained a proposal: that if design was the cause of the problem then design could (and should) also be a solution to the problem. This warning bell from the past has never rung so loud as it is ringing right now and it behooves us to pay heed, especially in light of the colossal growth of technology industries and their complicity in putting the gains of the few over the good of the many.

Under the auspices of innovation and usability, big tech has employed 'user-centred' design with incredible precision to remove the user from an understanding of the inner workings of the machine. The contrast between the ease of setting up a new phone and the complexity of understanding its terms and conditions reveals where and why such design is employed and in whose interests these decisions serve. This is as true at a product level as it is at a global level. 'Designed in California, Made in China' is an unambiguous presentation of today's truth. Futures designed in California and made in China.

The unprecedented dominance of big tech has created new narratives around scale, reach, and security that reinforce the status quo and smother disruptive and equitable innovation. These narratives suggest they are too big to fail, too established to replace, too data-rich to be challenged, and that we need to trust them to continue the job they have started. However, the ongoing success of this narrative will result in the colonisation of everyone's digital futures.

Digital colonialism is not just an established narrative, it is a lived experience across the world. We need to challenge this by providing new narratives that are based on the behaviours, lifestyles, needs and hopes of the multitude of people; and not just the desires and greed of a few. In doing so, we can begin to imagine better alternatives. The future is not a destination on a predetermined line (drawn between now and then), but instead a canvas for the creation of myriad possibilities that start from the present and ripple out in a hundred directions. There are many futures. It is within this richness that we must tell our own stories and forge new paths towards futures we envision for ourselves.

When unshackled from the pursuit of economic growth, the tools of design – built on the promise of providing better lived experiences – can be used to articulate these 'alternate' futures and enable their creation by connecting the 'dreamer' with the 'enabler'. Design's role will then become as much about working with people to tell their own stories as it will be about enabling those with power to hear, understand and ultimately bring these stories to life .

This approach is different from the typical and traditional mode of design as an activity that identifies problems and provides solutions. But the future is not a problem waiting to be fixed; we need to think beyond problematising and solutionism. Designers need to rethink their relationship with those they design with and for, as there is a tendency in this problem-solving space to see people in an overly scientific way where humans are subjects

and the future is an object; the two meet and things are solved. And design itself needs to be reframed as a partnership where people's participation (as equals and not subjects) is both solicited and welcomed.

Throughout this project, our approach was conversational and open-ended, concluding in a series of connected ideas, or building blocks, that form an evolving narrative. It was important to us that each of these blocks resonated with the people whose lives the stories were centred on. To do this required us to be more empathetic and work collaboratively and in partnership with the people of the community. It was a learning journey for everyone involved. There was no real right or wrong in this process, only a sense of resonance between people, their lives, and a sense of what their future(s) might hold. It was here that we needed to recognise and challenge the traditional asymmetrical power relationship between 'designer' and 'user'. Rather than being detached observers or commentators on peoples' futures - or worse, sole determiners of others' futures - we sought a more equitable relationship in which we acted as partners, advocates and allies to the communities we worked with. This gave agency to the people of the community and helped them become the 'designers' of their own futures.

Design can help people imagine new building blocks that act as the foundations for stories that give people the chance to consider and evaluate alternative futures to allow them to determine what feels right. Once a pathway to a new reality is created and tested, what remains is 'working backwards' from this future to establish and enable the things needed to make these futures a reality. Looked at this way, design has the power to put the future into the hands of anyone with a story to tell.

Speculative design offers a framework for telling these stories. It has become common to contextualise speculative design by referring to a 'Futures Cone', wherein futures are categorised as: possible, plausible, probable, and preferable. Much speculative design exists in the realm of the 'preferable'. Whilst this terminology works at a practitioner-level and provides a useful framework to position pieces of speculative design, when we started to think about how we would explain the idea to people who hadn't been exposed to it previously, such as our partners and communities, we realised it could be problematic. The idea of a 'preferable' future suddenly seemed both removed from a community's lived experience(s) and not ambitious enough in its scope. When we reflected on our conversations with farmers and indigenous people, we realised that whilst they often reflected hardship, they also reflected hope; most typically, hope for future generations, for their children and their grandchildren. This hope became an anchor for the project, a way to create a mutual understanding of what we hoped to achieve and why. We recognised that we were co-designing for hopeful futures.

To hope is to be human. But the power to realise hope is not evenly distributed. Design can and should be deployed to redress this imbalance. Of course, there are many tensions in framing design in this way. Tensions that exist because of the uneven distribution of power in partnerships involving designers, community organisations, and the people they are working with. Which is why it is important to recognise that there is no right answer here. The right approach would be to acknowledge these differences and attempt to find bespoke approaches best suited to the people and their context. In this project, we found that making abstract objects and interactions that suggested pathways towards hopeful futures (without explicitly providing solutions) was a powerful way to initiate conversations. The use of local materials and customs served to ground these technological suggestions in familiar territory.

Hope is grounded in reality; it recognises that things are not and may never be perfect, but that they could be better. Hope is the ground on which the building blocks of the future must be placed. Hope that is culturally specific, rooted in personal lived experiences and real lives. Hope that is actionable and realisable. Perhaps we have fallen into the trap of trying to fix problems. Speculative Design has successfully and thankfully moved design beyond 'solutionism' and into the realm of provocation, discussion and debate, but what is hope without a belief that it might be achieved? When people's lives and livelihoods are at stake, design has to aspire for something better. Just as planting seeds is an act of hope, the design approach of this project seeks to kickstart a journey towards hopeful futures for ourselves, our partners, and the communities we worked with. It is only a beginning.

Our timeline

The project ran from 2018 to 2021, with our teams working in India and Scotland. Much of the time, we worked in parallel; coming together (in person) at key points. We followed an iterative design approach that began with ethnographic fieldwork and workshops to understand and contextualise current practices and gain insights. These insights were used to frame briefs, which shaped our responses. These responses (usually design prototypes but sometimes narratives and stories), were then used in a second round of interviews and workshops to gain new insights. A further round of prototypes and stories were created, shared, and discussed before we made the ones you see in this book.

Our understanding, our methods, and our approach were naturally shaped by the world around us. Specific instances include: Apple becoming the first trillion dollar company (autumn 2018), the Indian supreme court ordering the eviction of one million forest-dwelling people (spring 2019), the Hong Kong democracy protests (summer 2019), the Black Lives Matter protests (summer 2020), and the Indian Farmers' protests (autumn 2020). However, the Covid-19 pandemic had a more direct effect than any other. At the start of 2020, we lost the ability to meet in person; to access tools, workshops and materials; and to work with our partners and their communities as we had been doing until then. The impact was profound and demanded a change in approach.

Our plan to create a series of functional, physical artefacts, co-created with participants, was replaced by a plan that focussed on developing hand-drawn illustrations and stories of those artefacts. While this approach has made it impossible to hold and interact with the objects, it has lent them a simplicity, perhaps making them more approachable and giving others a chance to project their understanding and hopes on to the artefacts and stories. We also used the opportunity to invite responses to these stories and artefacts from artists, illustrators, craftspeople and designers living and working in India. We believe these choices have strengthened the project creating a nuanced set of responses tempered by the unique conditions created by the global lockdown.

This timeline reflects the research through design process that took place between 2018 and 2020, which informed the development of the work we have included in this book.

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It's not a data problem, it's a story problem.

Nishant Srinivasaiah

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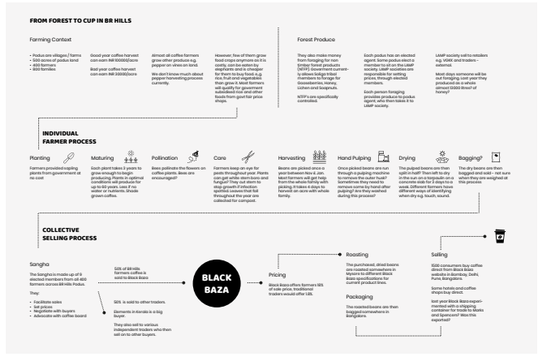
The customers refuse to buy unpolished ragi as it is not shiny. After the rains the ragi gets a little darker and sorted as a lower quality ragi.

Muniyappya



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November 2018 · January 2019

1. Our visit to Soliga coffee growers working with Black Baza in BR Hills.
2. Meeting with small holding natural farmers around Bangalore working with Buffalo Back Collective.
3. Quicksand research with small farmers across Karnataka and Andhra Pradesh to establish a baseline around small scale farming in the region.
4. University of Dundee Field notes from BR Hills.
5. Insights into the current state of biodiversity from a conversation with Achugegowda, the first Soliga coffee producer in BR Hills.
6. Our meeting with local craftspeople and technologists at the IruWay Rural Research Lab.
7. 'From Forest to Cup' initial research analysis of Soliga coffee growing.
8. School Radio setup at Namma Halli Radio at IruWay Rural Research Lab.
9. Harvest of radish from a small organic farm in Magadi.
10. Traditional method of ploughing and sowing lentils after the rains in Magadi.

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How can communities trust technology, especially when it seeks to replace old, trusted systems grounded in lived experiences.

Nishant Srinivasaiah

There is immense power in jointly imagining the future with communities.

Vishwanath Srikantaiah

February 2019 · May 2019

1. Quicksand hosts 330 designers, artists, technologists and researchers at the 2019 UnBox Festival in Bangalore.
2. TB Dinesh, Helava Hanumanthappa and Kadirappa, and Neelkantha Mama, a nomadic sheep herder from Karnataka, discuss storytelling at UnBox.
3. Printout from our biometrics workshop at UnBox which explored issues around privacy and data.
4. Workshops with farming collectives exploring hopeful futures, including peer certification systems.
5. Our Gaming the Future workshop used Situation Lab's card game to imagine speculative futures.
6. Participant drawing from Food Systems workshop with Buffalo Back at UnBox, which sought to inspire new ideas around food, farming and consumers.
7. Excerpt from prototype comic illustrating new technology narratives for nomadic shepherds.
8. Excerpt from prototype comic exploring new technology narratives around voice AI, biodiversity and Soliga identity.
9. Original sketch for a prototype set of scales that measure different forms of value, such as environmental, social and cultural impact.

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We have tried to talk to both consumers and producers about sharing stories... but whose responsibility is it... should the onus be only on the farmers?

Arshiya Bose

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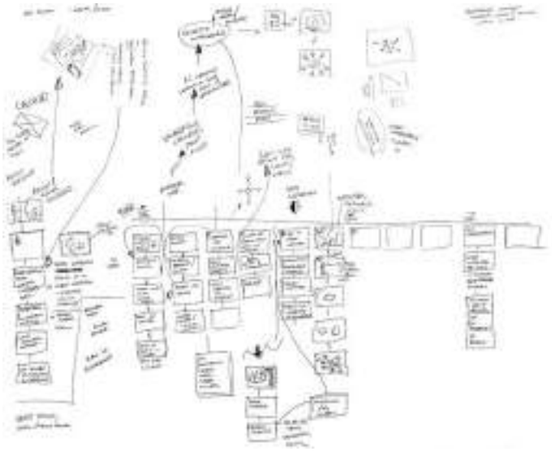

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These insights were not fabricated in the comfortable confines of studios but were generated while knee deep in the field.

Sahil Thappa

June 2019 · December 2019

1. Prototypes of digital farm tools exploring human scale sensing on small farms.
2. Sketch of modular digital farm tools.
3. Workshop exploring hopeful futures at the Sustainable Development through Design Symposium in Dundee.
4. Testing printing to explore empathy, solidarity and sharing beyond the screen.
5. Prototype of scales that measure and communicate different forms of value such as environmental, social and cultural impact.
6. Crafters at IruWay Farm experimenting with ColourWell, a prototype to prompt discussion about how biodiversity data could be measured at a local level.
7. Exploring audible interactions with craftspeople at IruWay.
8. Alternate audible interactions prototype.
9. Developing future scenarios guided by prototyping with communities.
10. Farmers discussing the idea of Slow AI packaging that combines farmers' tales, recipes, and environmental data.

When we first envisioned this project, we knew that we needed to find new ways to communicate our work (and what it is we were doing) that would resonate with the communities we were working with. Whilst the medium of film has often been used to communicate various utopias, dystopias and design speculations, it did not seem to us that it was the right medium for these conversations. We needed an approach that offered some ambiguity and invited critique – a rudimentary sketch (of the future) rather than something too resolved or complete; an approach that allowed for multiple 'next steps' instead of a 'The End'. Halfway through the project, we tentatively explored the idea of illustrated stories as a means to present sketches or glimpses of possible futures. This approach resonated with our partners and friends, many of whom particularly liked the way these illustrated stories highlighted and celebrated the experiences of the communities we were working with.

All through the second half of the project, we refined the themes underlying the stories we wanted to tell, eventually creating three comics – each of which expanded on and contextualised the artefacts we had imagined together. While we had originally intended to gather feedback from farmers and the Soliga communities, the global lockdown prevented this kind of face-to-face work. The next step is to share these comics with our partners and the communities they work with. By inviting them to reflect on and improve these stories, we hope to highlight alternative stories, envision different futures, and create new artefacts that will form the basis for continued design research.

Future of Food

This story is set in 2035, with consumers who are connected intimately to robust, small, sustainable farms of their 'family farmers'. It traces the various steps that were taken over time to build healthier farming ecosystems, nutritious local food, prosperity for small organic farmers, and how localised technology innovations enabled farmers to drive this change.

In the distant past of our ancestors...

...food was locally produced and had high nutrition, but this changed over time...

...A succession of governments fostered a highly industrialised approach to farming that came close to wiping out nutritional and diverse foods from India for good

But from 2025, new decentralised digital devices began to be built in villages...

...helping people to better understand the food they were growing, buying, and eating...such as scales that weighed up not just the economic value of the produce but also its social, nutritional, environmental and cultural value.

NAMMA ELECTRONIC HOSPITAL

FARMLAB

In 2030 - local farming labs emerged, enabling new forms of IoT, which farmers could experiment with to improve their organic farming practices. These labs also provided ways to locally test different methods and build new ways to measure the quality of these crops...

...By 2035, national certification schemes finally gave up their centralized mechanisms. The labs are now much more effective in gaining people's trust and delivering better food quality attuned to local needs and tastes...

Packaging in shops with stories about the food - where it is grown and who grew it, environmental conditions, biodiversity indicators. More than just a certification stamp!

Let us get some food, shall we?

FARMERS FAIR 2035

It's such a privilege to have a millet rich meal...

...considering that back in 2021, we had lost most of our local millet varieties

Farmers had to struggle a lot to bring back all these millet variants...

...Crop standardization made farming vulnerable to climate change

Ragi

Castor

Averaki

Indigenous millets and other heritage seeds

Water Bed Map

Factors like water depletion, global warming, resource exploitation...

Over Exploited | Saline | Semi-Critical | Critical | Safe

...soil degradation and irregular weather patterns almost pushed these crops to extinction...

...We have spent 10 years preserving, experimenting and growing a variety of heritage millet variants. Let me show you our lab...

We experimented with several varieties of millets - varieties that are resilient against unpredictable weather patterns...

...Identifying and growing a diverse range of millets with other companion crops, rather than a mono-culture approach, helped in crop revival...

...Farmers like Narasimha and his daughter Usha were critical in setting up and working with the FarmLab system and helping to spread it across villages

Varied millets

Maybe our farm scientist Raghu can tell us more...

These experiments have been successful because of multiple reasons...

...like seed preservation and sharing

Cattle rearing best practices

Experimental technologies to support farmers

Peer certification

Environmentally good practices

...and much more.

From our learnings, we published the "Future Farming Toolkit", and provided mail order kits for the farmers...

Future Farming Toolkit

Farm boxes of local produce from "family farmers" are now delivered to homes...

Use of natural fertilisers to avoid pest resistance and other chemical side effects...

Farmers decide what data to share and with whom...giving them full control over their data...

We hope that our learnings can inform future crop restoration and food security...

...Losing culturally and ecologically rich crops like millets would have cost us dearly, including the loss of our diverse food history

Millet upma

Millet chakli

Millet stew

Millet idli

Millet porridge

Millet dosa

...and so many other varieties!

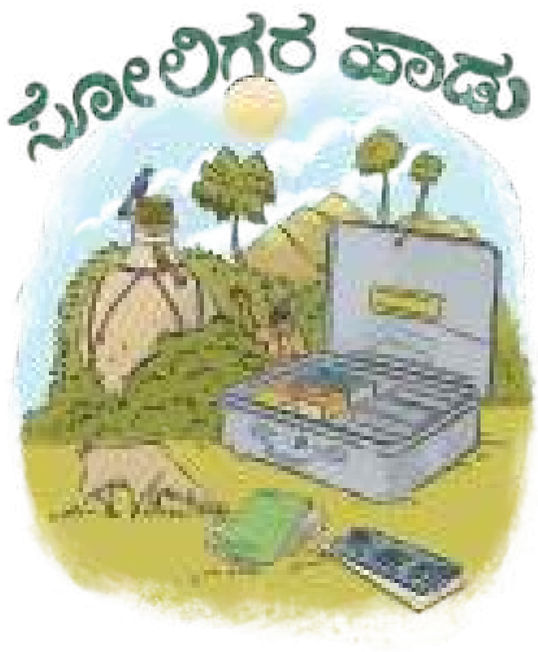
The connection between farmers and consumers is stronger now. Food packaging serves to make this connection better on a daily basis...

...Healthier and climate change resilient farms, happier farmers, sustainable certification, better resource management have all led to sustained profits for the farmers...

...Using better energy sources like Biogas...

...Climate change resilient crops...

...Resulting prosperity of the farmers, and thus, prosperity of the country.



Story of Soligas

This story is set in 2050 at a conservation conference where Soliga researchers are presenting their deep knowledge of the forest via songs. It traces the journey that a researcher begins in 2020, working with the Soligas to understand their ways, using technology over time to enhance this knowledge and incorporating it in conservation policies.

ಅಚ್ಚುಗೆಗೌಡ್ರೆ, ನಿಮ್ಮ ಸಹಾಯಕ್ಕಾಗಿ ಧನ್ಯವಾದ. ನಿಮ್ಮಿಂದ ಕಾಡಿನ ರೀತಿಗಳ ಬಗ್ಗೆ ತಿಳಿದು ಎಲ್ಲರೊಡನೆ ಹಂಚಿಕೊಳ್ಳುವ ಆಸೆ.

ಖಂಡಿತಾ! ಆದ್ರೆ, ಬರ್ತಾ ಬರ್ತಾ ಕಾಡು ಎಷ್ಟೋ ಬದ್ಲಾಗಿ ನಮ್ಗೆ ದುಃಖವಾಗುತ್ತದೆ.

ಗೌಡ್ರು ನಾಗಮ್ಮ ಅವರನ್ನು ಕಾಡಿನ ಮೂಲಕ ಸುಮಾರು ಸಾರಿ ಕರೆದುಕೊಂಡು ಹೋಗುತ್ತಾರೆ. ನಡೆಯುತ್ತಾ ಸೋಲಿಗರ ಹಾಡನ್ನು ಹಾಡುತ್ತಾರೆ.

ಈ ಹಾಡುಗಳಲ್ಲಿ ಕಾಡಿನ ಬಗ್ಗೆ ಬಹಳಷ್ಟು ಜ್ಞಾನ ಅಡಗಿದೆ. ಮರಗಳನ್ನು ಹೇಗೆ "ನೋಡ"ಬಹುದು ಮತ್ತು "ಕೇಳ"ಬಹುದು ಅಂತ ತಿಳಿಸುತ್ತಾರೆ.

ಸೋಲಿಗರು ಮರಗಿಡಗಳು, ಪ್ರಾಣಿಗಳು ಮತ್ತು ಅವುಗಳ ಆಹಾರ ಎಲ್ಲ ನೋಡಿ ಕಾಡಿನ ಆರೋಗ್ಯವನ್ನುತೀರ್ಮಾನಿಸುತ್ತಾರೆ.

ನಾಗಮ್ಮನವರಿಗೆ ತಮ್ಮ ವೈಜ್ಞಾನಿಕ ದೃಷ್ಟಿ ಮತ್ತು ಸೋಲಿಗರ ಪ್ರಾಕೃತಿಕ ದೃಷ್ಟಿ ನಡುವೆ ವ್ಯತ್ಯಾಸ ಎದ್ದು ಕಾಣುತ್ತದೆ

ಎರಡೂ ದೃಷ್ಟಿಗಳು ಒಂದನ್ನೊಂದು ಪೋಷಿಸಿ ಪೂರಕವಾಗಬಹುದು

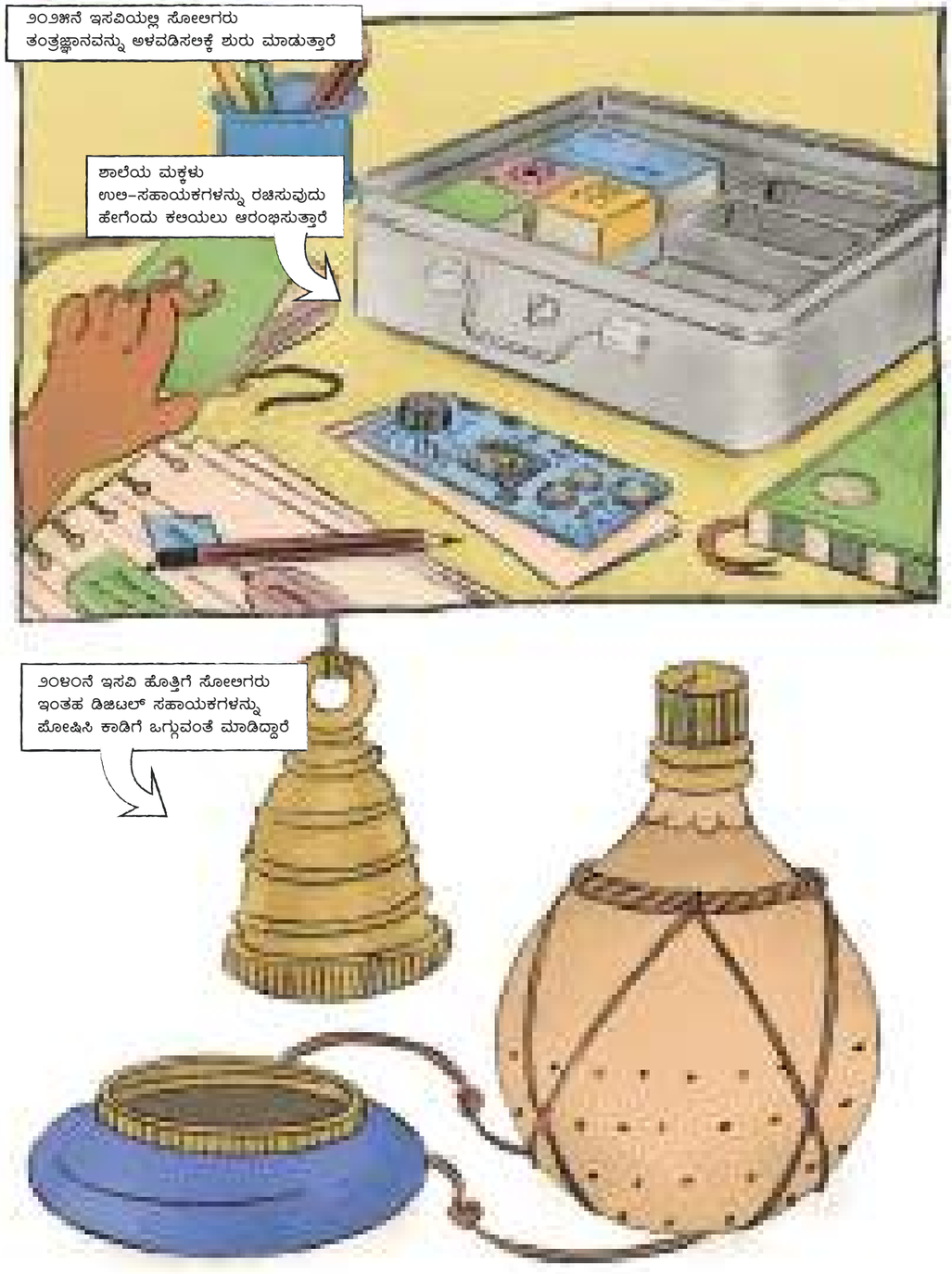
ಪ್ರಕೃತಿಯ ನೋಡಿ ಮಳೆ ಮತ್ತು ಹವಾಮಾನ ಬಗ್ಗೆ ಕಣಿ ಹೇಳುವುದು

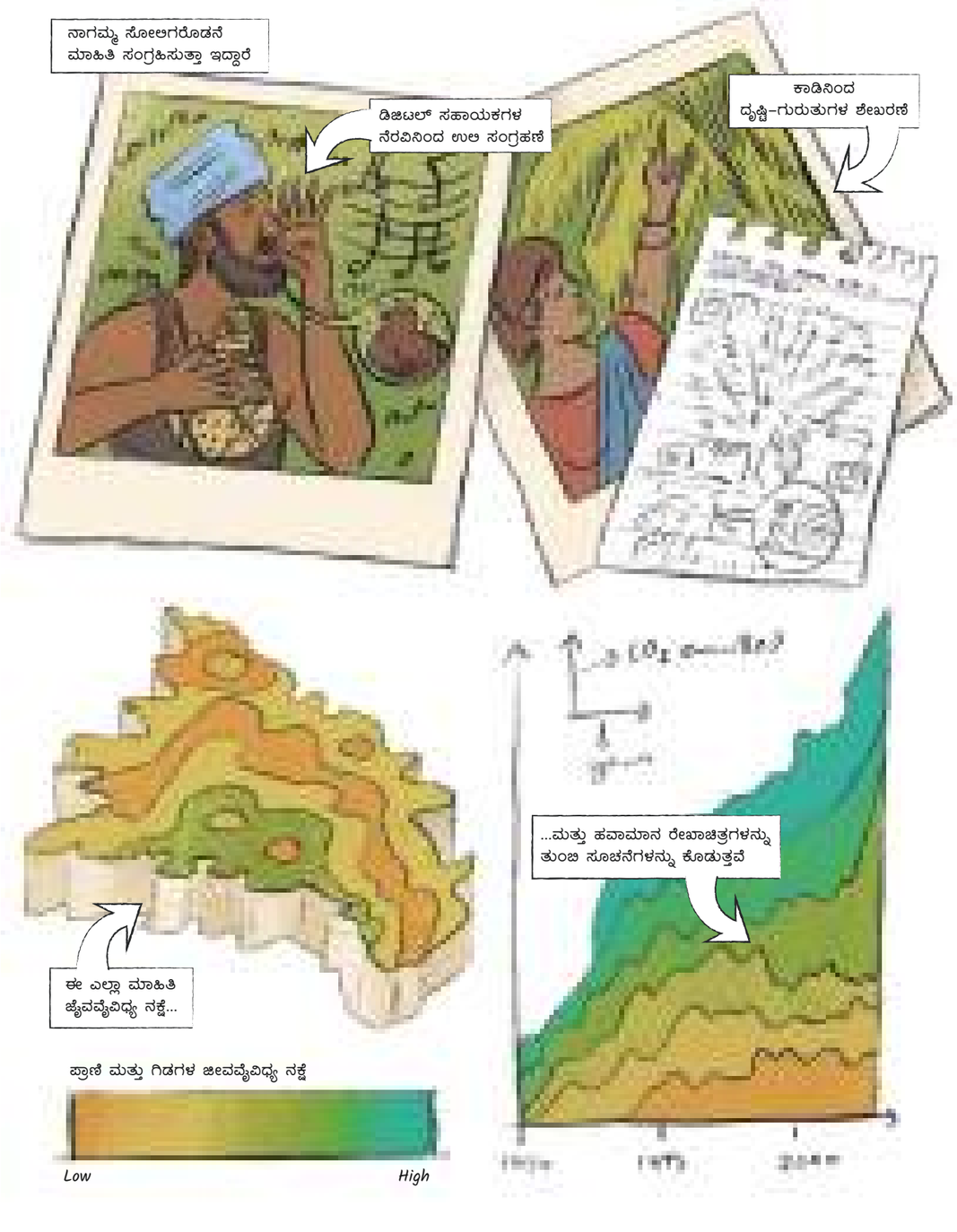
ಸೋಲಿಗರಿಗೆ ಮುಖ್ಯವಾದ ಸೊಲ್ಲು ಮತ್ತು ನೋಟ "ಗುರುತು"ಗಳ ಶೇಖರಣೆ

ಕಾರ್ಡ್ ಆಟದಲ್ಲಿ ಸೋಲಿಗರೂ ಭಾಗಿ. ಹೀಗೆ ಅವರನ್ನು ಸಂಶೋಧನೆಯಲ್ಲಿ ಸೇರಿಸುವುದು

ಹವಾಮಾನದ ಬಗ್ಗೆ ಸೋಲಿಗರ "ಭವಿಷ್ಯನುಡಿ"

ಕ್ರಮೇಣ, ನಾಗಮ್ಮನವರಿಗೆ ಸೋಲಿಗರ ರೀತಿಗಳು ಅರ್ಥವಾಗುತ್ತದೆ. ಅದಕ್ಕೆ ಹೇಗೆ ಬೆಲೆ ಕಟ್ಟಬಹುದು ಎಂಬ ಯೋಚನೆ ಮೂಡುತ್ತದೆ.


೨೦೨೫ನೆ ಇಸವಿಯಲ್ಲಿ ಸೋಲಗರು
ತಂತ್ರಜ್ಞಾನವನ್ನು ಅಳವಡಿಸಲಕ್ಕೆ ಶುರು ಮಾಡುತ್ತಾರೆ
ಶಾಲೆಯ ಮಕ್ಕಳು
ಉಲ-ಸಹಾಯಕಗಳನ್ನು ರಚಿಸುವುದು
ಹೇಗೆಂದು ಕಲಯಲು ಆರಂಭಿಸುತ್ತಾರೆ
೨೦೪೦ನೆ ಇಸವಿ ಹೊತ್ತಿಗೆ ಸೋಲಗರು
ಇಂತಹ ಡಿಜಿಟಲ್ ಸಹಾಯಕಗಳನ್ನು
ಪೋಷಿಸಿ ಕಾಡಿಗೆ ಒಗ್ಗುವಂತೆ ಮಾಡಿದ್ದಾರೆ


ನಾಗಮ್ಮ ಸೋಲಗರೊಡನೆ
ಮಾಹಿತಿ ಸಂಗ್ರಹಿಸುತ್ತಾ ಇದ್ದಾರೆ
ಡಿಜಿಟಲ್ ಸಹಾಯಕಗಳ
ನೆರವಿನಿಂದ ಉಲ ಸಂಗ್ರಹಣೆ
ಕಾಡಿನಿಂದ
ದೃಷ್ಟಿ-ಗುರುತುಗಳ ಶೇಖರಣೆ
ಈ ಎಲ್ಲಾ ಮಾಹಿತಿ
ಜೈವವೈವಿಧ್ಯ ನಕ್ಷೆ...
ಪ್ರಾಣಿ ಮತ್ತು ಗಿಡಗಳ ಜೀವವೈವಿಧ್ಯ ನಕ್ಷೆ
Low
High
...ಮತ್ತು ಹವಾಮಾನ ರೇಖಾಚಿತ್ರಗಳನ್ನು
ತುಂಬಿ ಸೂಚನೆಗಳನ್ನು ಕೊಡುತ್ತವೆ

೨೦೪೦ನೆ ಇಸವಿ. ನಾಗಮ್ಮ ಮತ್ತು ಸೋಲಿಗರು ಒಟ್ಟಿಗೆ ಸರ್ಕಾರಕ್ಕೆ ವರದಿ ತಲುಪಿಸುತ್ತಾರೆ

A report by Ministry of Agriculture and the Ministry of Environment, Forest and Climate Change

Drishti 2040

A new paradigm for biodiversity regeneration in Karnataka

A partnership between the government of Karnataka and the Soliga tribes in BR hills to discover a new direction for biodiversity protection and regeneration in the state.

೨೦೫೦ – ನಾಗಮ್ಮರು ಸೋಲಿಗರದ್ದೇ ಹಾಡುಗಳ ಮೂಲಕ ಅವರ ಕಥೆ ಹೇಳುತ್ತಿದ್ದಾರೆ. ಜಿಡುಗಡೆಯಾದ ಧ್ವನಿಸುರುಳಿ ಎಲ್ಲರ ಮೆಚ್ಚುಗೆ ಪಡೆದಿದೆ.

Learning to speak to an elephant and other Forest stories.

Dr. Nagamma C and the Soligas

One
Tuning
The long walk For honey
Learning to speak to an elephant
A bird called Tiger
Those that whisper also cry

Two
Life without language
The data steward's lament
In the Mesh
Finding my song
Soliga justice day

೨೦೫೦ ಸಂರಕ್ಷಣಾ ಸಮಾವೇಶದಲ್ಲಿ ನಾಗಮ್ಮನ ಜೊತೆ ಸೋಲಿಗರು

೩೦ ವರ್ಷದ ಕೆಲಸ ಈ ಐತಿಹಾಸಿಕ ಸಮಾವೇಶದಲ್ಲಿ ಪ್ರಸ್ತುತ ಪಡಿಸುವುದು ನನ್ನ ಹೆಮ್ಮೆ. ಆದರೆ, ಇದು ಪವರ್-ಪಾಯಿಂಟ್ ಅಲ್ಲ...

Drishti 2040

...ಸೋಲಿಗರ ಕೊರಳಿಂದಲೇ ಕೇಳಬೇಕಾದ ಹಾಡಗಳವು! ಕೇಳಿ.

ಸೋಲಿಗರು ಕಾಡಿನ ಹಾಡು ಹಾಡುತ್ತಾ...

...ಇದರಿಂದ ಸೋಲಿಗ ಭಾಷೆಗೆ ಸಿಕ್ಕ ಮನ್ನಣೆ ತೋರಿಸಿ ಕೊಡುತ್ತಾರೆ

ಈ ಯೋಜನೆಯಿಂದ ದೇಶಾದ್ಯಂತ ಹೊಸ ನೀತಿ ಜಾರಿಗೆ ಬರುತ್ತದೆ. ಜೀವವೈವಿಧ್ಯ ಹೆಚ್ಚು ಸುರಕ್ಷಿತವಾಗುತ್ತದೆ

2030

2050

ಪ್ರಪಂಚವೇ ಸಾಂಪ್ರದಾಯಿಕ ಸ್ಥಳೀಯ ನಡೆನುಡಿಗಳ ಮಹತ್ವ ಅರಿಯುತ್ತದೆ

ಸೋಲಿಗರ ರೀತಿಗಳಿಗೆ ಗೌರವ ದೊರೆತು, ಸರ್ಕಾರಿ ಯೋಜನೆಗಳಲ್ಲಿ ಸೋಲಿಗ ಪದಗಳು ಸೇರುತ್ತವೆ

ಪ್ರಾಣಿ ಮತ್ತು ಗಿಡಗಳ ಜೀವವೈವಿಧ್ಯ ನಷ್ಟ

Low

High

ಸೋಲಿಗರ ಭೂಸ್ವಾಧೀನ ಹಕ್ಕಿಗೆ ಕಾನೂನಿನ ಬೆಂಬಲ

April, 2053

ದೇಶದೆಲ್ಲೆಡೆ ಬುಡಕಟ್ಟು ಜನರ ಹಕ್ಕುಗಳಿಗೆ ಹೋರಾಟ

January, 2051

ಹೊಸ ನಿಯಮದಂತೆ ಕಂಪನಿಗಳು ೧೦೦% ಇಂಗಾಲರಹಿತವಾಗಬೇಕು

March, 2052

ರಕ್ಷಿಸಿ! ರಕ್ಷಿಸಿ! ರಕ್ಷಿಸಿ! ಪಕ್ಷಿ, ಪ್ರಾಣಿ ಮತ್ತು ಮರಗಳನ್ನು ರಕ್ಷಿಸಿ!

ಸ್ಥಳೀಯ ಹಕ್ಕುಗಳ ಮಾನ್ಯತೆಗೆ ಒತ್ತಾಯ

ಸ್ಥಳೀಯರ ಹಕ್ಕು ನಮ್ಮ ಹಕ್ಕು ಕೂಡ

ನೀತಿಕಾರರಿಗೆ ಸೋಲಿಗರ ಸಹಾಯ

May, 2054

ಕಳೆದ ೨೦ ವರ್ಷಗಳಲ್ಲಿ ಜೀವವೈವಿಧ್ಯತೆಯಲ್ಲಿ ದೊಡ್ಡ ಹೆಚ್ಚಳ

October, 2060

Making a Mesh

This story is set in 2030 where decentralised mesh networks are beginning to provide a respite from Internet and phone network shutdowns. It goes back to experiments in one village in 2025, and gradually builds the story of decentralised mesh networks emerging from villages in South India, becoming a 'Resilience by Design' movement across the country, giving people complete control over their data.

I couldn't get in touch with Vinod. Cell phone services have been barred!

What? It has been a month since the services have been barred! That small altercation between the village communities has been long resolved. Why is the network still barred?

There are rumours going around that the chief minister wants to take revenge on our district because we didn't vote for him in the last elections

You know what, my sister's husband was mentioning something about a local network. Wait a second, let me show you the message that he sent me...

MESH NETWORK

ARE YOU TIRED OF NETWORK ISSUES IN YOUR AREA ?

TOTALLY DECENTRALISED NETWORK
YOUR COMMUNITY CONTROLS
YOUR NETWORK
NO ADS
NO DATA THEFT
NO MORE GOVERNMENT BLOCKS
ON THE NETWORK

TEXT "MESH" TO 987654321 IF YOU ARE INTERESTED

Nagesh sends a text to the number...

...And a few years later, Nagesh and his wife Rani, are actively participating in Mesh network meetups in the village

A traditional centralised network, the one we have in the village has one authority that is responsible for the network. Which means that that one authority can tamper with your network whenever and however they feel like...

CENTRALISED

DECENTRALISED

...In contrast, a decentralised network is governed by everyone! You own the network...

Jayalakshmi is talking about mesh networks and decentralisation

...This means no one centralised authority can ever bar you from the network. This network is called a mesh network. I'm so pleased to share this experiment that was started in a small village in Karnataka by Dinesh and his group in 2025...

2025, in a village in Karnataka that Dinesh's group started working with...

People separating components to set-up WiFi hotspots and a local network

SERVER ROOM

HOT-SPOT

I think we have everything to set up the server room and the local radio station...but I think we still have to spread this local network...other villages close by are also requesting access

Dinesh

You're right! But whilst the network can include everyone, each village should create their own rules and take ownership of their data. Maybe you could explain our thinking to each village and help them understand how to make their own mesh...

...you are the mesh-maker!

Jugaad WiFi hotspot created with a solar panel sleeve, microcontroller board, duct tape and a plastic water bottle. This frugal DIY hotspot made access to connectivity for everyone in the rural regions possible.

HOTSPOT

The network's self-sufficiency and decentralised connectivity enabled it to expand rapidly...

...And soon enough, it reached other nearby villages

A few years in the future

MESH MEETUP 2037

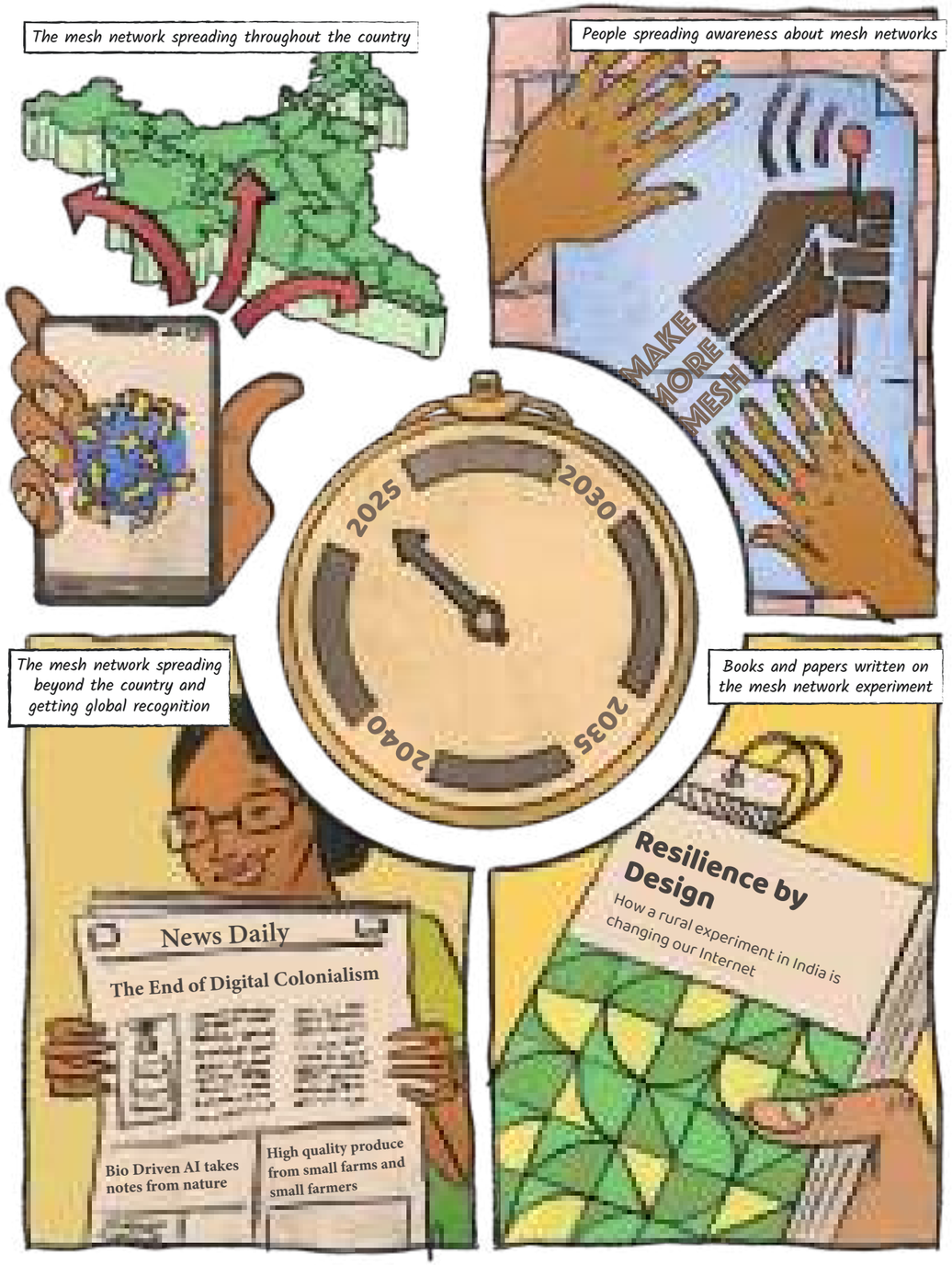
So this group has elected Manjunath as the technical support lead. He will work with young locals to build a team to maintain the network. You have also chosen Asha as the data steward...

...Her job is to consult with all of you and decide what data is collected here and who it is shared with. She will also negotiate with outside groups, who may want your data, on your behalf.

The mesh network is replacing the existing Internet in many villages across the country and even in some cities now where people are tired of their data being mined all the time. I am really proud of this, something that started in our villages is now showing the way to people in the cities.

Yes, it is now much harder for authorities to randomly shut down our local network, since we don't depend on them so much with the mesh network. We are calling it - Resilience by Design

The Mesh Network Data Controller helps to create the decentralised network. Individually crafted data tokens represent different data types such as camera data, location, microphone, texts and Aadhaar data. Simply moving the tokens into the data bowl ensures that data is kept private.


The mesh network spreading throughout the country
People spreading awareness about mesh networks
MAKE MORE MESH
2025
2030
2035
2040
The mesh network spreading beyond the country and getting global recognition
Books and papers written on the mesh network experiment
News Daily
The End of Digital Colonialism
Bio Driven AI takes notes from nature
High quality produce from small farms and small farmers
Resilience by Design
How a rural experiment in India is changing our Internet

Artefacts from hopeful futures

The twelve artefacts presented here are responses to our iterative approach. Building on our fieldwork and engagements with our partners, we imagined a series of scenarios and futures that span the next 30 odd years. The future, as we know from the present, is a continuation of the past. Our hopeful futures hark back to a time when farmers saved and shared their own seeds even as they look forward to a time when an indigenous community develops the capacity to build its own voice assistant (in the same way they have always built their forest tools). These hopeful future stories are illustrated by artefacts that intentionally adopt a visual and material language rooted in the knowledge of the people and the communities we worked with.

We have used some recurring 'story anchors' to help us tell these stories. The first is You-Learn, a fictional future organisation that supports localised digital innovation by teaching advanced technology using bespoke kits. These are kits people can use to create meaningful improvements in their lives. We have taken inspiration from the success of Arduino and Raspberry Pi and the work of organisations such as Janastu to envision the creation of a national network of community groups that encourages local technological development and its fair and open sharing and distribution. The other fictional organisation we've introduced is FarmLab. FarmLab symbolises support for farmers in accessing cutting-edge scientific discoveries and adapting them for local use, in their own practices. Like You-Learn, it is a national network with local units of support. We imagine one FarmLab unit as capable of supporting some 5-10 villages and about 100-200 farms.

The futures we imagine mirror the ones we have seen emerging in India, where different people and communities play a part in engaging with decentralised technology in different ways. These are futures where people are not beholden to technology but choose to use it for their own good. Futures where technology supports and complements existing sustainable patterns and behaviours, rather than imposing new ones. The matter of how much technology we should include in these artefacts was debated thoroughly: we recognised, eventually, that while some of these artefacts needed to highlight emergent digital technologies, it was also necessary to illustrate their plausibility within the contexts that enabled their adoption and success.

Children's Coding Kit

Education builds hope. Hope that can help challenge an overtly globalised society in which the centralisation of technology has stifled local innovation and resulted in the uneven distribution of wealth. That the Soliga people possess such hope was evident in the way they worked with educators and technologists to develop locally-tuned digital products and services for themselves.

In 2025, a Soliga child studying at the Vivekananda Girijana Kalyana Kendra (VGKK) in BR hills signs up to participate in a government inter-school competition. The topic: designing hopeful technology futures for local contexts. A You-Learn coding kit arrives in the school's mailroom. You-Learn advocates for fairer technology for all and seeks to help people understand and then take control of the algorithms and code that affect their lives. This simple metal box contains the building blocks of many futures. A Class 8 student takes the kit, cradling the box in her arms as she walks home.

Deepa's parents are hovering over her. Just 12 years old, she is the youngest school lead in this inaugural You-Learn competition. She knows she's smart. She's always been that. Her parents watch with expectation and trepidation as she opens the shiny metal box. Inside is the world's first microcomputer that can be programmed by speech. In Deepa's hands, it will become the world's first Soliga voice assistant. Deepa was part of the first group that helped user-test the alpha release nearly two years ago. Working with a young Soliga researcher, Dr. Nagamma C, she and the team tested the technology to see if it could help catalogue and preserve the sounds of the forest. Now, she has two weeks to lead the team that will build a prototype voice assistant, one that will be tested directly by the tribe's elders. A voice assistant that can be sung to.

Deepa finishes unboxing the microcomputer, plugs it in, and says what she has been waiting two years to say: "Hi Soli, can we get started?" Tiny lights on the circuit board flicker like fireflies in spring as a Soliga voice says *Opening file: Hello BR Hills. Adjusting mic-array to 80cm. Calibrating for female voice. Hello Deepa, what do you want to do?*

Children's Coding Kit. Stainless steel case containing 'Your Voice' developers board, various electronic components, and a deck of coding cards. 2025.

ಮಕ್ಕಳ ಕೋಡಿಂಗ್ ಪೆಟ್ಟಿಗೆ (ಕೋಡಿಂಗ್ ಕಿಟ್)

ಶಿಕ್ಷಣ ಯಾವತ್ತೂ ಆಶಾದಾಯಕ. ಭರವಸೆಯನ್ನು ಹೆಚ್ಚಿಸತ್ತದೆ. ಇಂದಿನ ಜಾಗತೀಕೃತ ಪ್ರಪಂಚದಲ್ಲಿ, ತಂತ್ರಜ್ಞಾನದ ಕೇಂದ್ರೀಕರಣವು ಎಲ್ಲೆಡೆಯ ಸ್ಥಳೀಯ ಆವಿಷ್ಕಾರಕ್ಕೆ ಧಕ್ಕೆ ತಂದು ಬಹುತೇಕ ಸಂಪತ್ತನ್ನು ಕೇವಲ ಕೆಲವರ ಕೈವಶ ಮಾಡಿದೆ. ಇಂಥ ಅನ್ಯಾಯ ಮತ್ತು ಅಸಾಮಾನತೆಯನ್ನು ಸೋಲಿಸಲು ಆಸೆಯೂ ಭರವಸೆಯೂ ಹುಟ್ಟಬೇಕಾಗಿದೆ. ತಂತ್ರಜ್ಞರ ಮತ್ತು ಶಿಕ್ಷಕರ ಜೊತೆ ಕೈಜೋಡಿಸಿದ ಸೋಲಿಗರ ಧೋರಣೆ ಮತ್ತು ಹುಮ್ಮಸ್ಸನ್ನು ನೋಡಿದರೆ, ಆ ಭರವಸೆ ಮೂಡಿದೆ ಎಂದು ಗೊತ್ತಾಗುವುದು.

2025ನೆ ಇಸವಿ. ಬಿಳಿಗಿರಿರಂಗನ ಬೆಟ್ಟದಲ್ಲಿರುವ ವಿ.ಜಿ.ಕೆ.ಕೆ. ಶಾಲೆಯಲ್ಲಿ ಓದುತ್ತಿರುವ ಒಬ್ಬ ಸೋಲಿಗ ವಿದ್ಯಾರ್ಥಿ ಅಂತರ್ಶಾಲೀಯ ಸ್ಪರ್ಧೆಯಲ್ಲಿ ಸೇರಿಕೊಳ್ಳುತ್ತಾಳೆ. ಸ್ಪರ್ಧೆಯ ವಿಷಯ: ಸ್ಥಳೀಯ ಸಂದರ್ಭಗಳಿಗೆ ಒಗ್ಗುವಂತ ಭಾವೀ ತಂತ್ರಜ್ಞಾನಗಳು.

ಶಾಲೆಗೆ ಒಂದು 'ಯೂ-ಲರ್ನ್ ಐಟಿ' ಕೋಡಿಂಗ್ ಕಿಟ್" ಬರುತ್ತದೆ. ಸ್ಪರ್ಧೆಯ ಯೋಜನೆಯಾದರೊ ಎಲ್ಲರಿಗೂ ದಕ್ಕುವಂತ ತಂತ್ರಜ್ಞಾನಕ್ಕೆ ಒತ್ತು ಕೊಡುವುದು. ಅದರಿಂದ, ಜನಗಳು ಅವರವರ ಬದುಕಲ್ಲಿ ಪ್ರಭಾವ ಬೀರುವ ತಂತ್ರ ಕ್ರಮಾವಳಿ (ಆಲ್ಗೊರಿದಮ್) ಮತ್ತು ಕೋಡ್ ಬಗ್ಗೆ ಅರ್ಥಮಾಡಿಕೊಂಡು ಅವನ್ನು ಬಳಸಬಹುದು. ಒಟ್ಟಿನಲ್ಲಿ, ಶಾಲೆಗೆ ಬಂದಿರುವ ಸಣ್ಣ ಪೆಟ್ಟಿಗೆಯಲ್ಲಿ (ಕಿಟ್) ಹಲವರ ಭವಿಷ್ಯದ ಸಾಧನವಿದೆ. ಆ ಪೆಟ್ಟಿಗೆಯನ್ನು ಎಂಟನೆ ತರಗತಿಯ ಹುಡುಗಿಯೊಬ್ಬಳು ಉತ್ಸಾಹದಿಂದ ತೆಗೆದುಕೊಂಡು ಮನೆಯತ್ತ ಚಕಚಕ ನಡೆಯುತ್ತಾಳೆ.

ದೀಪಾಳ ತಂದೆತಾಯಿ ಅವಳ ಬೆಂಬತ್ತಿದ್ದಾರೆ. ಅವಳೇ ಮನೆಗೆ ಪಟ್ಟಿಗೆ ತೆಗೆದುಕೊಂಡು ಹೋದ ಹುಡುಗಿ! ಬರೇ 12 ವಯಸ್ಸಾದರೂ, ಅವಳು ಈ ಮೊದಲನೆ "ಯೂ-ಲರ್ನ್" ಐಟಿ ಸ್ಪರ್ಧೆಯಲ್ಲಿ ಶಾಲೆಯನ್ನು ಪ್ರತಿನಿಧಿಸಲು ಆಯ್ಕೆಯಾಗಿದ್ದಾಳೆ. ದೀಪಾಗೆ ಇದು ಹೊಸದೇನಲ್ಲ. ತಾನು ಜಾಣೆ ಎಂದು ಗೊತ್ತು. ಪಳ ಪಳ ಹೊಳೆಯುವ ಹೊಸ ಪೆಟ್ಟಿಗೆಯನ್ನು ದೀಪಾ ತೆಗೆಯುತ್ತಿದ್ದಾಗ, ಅವಳ ತಾಯಿತಂದೆ ಕೌತುಕದಿಂದ ನೋಡುತ್ತಿದ್ದಾರೆ. ಒಳಗೆ ನೋಡಿದರೆ – ಬಾಯಿಮಾತಿನಿಂದಲೇ ನಡೆಸಬಹುದಾದ ಮೈಕ್ರೊ ಕಂಪ್ಯೂಟರ್! ದೀಪಾಳ ಕೈಯಲ್ಲಿ ಈ ಕಂಪ್ಯೂಟರು ಜಗತ್ತಿನ ಮೊದಲನೆ "ಸೋಲಿಗ ಉಲಿ ಸಹಾಯಕ" ಆಗಲಿದೆ.

ದೀಪಾ ಈ ಯಂತ್ರದ ಮೊದಲ ಪರೀಕ್ಷೆ (ಆಲ್ಫಾ ಟೆಸ್ಟ್) ನಡೆಸಿದ ಗುಂಪಿನವಳು. ಇದು ಸುಮಾರು ಎರಡು ವರ್ಷಗಳ ಹಿಂದೆ ನಡೆದದ್ದು. ಆಗ, ನಾಗಮ್ಮ ಎಂಬ ಒಬ್ಬ ಯುವ ಸಂಶೋಧಕಿ ಜೊತೆ ಕೆಲಸ ಮಾಡುತ್ತಾ, ಕಾಡಿನ ನೂರಾರು ಸದ್ದುಗಳನ್ನು ರೆಕಾರ್ಡ್ ಮಾಡಿ ಉಳಿಸಿಕೊಳ್ಳುವುದರ ಬಗ್ಗೆ ದೀಪಾ ಪರೀಕ್ಷೆ ನಡೆಸಿದ್ದಳು. ಸ್ಪರ್ಧೆಗಾಗಿ, ಬರುವ ಎರಡು ವಾರಗಳಲ್ಲಿ ದೀಪಾ ಮತ್ತು ಅವಳ ಗೆಳೆಯರು ಹಿರಿಯ ಸೋಲಿಗರು ಬಳಸುವಂತಹ 'ಮಾದರಿ ಉಲಿ ಸಹಾಯಕ'ವನ್ನು ತಯಾರಿಸಬೇಕಾಗಿದೆ. "ಹಾಡುಗಳಿಗೆ ಒಲಿಯುವ" ಉಲಿ ಸಹಾಯಕ!

ದೀಪಾ ಪೆಟ್ಟಿಗೆ ಮುಚ್ಚಳವನ್ನು ಬಿಚ್ಚಿ ಪಕ್ಕಕಿಡುತ್ತಾಳೆ. ಅದನ್ನು ಪ್ಲಗ್ ಪೊಯಿಂಟಿಗೆ ಸೇರಿಸುತ್ತಾಳೆ. ಎರಡು ವರುಷಗಳಿಂದ ಹೇಳಬೇಕೆಂದಿದ್ದ ಮಾತನ್ನು ಹೇಳುತ್ತಾಳೆ: "ಹಾಯ್ ಸೋಲಿ, ಶುರು ಮಾಡಬಹುದಾ?' 'ಸೋಲಿ'ಯ ತೋರುಮಣಿ ಮೇಲೆ ಮಿಣುಗುಹುಳದಂತೆ ಪುಟ್ಟಪುಟ್ಟ ದೀಪಗಳು ಹೊಳೆಯುತ್ತ ಸೋಲಿಗ ದನಿಯೊಂದು ಉಲಿಯುತ್ತದೆ: "ಫೈಲನ್ನು ತೆರೆಯಲಾಗಿದೆ: ನಮಸ್ಕಾರ ಬಿಆರ್ ಬೆಟ್ಟ. ಹೆಣ್ಣ ದನಿಗೆ ಏರ್ಪಾಡು ಮಾಡಲಾಗಿದೆ. ನಮಸ್ಕಾರ ದೀಪಾ, ಈಗ ಏನು ಮಾಡೋಣ?"

Soliga Voice Assistants

The emergence of open Voice AI means that people are free to create their own voice assistants, naming and interacting with them however they like. In time, these AI devices become less like assistants and more like pets; cared for, taught, and nurtured over many years. Their forms are crafted by local artisans and individualised to their users. With their early commitment to teach coding in tribal schools, the Soligas are now at the forefront of new experiments to decentralise technology in Karnataka. The AI device has been taught that Soliga voices are an indivisible part of the forest's soundscape; that they are as much part of the forest's sound as the woodpecker's tap and the wolf's howl. Languages and sounds are encoded in ways that respect the Soliga culture and lifestyle. Bird calls, the swish of the wind through the leaves, and the humming of bees are all part of the vocabulary of an AI trained for and by Soligas. A voice assistant for the forest.

The group of four Soligas has paused for rest under the Dodda Sampige Mara. A young man and woman are inspecting the markings on a hollowed-out gourd while the other two are resting their backs against the broad tree, the spring sunshine playing on their closed eyes. "No, that's not how you do it," says the woman, "give it to me". She takes the device from the man and holds it confidently, adjusting the dial at its neck while listening attentively to the quiet clicks of the device. "You need to focus the distance first like this, and then..." she stops turning the dial and points the device in the direction of a far-off whistling sound. *Black Drongo food call signifying presence of bees* says the device in a sing-song Soliga voice. "Easy as that - if you'd learnt from Achugegowda, you wouldn't be needing this anyway" she scolds in a friendly way. "Yes, but you made it - of course it's easy for you to use, Deepa" the younger man flashes. "Pah, let's go. We need to bring home that honey, come on you two".

ಸೋಲಿಗ ಉಲಿ ಸಹಾಯಕರು

2030ನೆ ಇಸವಿಯ ಕಾಲ್ಪನಿಕ ಸನ್ನಿವೇಶ. 'ಏಐ' ದನಿಯಂತ್ರಗಳಿಂದಾಗಿ ಜನರು ಅವರವರಿಗೆ ಬೇಕಾದ 'ಉಲಿ ಸಹಾಯಕ'ಗಳನ್ನು ರಚಿಸಿ ತಮಗಿಷ್ಟವಾದ ರೀತಿಯಲ್ಲಿ ಅವುಗಳನ್ನು ರೂಪಿಸಲು ಸಾಧ್ಯವಾಗಿದೆ. ಕ್ರಮೇಣ ಈ ಏಐ ಯಂತ್ರಗಳು ಸಹಾಯಕರು ಮಾತ್ರವಲ್ಲದೇ, ಬೆಳೆಸಿ ಪೋಷಿಸಿದ ಮನೆಮಕ್ಕಳಂತೆ ಆಗುವರು. ಅವುಗಳು ಸ್ಥಳೀಯ ಕಲಾವಿದರಿಂದ ರಚಿಸಲ್ಪಟ್ಟು ತಂತಮ್ಮ ವ್ಯಕ್ತಿತ್ವಕ್ಕನುಗುಣವಾಗಿ ಬಳಕೆದಾರರಿಗೆ ದಕ್ಕುವವು. ಸುತ್ತಮುತ್ತಲಿನ ಶಾಲೆಗಳಲ್ಲಿ ಕೋಡಿಂಗ್ ಹೇಳಿಕೊಡಲು ಒಪ್ಪಿಕೊಂಡಿದ್ದರಿಂದ, ಈಗಾಗಲೇ ಸೋಲಿಗರು ತಂತ್ರಜ್ಞಾನ ವಿಕೇಂದ್ರೀಕರಣದ ಮುಂದಾಳತ್ವವನ್ನು ವಹಿಸುತ್ತಿದ್ದಾರೆ. 'ಏಐ' ದನಿ ಯಂತ್ರಕ್ಕೆ ಅವರು ಸೋಲಿಗರ ಉಲಿಗಳು ಸುತ್ತಮುತ್ತಲ ಕಾಡಿನ ಅವಿಭಾಜ್ಯ ಅಂಗವೆಂದು ಕಲಿಸಿದ್ದಾರೆ. ಅದರಲ್ಲಿ ಹಾಕುತ್ತಿರುವ ಕೋಡ್ ಆದರೊ ಸೋಲಿಗರ ಸಂಸ್ಕೃತಿಯನ್ನು ಗೌರವಿಸುವಂಥದ್ದು. ಹಕ್ಕಿಯ ಕಲರವ, ಗಾಳಿಯ ಸುಯ್ಯ್, ತುಂಬಿಯ ಗುಂಗುಂ ಗಾನ – ಇವೆಲ್ಲವನ್ನೂ ಈ 'ಏಐ' ಯಂತ್ರ ಕಲಿತಿದೆ, ಕಾಡಿಗೆ ಒಗ್ಗುವಂಥ ಈ 'ಉಲಿ ಸಹಾಯಕ'.

ದೊಡ್ಡ ಸಂಪಿಗೆ ಮರದಡಿಯಲ್ಲಿ ನಾಲ್ಕು ಸೋಲಿಗರು ಕೂತಿದ್ದಾರೆ. ಅವರಲ್ಲಿ ಇಬ್ಬರು (ಯುವಕ ಮತ್ತು ಯುವತಿ) ಪೊಳ್ಳಾದ ಕಾಯಿಯ ಮೇಲಿರುವ ಗುರುತುಗಳನ್ನು ದಿಟ್ಟಿಸಿ ನೋಡುತ್ತಿದ್ದಾರೆ. ಇನ್ನಿಬ್ಬರು ಕಣ್ಮುಚ್ಚಿ ಮರದ ಬುಡಕ್ಕೆ ಒರಗಿದ್ದಾರೆ. "ಇಲ್ಲ, ಹಾಗಲ್ಲ, ಕೊಡಿಲ್ಲಿ," ಎನ್ನುತ್ತಾಳೆ ಯುವತಿ. ದನಿ ಯಂತ್ರವನ್ನು ಅವನ ಕೈಯಿಂದ ಕಸಿದು ಅದರ ಡಯಲನ್ನು -ತಿರುಗಿಸಿ ಜೋಪಾನವಾಗಿ ಆಲಿಸುತ್ತಾಳೆ. "ಮೊದ್ಲು ಎಷ್ಟ್ ದೂರ ಅಂತ ನೋಡಿ ಫೋಕಸ್ ಮಾಡ್ಬೇಕು, ಆಮೇಲ್ ಹೀಗ್ ಮಾಡ್ಬೇಕು..." ಅಂತ ಹೇಳಿ ದೂರದಲ್ಲಿ ಕೂಗುತ್ತಿರುವ ಹಕ್ಕಿ ಕಡೆ ಯಂತ್ರವನ್ನು ಬಾಚುತ್ತಾಳೆ. ಯಂತ್ರದಿಂದ ಇಂಪಾದ ಸೋಲಿಗ ಉಲಿ ಹೊರಡುತ್ತದೆ: *ಕಾಜಾಣದ ಊಟದ-ಕರೆ ಎಂದರೆ ತುಂಬಿಯ ದಂಡು ಹತ್ತಿರದಲ್ಲಿದೆ*. "ನೋಡು, ಎಷ್ಟ್ ಸುಲ್ಭ. ಅಚ್ಚುಗೆಗೌಡರಿಂದ ಕಲ್ತಿದ್ರೆ, ಇದ್ ಬೇಕಾಗ್ತಿರ್ಲೂ ಇಲ್ಲ" ಎಂದು ಹಾಸ್ಯ ಮಾಡುತ್ತಾಳೆ. "ಇರ್ಬೋದು, ಯಂತ್ರ ನೀನೇ ಮಾಡಿದ್ರಿಂದ ನಿಂಗೆ ಸುಲಭ ಕಣೆ, ದೀಪಾ" ಎನ್ನುತ್ತಾನೆ ಯುವಕ. "ಅಯ್ಯೊ ಸಾಕ್ರಪ್ಪ ನಿಮ್ಮು, ಜೇನ್ ತುಪ್ಪ ತೊಗೊಂಡು ಮನೆಗೆ ಹೋಗೋಣ ಬನ್ನಿ."

Three Soliga Voice Assistants. Turned painted lacquered wood, brass bezel, various electronic components. 2034. Cast bell metal, metal bezel, woven twine, various electronic components. 2045. Perforated dried gourd, brass dial, woven twine, various electronic components. 2030.

Drishti 2040 Report

New technologies enable the Soligas to document and record their way of life without forcing them to make changes to their behaviour. This data is owned by the Soligas and ensures that their engagement with external researchers, scientists, and policy makers is equitable. Over time, the aggregated data highlights their conservation practices and makes clear what the Soligas have long argued for: legitimising indigenous knowledge and their approach to forest stewardship to form the foundation of a new approach to conservation and regeneration in Karnataka.

Roopa, Ahmed and Nagamma are at the centre of a circle of researchers, policy makers and tribal leaders. The group is putting the finishing touches on a report that details new approaches to biodiversity conservation. The report itself is the culmination of two decades of collaboration between the Government of Karnataka and the Soligas and is due soon.

It's a big deal for Roopa, the newly appointed director of the Socio-biodiversity department at Bangalore University, and for Ahmed, the current Principal Chief Conservator of Forests. Nagamma is more relaxed – she has succeeded in ensuring that Soliga knowledge is accepted and revered beyond the learning grounds of BR hills. And, frankly, though she knows the report is important to the government, she is more interested in the new song she has been working on.

"OK, so let's get this in the right order!" Roopa cries out over the buzz. Behind her, on the wall is a thicket of sticky notes. Ahmed stoops to pick up a few notes that have fluttered on to the floor. "So we're starting with Nagamma's paper on 'Soliga Ways of Seeing' and then moving on to our 2025 ecosystem project?" A woman with small rectangular glasses steps forward from the circle of participants and Nagamma turns to her. "What have we missed, Deepa?", "I'm wondering about the piece detailing the shift from researching Soligas to respecting them." The room is quieter now as she looks around. "We need to make that much more prominent". Ahmed nods, "Yes, of course, you're right. Let's put that in around 2023." Before continuing, he shifts his attention to Nagamma, "And we can follow that with your justice and equity work around life-centred design policies and practices". Nagamma smiles, a new melody forming in her mind. "Sure Ahmed, that sounds great."

Drishti 2040: A new Paradigm for Biodiversity Regeneration in Karnataka. A report by the Ministry of Agriculture and the Ministry of Environment, Forest and Climate Change. Hardbound book with sleeve. 2040.

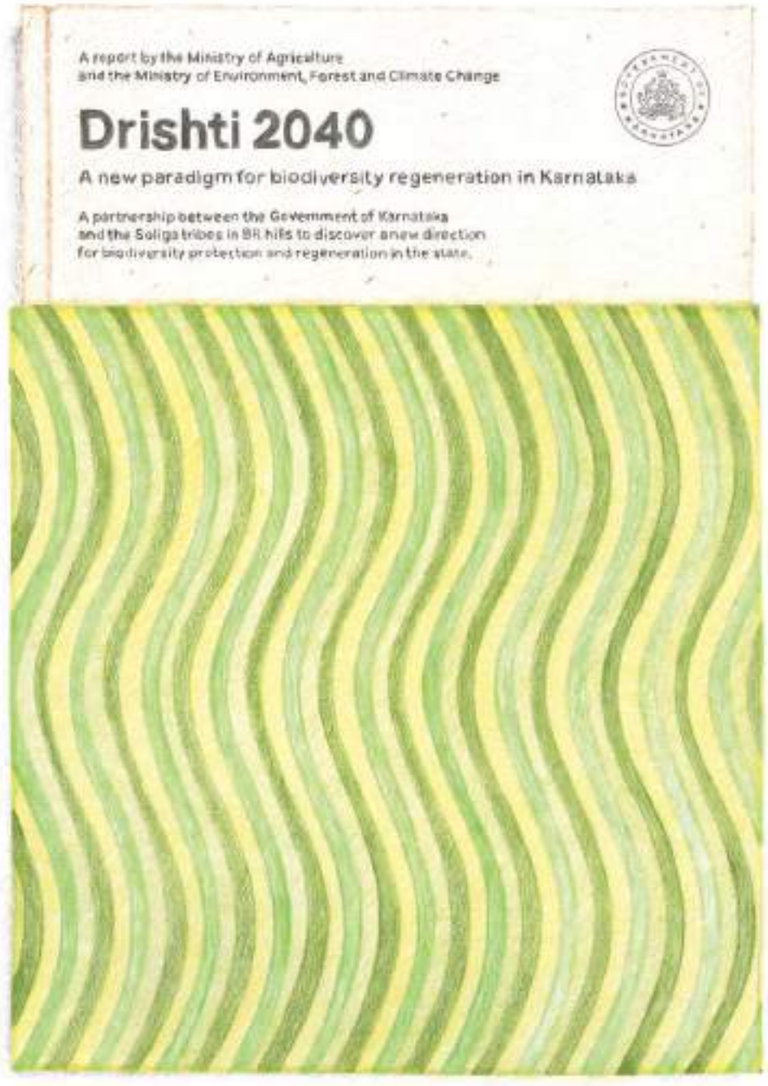
ವರದಿ: "2040ರ ದೃಷ್ಟಿ"

ಹೊಸ ತಂತ್ರಜ್ಞಾನಗಳಿಂದಾಗಿ ಸೋಲಿಗರು ತಮ್ಮ ಜೀವನಶೈಲಿಯನ್ನು ಬದಲಾಯಿಸದೆ ಅದರ ವಿವರಗಳನ್ನು ದಾಖಲಿಸಬಲ್ಲರು. ದಾಖಲಿಸಿದ ಡೇಟಾ ಎಲ್ಲ ಸೋಲಿಗರ ಸ್ವಂತ ಸೊತ್ತಾಗಿದ್ದು ಹೊರಗಿನ ಸಂಶೋಧಕರು, ವಿಜ್ಞಾನಿಗಳು, ಮತ್ತು ನೀತಿಕರ್ತೃಗಳೊಂದಿಗೆ ಸಮಾನಸ್ಥರಾಗಿ ವ್ಯವಹರಿಸಲು ಅವಕಾಶ ಮಾಡಿಕೊಡುತ್ತದೆ. ಶೇಖರಿಸಿದ ಡೇಟಾ ಸೋಲಿಗರ ಕಾಡಿಗೆ ಸಂಬಂಧಪಟ್ಟ ಸಂರಕ್ಷಣಾ ರೀತಿನೀತಿಗಳನ್ನು ಉಲ್ಲೇಖಿಸುತ್ತದೆ. ಹಾಗೇ, ನೂರಾರು ವರುಷಗಳಿಂದ ಸೋಲಿಗರು ಬಳಸುತ್ತಿರುವ ದೇಶೀ ಜ್ಞಾನ, ಮಣ್ಣಿನ ಮಕ್ಕಳ ರೀತಿಗಳು ಮತ್ತು ಕಾಡು ನಿರ್ವಹಣೆಯ ಕ್ರಮಗಳ ಶೇಷ್ಠತೆಯನ್ನೂ ಎತ್ತಿ ತೋರಿಸುತ್ತದೆ.

ಸಂಶೋಧಕರು, ನೀತಿಕರ್ತೃಗಳು ಮತ್ತು ಬುಡ್ಡಕಟ್ಟು ಮುಖಂಡರ ಗುಂಪಿನ ನಡುವೆ ರೂಪ, ಅಹಮದ್ ಮತ್ತು ನಾಗಮ್ಮ ಕೆಲಸದಲ್ಲಿ ಮುಳುಗಿದ್ದಾರೆ. ಕರ್ನಾಟಕ ಸರ್ಕಾರದ ಜೊತೆ ಕೈಜೋಡಿಸಿ ಮಾಡಿದ 20 ವರುಷಗಳ ಕೆಲಸದ ಬಗ್ಗೆ ವರದಿ ತಯಾರಿಸಿ ಒಪ್ಪಿಸಲು ಕೇವಲ ಮೂರು ತಿಂಗಳ ಕಾಲ ಉಳಿದಿದೆ! ವರದಿಯ ವಿಷಯ: ಜೀವವೈವಿಧ್ಯವನ್ನು ಕಾಪಾಡಲು ಹೊಸ ವಿಧಾನಗಳು.

ಈ ವರದಿ ರೂಪಾ ಮತ್ತು ಅಹಮದ್ ಇಬ್ಬರಿಗೂ ದೊಡ್ಡ ವಿಷಯ. ಆಕೆ ಈಚೆಗಷ್ಟೆ ಬೆಂಗಳೂರು ವಿಶ್ವವಿದ್ಯಾಲಯದ ಸಮಾಜವೈವಿಧ್ಯ ವಿಭಾಗದ ಮುಖ್ಯಸ್ಥರಾಗಿ ನೇಮಕಗೊಂಡಿರುವರು. ಆತ 'ಕಾಡುಗಳ ಪ್ರಧಾನ ಸಂರಕ್ಷಕ' ಹುದ್ದೆಯಲ್ಲಿದ್ದಾರೆ. ನಾಗಮ್ಮ ಮಾತ್ರ ಆರಾಮಾಗಿದ್ದಾರೆ. ಅವರು ಶುರು ಮಾಡಿದ ಕೆಲಸಕ್ಕೆ ಭಾರಿ ಮನ್ನಣೆ ಮತ್ತು ಮೆಚ್ಚುಗೆ ಸಿಕ್ಕಾಗಿದೆ. ಈ ವರದಿ ಸರ್ಕಾರಕ್ಕೆ ಮುಖ್ಯವೆಂದು ಅವರಿಗೆ ಗೊತ್ತಿದ್ದರೂ, ಅವರ ಗಮನವೆಲ್ಲ ತಮ್ಮ ಹೊಸ ಹಾಡಿನ ಕಡೆಯಿದೆ.

"ಸರಿ, ಇದೆಲ್ಲ ಸರಿಯಾಗಿ ಜೋಡಿಸೋಣ!" ಎನ್ನುತ್ತಾಳೆ ರೂಪಾ. ಆಕೆಯ ಪಕ್ಕದಲ್ಲಿ ಚೀಟಿಗಳ ದೊಡ್ಡ ಗುಡ್ಡೆಯಿದೆ. ನೆಲದಲ್ಲಿ ಹರಡಿದ್ದ ಹಲವು ಚೀಟಿಗಳನ್ನು ಅಹಮದ್ ಎತ್ತಿಕೊಳ್ಳುತ್ತಾರೆ. "ಸರಿ ಹಾಗಾದರೆ, ನಾವು ನಾಗಮ್ಮನವರ "ಸೋಲಿಗರ ದೃಷ್ಟಿ" ಪ್ರಬಂಧದಿಂದ ಶುರು ಮಾಡಿ ಆಮೇಲ್ ನಮ್ಮ 2025 ಪರಿಸರ ಯೋಜನೆಗೆ ಬರೋಣ?" ಸಣ್ಣ ಕನ್ನಡಕ ಹಾಕಿಕೊಂಡಿರುವ ಹೆಂಗಸೊಬ್ಬರು ಮುಂದೆ ಬರುವದನ್ನು ನೋಡಿ ನಾಗಮ್ಮ ಅವರತ್ತ ತಿರುಗಿ ಕೇಳುತ್ತಾರೆ, "ಏನ್ ಮಿಸ್ ಆಗಿದೆ, ದೀಪಾ?" "ಆ ಬರೆಹ ಇತ್ತಲ್ಲಾ, ಹೇಗ್ ನಮ್ಮ ಬಗ್ಗೆ ಸಂಶೋದನೆ ಮಾಡುವುದನ್ನು ನಿಲ್ಸಿ ನಮಗೆ ಗೌರವ ಕೊಡುವುದನ್ನು ಶುರು ಮಾಡಿದರು..." ಕೋಣೆ ಈಗ ನಿಶ್ಶಬ್ದವಾಗಿದೆ. "ಆ ಬರಹಕ್ಕೆ ಹೆಚ್ಚು ಒತ್ತು ಕೊಡ್ಬೇಕು" ಎನ್ನುತ್ತಾರೆ ದೀಪಾ. "ಹೌದೌದು," ಎನ್ನುತ್ತಾರೆ ಅಹಮದ್. "ಅದನ್ನು ಸುಮಾರು 2023ರ ಅವಧಿಗೆ ಸೇರಿಸೋಣ." ನಾಗಮ್ಮನತ್ತ ತಿರುಗಿ, "ಅದಾದ್ ಮೇಲೆ ನೀವ್ ನ್ಯಾಯ ಮತ್ತು ಸಮಾನತೆ ಕುರಿತು ಮಾಡಿದ ಕೆಲ್ಸದ ಬಗ್ಗೆ ಮಾತಾಡಬೋದು." ಏನೋ ಗುನುಗುತ್ತಿರುವ ನಾಗಮ್ಮನ ಮುಖ ಅರಳುತ್ತದೆ. "ಆಗಲಿ, ಅಹಮದ್, ಹಾಗೆ ಮಾಡೋಣ," ಎನ್ನುತ್ತಾರೆ.



Learning to speak to an elephant and other forest stories

The increasing integration of technology into tribal life creates the need for new approaches and practices, particularly around the governance of the data it records and generates. One such approach is the development of Data Stewards, people elected by the tribe to oversee the data, its collection, its use, and how it is shared.

Backstage, Nagamma is unconsciously playing with the small glass disc in her left hand. It still feels strangely like a toy. She can hear the announcement starting out front. The host of the 25th anniversary Data Handlers conference is introducing her as this year's keynote speaker. Nagamma hates this bit. "Oh my" she thinks. "I've been doing this for too long". She wonders if they will have grown tired of the story of her transformation from a Soliga language denier to its champion? Or the part where she reflects on writing papers about the forest in Kannada and English before gaining the confidence to return to and embrace her native tongue and mould it into a language fit for academic discourse? Will her transformation from writer to singer still resonate with this young audience?

On stage, she can hear the host telling the audience how Dr. Nagamma C changed the world's view on data belonging to the forest; how her initiative of 'designing for life' meant the end of data as something remote from the people and place; that data, places, the forest and its life had all to be treated as a 'single entity'. She hears her describe the early work, and shudders at the idea that she ever had to write papers ... that seminal paper on Ways of Seeing should really have been a seminal song.

Despite nerves, she feels her excitement building and allows herself to feel just a little proud. She is holding two discs. In her right hand is her first vinyl record, released by Roopa's Socio-biodiversity department at Bangalore University. She knows the vinyl is an affectation but she can't help but be excited by the idea of listening to her songs and field recordings on a turntable, the sounds representing the heart of her people and the forest. In her left hand is a glass disc the size of the now-defunct two-rupee coin. This, she told Roopa, was her life's work, a 5D optical data-disc that contains everything she has ever recorded in BR Hills. The disc can survive for millions of years.

She waits for the host to stop. She then takes a deep breath and walks to the centre of the stage. She looks out at the audience, smiles widely and opens in her usual way: "I'd like to sing you a story".

Learning to speak to an elephant and other forest stories. Vinyl record published by Bangalore University Press Academic Songs. 2050. Laser written, nanostructured glass, 5D optical data disc. 2050.

ಆನೆಯೊಡನೆ ಮಾತಾಡುವ ಬಗೆ ಮತ್ತಿತರ ಕಾಡಿನ ಕಥೆಗಳು

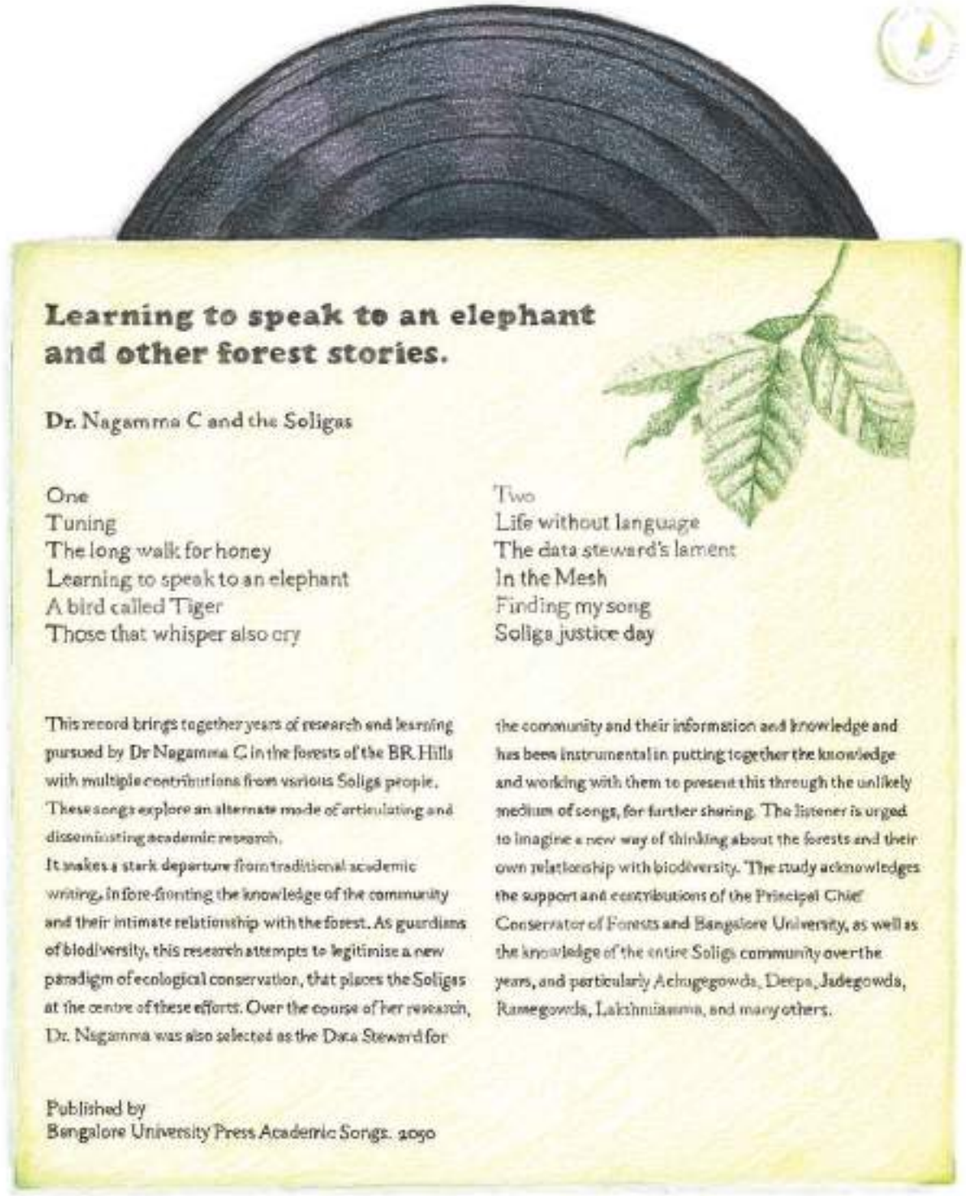
ಬುಡಕಟ್ಟಿನ ಜನಜೀವನದಲ್ಲಿ ತಂತ್ರಜ್ಞಾನವು ಹೊಕ್ಕಾಗ ಅದರ ಬಳಕೆಗಾಗಿ ಹೊಸಹೊಸ ರೀತಿನೀತಿಗಳು ಬೇಕಾಗುತ್ತವೆ; ಅದರಲ್ಲಿಯೂ ತಂತ್ರಜ್ಞಾನದಿಂದ ಹುಟ್ಟುವ ಡೇಟಾ ಮತ್ತು ಅದರ ದಾಖಲಿಸುವುದನ್ನು ಕುರಿತು. ಈ ಸವಾಲಿಗೆ ಒಂದು ಉತ್ತರವೆಂದರೆ: "ಡೇಟಾ ನಿರ್ವಾಹಕರು", ಅರ್ಥಾತ್ ಜನರಿಂದ ಆಯ್ಕೆಯಾದ ಬುಡಕಟ್ಟಿನ ಜನಪ್ರತಿನಿಧಿಗಳು. ಇಂಥವರು ಡೇಟಾದ ಸಂಗ್ರಹಣೆ, ಬಳಕೆ ಮತ್ತು ಹಂಚಿಕೆಯನ್ನು ನೋಡಿಕೊಳ್ಳುವವರಾಗಿರುತ್ತಾರೆ.

ರಂಗದ ಹಿಂಭಾಗದಲ್ಲಿ, ನಾಗಮ್ಮ ಪುಟ್ಟ ಮುದ್ರಿಕೆಯನ್ನು ಆಟಿಕೆಯಂತೆ ಬೆರಳಲ್ಲಿ ಸುತ್ತುತ್ತಿದ್ದಾರೆ. ಈ ಬಾರಿ "ಡೇಟಾ ನಿರ್ವಾಹಕರ ಸಮ್ಮೇಳನ"ದ 25ನೆ ವಾರ್ಷಿಕೋತ್ಸವ. ಮುಂದುಗಡೆಯಿಂದ ಘೋಷಣೆ ಕೇಳಿಬರುತ್ತಿದೆ, "ಅಂತಃರಾಷ್ಟ್ರೀಯ ಖ್ಯಾತಿಯ, ಮಹಾನುಭವಿಯಾದ, ಕಾಡಿನ ಡೇಟಾ ನಿರ್ವಾಹಕಿ ಡಾ. ಸಿ. ನಾಗಮ್ಮನವರನ್ನು ಚಪ್ಪಾಳೆಯೊಂದಿಗೆ ಸ್ವಾಗತಿಸಿ". ನಾಗಮ್ಮನವರಿಗೆ ಇದೆಲ್ಲ ಸೇರುವುದಿಲ್ಲ. "ಅಯ್ಯೊ, ಇದನ್ನೇ ಮಾಡ್ತಾ ಎಷ್ಟು ವರ್ಷ ಆಗ್ಹೋಯಿತಲ್ವಾ" ಅಂತ ಯೋಚಿಸುತ್ತಾರೆ. ಅವರು ಹೇಗೆ ಒಂದು ಕಾಲದಲ್ಲಿ ಸೋಲಿಗ ಭಾಷೆಯನ್ನು ನಿರಾಕರಿಸಿ ಆನಂತರ ಅದೇ ಭಾಷೆಯ ಹೋರಾಟಗಾರರಾದರು; ಹೇಗೆ ಕನ್ನಡ ಮತ್ತು ಇಂಗ್ಲಿಶ್ ಭಾಷೆಗಳಲ್ಲಿ ಬರೆಯಲು ಶುರು ಮಾಡಿದ ಅವರು ತಿರುಗಿ ಸೋಲಿಗ ನುಡಿಗೆ ಮರಳಿ ಅದಕ್ಕೆ ಶೈಕ್ಷಣಿಕ ಸ್ಥಾನಮಾನ ಸಿಗುವಂತೆ ಮಾಡಿದರು; ಹೇಗೆ ಬರಹಗಾರ್ತಿಯಾದವರು ಹಾಡುಗಾರ್ತಿಯಾಗಿ ಮಾರ್ಪಾಡಾದರು. ಇವೆಲ್ಲಾ ವಿಷಯಗಳು ಈ ಯುವ ಜನರಿಗೆ ತಟ್ಟುತ್ತದೆಯೊ, ಇಲ್ಲ ಹಳೆಯ ಕಥೆ ಆಗಿಹೋಗಿದೆಯೋ ಏನೊ ಎಂದು ನಾಗಮ್ಮ ಯೋಚಿಸುತ್ತಾರೆ.

ಸಭೆಯಲ್ಲಿ "ನಾಗಮ್ಮನ ಕಥೆ" ತಿಳಿಸುತ್ತಿದ್ದಾರೆ. ಹೇಗೆ ನಾಗಮ್ಮನವರು ಕಾಡಿನ ಡೇಟಾ ಬಗ್ಗೆ ಪ್ರಪಂಚದ ದೃಷ್ಟಿಯೇ ಬದಲಾಯಿಸಿದರು; ಹೇಗೆ ಜನರಿಗೂ ಡೇಟಾಗೂ ಇರುವ ನಿಕಟ ಸಂಬಂಧವನ್ನು ಒತ್ತೊತ್ತಿ ಹೇಳಿದರು; ಹೇಗೆ ಡೇಟಾ, ಸ್ಥಳ, ಕಾಡು, ಜೀವನ ಎಲ್ಲವೂ ಅನ್ಯೋನ್ಯ ಎಂದು ತೋರಿಸಿಕೊಟ್ಟರು. ಹಿಂದೆ ಬರೆದ ಪ್ರಬಂಧದ ಪ್ರಸ್ಥಾಪ ಕೇಳಿ ಆಕೆಗೆ ಕೊಂಚ ಮೈನಡುಕವೇ ಆಯ್ತು. "ನೋಡುವ ಪರಿ" ಎಂಬುದು ಪ್ರಬಂಧವಾಗದೆ ಹಾಡಾಗಿ ಹೊಮ್ಮಬೇಕಾಗಿತ್ತು ಎಂದೆನಿಸಿತು ಆಕೆಗೆ.

ಸಂಕೋಚದೊಂದಿಗೆ ಹೆಮ್ಮೆ ಉತ್ಸಾಹಗಳು ಆಕೆಯಲ್ಲಿ ಮೂಡಿವೆ. ಅವರ ಕೈಯಲ್ಲಿ ಎರಡು ಮುದ್ರಿಕೆಗಳಿವೆ. ಬಲಗೈಯಲ್ಲಿ ಆಕೆಯ ಮೊದಲನೆ "ವಿನೈಲ್ ರೆಕೊರ್ಡ್". ಇದು ಬೆಂಗಳೂರು ವಿಶ್ವವಿದ್ಯಾಲಯದ ರೂಪಾ ಸಹಾಯದಿಂದ ಬಿಡುಗಡೆಯಾದುದು. ಈ "ವಿನೈಲ್" ಹಳೆಕಾಲದ್ದಾದರೂ, ನಾಗಮ್ಮನಿಗೆ ಅದು ತಿರುತಿರುಗುತ್ತ ಹಾಡು ಹೊಮ್ಮಿಸಿವ ಬಗ್ಗೆ ಕೌತುಕ. ಕೊನೆಗೂ, ಆ ಮುದ್ರಿಕೆಯಲ್ಲಿರುವುದು ತಾನು ಹಾಡಿದ್ದ ಹಾಡುಗಳು, ತನ್ನ ಜನರ ದನಿಗಳು. ಎಡಗೈಯಲ್ಲಿರುವುದು ಒಂದು ನಾಣ್ಯದಷ್ಟು ಪುಟ್ಟ ಗಾಜಿನ ಮುದ್ರಿಕೆ. ಈ ಪುಟ್ಟ ಮುದ್ರಿಕೆ ನಾಗಮ್ಮನವರ ಜೀವಾಳವೇ ಸರಿ. ಅದರಲ್ಲಿ ಅವರು ಬಿಳಿಗಿರಿರಂಗನ ಬೆಟ್ಟದಲ್ಲಿ ರೆಕೊರ್ಡ್ ಮಾಡಿದ್ದೆಲ್ಲವೂ ಇದೆ. ಸಾವಿರಾರು ವರ್ಷ ಬಾಳಿಕೆ ಬರುವ 5ಡಿ ಡೇಟಾ ಮುದ್ರಿಕೆಯಿಂದ ಅದೆಲ್ಲ ಚಿರಾಯುವಾಗಿದೆ.

ಭಾಷಣ ಮುಗಿಯುತ್ತಲೆ ನಾಗಮ್ಮ ವೇದಿಕೆಗೆ ಬರುತ್ತಾರೆ. ನೆರೆದಿದ್ದ ಸಭೆಯನ್ನು ದಿಟ್ಟಿಸಿ ತನ್ನ ಮಾತನ್ನು ಶುರು ಮಾಡುತ್ತಾರೆ. "ಇವೊತ್ತು ನಿಮಗೋಸ್ಕರ ಒಂದು ಕಥೆ ಹಾಡುತ್ತೇನೆ".



Mesh Hotspot & Instructions

Mesh networks offer a different way to access information and services from the Internet. The circuitry, tools, and instructions to add a new mesh hotspot or node to a network in a village are decentralised. The code and protocols for adding a node to the network are open-source and can be shared through text messages, SD cards, or written instructions. Taking these open protocols and hosting them on a piece of hardware is typically completed in rural hack labs. These are then shared with the local community so they can host nodes in their homes, shops, and businesses.

It is in one of these rural hack labs in 2025 that a simple set of instructions is written to help communities set up hotspots for the first time. While the principles underpinning the code and hardware are relatively consistent, the material and skills available to house the technology are different in each village. A vernacular technology is created, with the design and build of each hotspot reflecting its geography and culture.

Dinesh and Vidya are working late, putting the final touches to the first edition of their 'Make Your Own Hotspot' guide. Dinesh looks across the table to Vidya.

"What's troubling you?"

"I'm still figuring out how best to edit this so that there's focus on the local design aspect".

"Let me look at it". Dinesh sits on the opposite side of the table and takes a pencil and notebook out of his shirt pocket. He pulls up his bifocals from around his neck and, brow furrowed, looks at what Vidya's handed him.

"I think it looks fine, Vidya." He removes his glasses and continues. "What's important is for these communities to see that it is enough if the hotspots are compatible; that they don't need to be alike. As long as they are able to talk to each other, they can take on any form and be made with anything, whether it's the jondu grass and bamboo we have here at Iruway Farm or reuse the waste plastic of the city!"

Vidya laughs, "Do you think cities will ever want to make mesh hotspots?"

"I don't know" replies Dinesh, "It would certainly be novel for the cities to learn something from us 'villagers', but I'm hopeful, Vidya, I'm hopeful."

ಬಲೆ (ಮೆಶ್) ಹಾಟ್-ಸ್ಪಾಟ್ ಬಗ್ಗೆ ತಿಳುವಳಿಕೆ

ಬಲೆ (ಮೆಶ್) ನೆಟ್ವರ್ಕುಗಳು ಅಂತರ್ಜಾಲದಿಂದ ಮಾಹಿತಿಯನ್ನು ಪಡೆಯಲು ಬೇರೊಂದು ದಾರಿ. ಹಳ್ಳಿಯೊಂದಕ್ಕೆ ಹೊಸ "ಮೆಶ್ ಹಾಟ್-ಸ್ಪಾಟ್" (ಅಲೆಬುಗ್ಗೆ) ಅಥವಾ ನೋಡ್ (ಜಾಲಘಟಕ) ಒದಗಿಸಲು ಬೇಕಾದ ಸಾಮಗ್ರಿ, ಸಲಕರಣೆ ಇತ್ಯಾದಿ ಈಗ ಎಲ್ಲೆಡೆಯೂ ದೊರೆಯುತ್ತವೆ. ನೆಟ್ವರ್ಕಿಗೆ ನೋಡ್ ಸೇರಿಸಲು ಬೇಕಾದ ವಿಧಾನಗಳು ಎಲ್ಲರಿಗೂ ದಕ್ಕುವಂತಿದ್ದು, ಟೆಕ್ಸ್ಟ್ ಮೆಸಜ್, ಎಸ್ಡಿ ಕಾರ್ಡುಗಳು ಅಥವಾ ಬರಹದ ಮೂಲಕ ಅವನ್ನು ಹಂಚಬಹುದು ಕೂಡ. ಇಂಥ ಮುಕ್ತನಿಯಮಾವಳಿ (ಓಪನ್ ಪ್ರೋಟೊಕಾಲ್ಸ್) ಬಳಸಿ ಹಾರ್ಡ್-ವೇರ್-ಗೆ ಜೋಡಿಸುವುದನ್ನು ಗ್ರಾಮೀಣ ಹ್ಯಾಕ್ ಲ್ಯಾಬುಗಳಲ್ಲಿ ನಡೆಯುತ್ತದೆ. ನಂತರ, ಈ ಸೌಲಭ್ಯವನ್ನು ಎಲ್ಲರಿಗೂ ಹಂಚಲಾಗುತ್ತದೆ.

ಇಂಥದೊಂದು ಗ್ರಾಮೀಣ ಹ್ಯಾಕ್ ಲ್ಯಾಬಿನಲ್ಲೇ 2025 ಇಸ್ವಿಯಲ್ಲಿ ಮೊದಲ ಬಾರಿಗೆ ಹಾಟ್-ಸ್ಪಾಟ್ ಅಣಿ ಮಾಡುವುದು ಹೇಗೆಂದು ಸರಳವಾಗಿ ಬರೆದಿಡಲಾಗುತ್ತದೆ. ಅಣಿ ಮಾಡುವ ಬಗೆ ಮತ್ತು ಯಂತ್ರ ಎಲ್ಲೆಡೆಯೂ ಹೆಚ್ಚುಕಡಿಮೆ ಒಂದೆ ಇದ್ದರೂ, ಒಂದೊಂದು ಹಳ್ಳಿಗೂ ಅದನ್ನು ಒಗ್ಗಿಸುವ ಬಗೆ ಬೇರೆಬೇರೆ. ಈ ಸವಾಲನ್ನು ಎದುರಿಸಲು ದೇಶಿ ತಂತ್ರಜ್ಞಾನ ಹುಟ್ಟುಹಾಕಲಾಗಿದೆ.

"ನಿಮ್ಮದೇ ಹಾಟ್-ಸ್ಪಾಟ್ ರಚಿಸಿ" ಎಂಬ ಕಿರುಹೊತ್ತಿಗೆಯನ್ನು ದಿನೇಶ್ ಹಾಗೂ ವಿದ್ಯಾ ಸಿದ್ಧ ಮಾಡುತ್ತಿದ್ದಾರೆ . ದಿನೇಶ್ ವಿದ್ಯಾಳತ್ತ ನೋಡಿ,

"ಏನಮ್ಮ ತೊಂದ್ರೆ?"

"ಇಲ್ಲಿ ಸ್ಥಳೀಯತೆಗೆ ಹೇಗೆ ಒತ್ತು ಕೊಡಬಹುದು ಅಂತ ಯೋಚನೆ ಮಾಡ್ತಿದ್ದೆ."

"ಕೊಡಿಲ್ಲಿ, ನೋಡೋಣ." ದಿನೇಶ್ ಕನ್ನಡಕ ಹಾಕಿಕೊಂಡು, ವಿದ್ಯಾಳ ಕೈಯಿಂದ ಹೊತ್ತಿಗೆ ತೊಗೊಂಡು ನೋಡ್ತಾರೆ.

"ಸರ್ಯಾಗೆ ಇದೆ, ವಿದ್ಯಾ. ಮುಖ್ಯವೆಂದರೆ, ಅಲ್ಲಿಯವರಿಗೆ ಈ ಹಾಟ್-ಸ್ಪಾಟುಗಳು ಒಂದಕ್ಕೊಂದು ಹೊಂದುವಂತಿರಬೇಕು, ಪರಸ್ಪರ ಮಾತಾಡುವಂತಿರಬೇಕು ಎಂಬುದನ್ನು ತಿಳಿಸುವುದು ಜರೂರು. ಮಿಕ್ಕಿದ್ದೆಲ್ಲಾ ವಿವರಗಳಷ್ಟೇ!"

ನಗುತ್ತಾ ವಿದ್ಯಾ ಕೇಳುತ್ತಾಳೆ, "ನಗರಗಳಲ್ಲಿ ಇಂಥ ಹಾಟ್-ಸ್ಪಾಟುಗಳು ಯಾವತ್ತಾದರೂ ಬಳಸ್ತಾರಾ?"

"ಯಾರಿಗ್ಗೊತ್ತು, ವಿದ್ಯಾ? ಆದರೆ, ಏನೋ ನಮ್ಮಂಥ "ಹಳ್ಳಿಗರಿಂದ" ಅವರು ಚೂರಾದರೂ ಕಲಿಯಬಹುದೆಂದು ನಂಬಿದ್ದೀನಿ."

Mesh Hotspot & Instructions. Make Your Own Hotspot instructions by the Meshmaker organisation. 2025. Mesh Hotspot from Gulbarga Colony, Bangalore. Plastic Bottle, wound wire aerial, solar panel, various electronic components. 2038.

Data Steward Scarf, Handbook & Data Blocks

The proliferation of decentralised technologies in rural areas of Karnataka demands a new approach to managing data in ways that are sensitive to and respectful of the local tradition and culture.

Jayalakshmi is sitting on her bed and holding up her just-awarded Data Steward Scarf to her face. It feels so official and important and the fact that it was made locally (using the practices and crafts of her community) makes her doubly happy. Tomorrow she will wear this as she does her first data-walk around Durgadahalli. She is gripping her handbook tightly; its worn edges and scuffed front speak to the many hours she's spent reading it. Of course she knows every word - she scored 100% in the test last week – but knowing something and understanding something are not the same. She knows everything in the book, but will she know how to explain to Gopi how he can ensure his bee-sound-capturing files are kept anonymous? Will he understand when she explains to him that shouting about how 'Lakshmi's honey is the best this side of the forest' means the data is no longer anonymous? Maybe she can use the Data Blocks to discuss different approaches to data collection and privacy; who knows, together they might come up with a better approach! She knows the kids at school will have everything right, but will they be able to rate the value of the butterfly counts they have been doing on their way to the school? Will they be able to score it as highly as they should? Will they know that the presence of a swarm of butterflies can, when fed into a You-Learn rain predictor, be used to predict the start of this year's rainy season? Will they know how to normalise the data they've collected given the relatively large size of their school? So much to do in one day. Her first day as Durgadahalli's Data Steward.

Data Steward Scarf, Handbook & Data Blocks. Data Steward Scarf. Khadi Cotton, block printed and hand embroidered. 2032. Data Steward Handbook. Softcover booklet. 2032. Three Data Steward Data Blocks. Screen printed, wooden blocks. 2032.

ಡೇಟಾ-ನಿರ್ವಾಹಕ ಶಾಲು, ಕೈಪಿಡಿ ಮತು ಡೇಟಾಗುಡ್ಡೆಗಳು

ವಿಕೇಂದ್ರೀಕರಿಸಿದ ತಂತ್ರಜ್ಞಾನಗಳು ಕರ್ನಾಟಕದ ಹಳ್ಳಿಹಳ್ಳಿಗೂ ಹಬ್ಬುತ್ತಿರುವುದರಿಂದ, ಅಲ್ಲಲ್ಲಿಗೆ ಬಂದ ಡೇಟಾದ (ಮಾಹಿತಿ) ನಿರ್ವಹಣೆ ಅಲ್ಲಲ್ಲಿಗೆ ಒಗ್ಗುವುವಂತೆ ಮಾಡುವುದು ಮುಖ್ಯ. ಇದೇ ಡೇಟಾ-ನಿರ್ವಾಹಕರ ಜವಾಬ್ದಾರಿ.

ಮೊನ್ನೆಯಷ್ಟೇ ಕೊಟ್ಟಿದ ಡೇಟಾನಿರ್ವಾಹಕ ಶಾಲನ್ನು ಜಯಲಕ್ಷ್ಮಿ ಅವಳ ಮುಖಕ್ಕೆ ಒತ್ತಿಕೊಂಡಿದ್ದಾಳೆ. ಅವಳಿಗೆ ಅದು ಸಿಕ್ಕಿದ್ದು ಹಿಗ್ಗಿನ ವಿಷಯ. ಶಾಲು ಅಲ್ಲಿನ ಪಾರಂಪಾರಿಕ ರೀತಿಯಲ್ಲಿ ಹೊಲೆದದ್ದು ಎಂಬುದು ಮತ್ತೊಂದು ಖುಶಿಯ ವಿಚಾರ.

ನಾಳೆ ಇದೇ ಶಾಲನ್ನು ಹಾಕಿಕೊಂಡು ದುರ್ಗದಹಳ್ಳಿ ಸುತ್ತ ಓಡಾಡಲು ಕಾತರಿಸುತ್ತಿದ್ದಾಳೆ. ನಾಳೆ ಅವಳು ಡೇಟಾನಿರ್ವಾಹಕಿ ಕೆಲಸ ಶುರು ಮಾಡುವ ದಿನ! ಕೈಪಿಡಿ ಇಟ್ಟುಕೊಂಡಿದ್ದಾಳಾದರೂ ಅದರಲ್ಲಿರುವುದೆಲ್ಲಾ ಅವಳಿಗೆ ಗೊತ್ತು. ಹೋದ ವಾರ ತಾನೆ ಪರೀಕ್ಷೆಯಲ್ಲಿ ನೂರಕ್ಕೆ ನೂರು ಗಳಿಸಿದಳು. ಆದರೆ – ಪುಸ್ತಕದಲ್ಲಿರುವುದನ್ನು ಓದುವುದು ಬೇರೆ, ಅರ್ಥೈಸುವುದೇ ಬೇರೆ.

ಉದಾಹರಣೆಗೆ, ಅವಳು ದೇಟಾ-ಅನಾಮಿಕತೆ ಮತ್ತು ಸುರಕ್ಷತೆ ಬಗ್ಗೆ ಗೋಪಿಗೆ ಹೇಗೆ ಮನವರಿಕೆ ಮಾಡಿಕೊಡುವುದು? ಅವನ ಖುಶ್ಬುಶಿಯಾಗಿ "ಕಾಡಿನ ಈ ಭಾಗದಲ್ಲಿ ಲಕ್ಷ್ಮಿಯ ಜೇನೇ ಬೆಸ್ಟು!" ಎಂದು ಒದರಿಬಿಟ್ಟರೆ ಡೇಟಾ-ಅನಾಮಿಕತೆಯನ್ನು ಕಳಚಿ ಹೋಗುತ್ತೆ ಅಂತ ಹೇಗೆ ತಿಳಿ ಹೇಳುವುದು? ಡೇಟಾಗುಡ್ಡೆಗಳನ್ನು ಬಳಸಿ ಅದರ ಬಗ್ಗೆ ಮಾತಾಡಬಹುದೊ ಏನೊ. ಅಥವಾ ಮಾತಾಡ್ತಾ ಮಾತಾಡ್ತಾ ಇನ್ಯಾವುದೋ ರೀತಿ ಹೊಳೆಯಬಹುದು!

ಹಾಗೆ, ಶಾಲೆಯ ಮಕ್ಕಳ ಬಗ್ಗೆ ಅವಳಿಗೆ ಏನೂ ಚಿಂತೆಯಿಲ್ಲ. ಅವರಿಗೆ ಇದೆಲ್ಲ ಅರ್ಥವಾಗುತ್ತದೆ. ಆದರೆ, ಅವರು ಮಾಡಿದ "ಚಿಟ್ಟೆ ಎಣಿಕೆ"ಯ ಮೌಲ್ಯ ಅವರಿಗೆ ತಿಳಿದಿದೆಯಾ? ಆ ಎಣಿಕೆಯಿಂದ ಮಳೆಗಾಲ ಯಾವಾಗ ಬರುತ್ತದೆ ಎಂದು ಊಹಿಸಬಹುದೆಂದು ಅವರಿಗೆ ಗೊತ್ತಾ? ಅದರ ಮಹತ್ವವನ್ನು ಅರಿತಾರೆ? ಕಣಿ ಹೇಳುವ ಯೂ-ಲರ್ನ್ ಯಂತ್ರವನ್ನು ಬಳಸಿ ಮಳೆಗಾಲದ ಬಗ್ಗೆ ತಿಳಿದುಕೊಳ್ಳಬಹುದೆಂದು ಅವರಿಗೆ ಗೊತ್ತಿರುತ್ತಾ?

ಮಾಡಲು ಅಷ್ಟೊಂದು ಕೆಲಸ! ಸದ್ಯಕಾದರೊ, ಇರಲಿ ನಾಳೆಯು ನಾಳೆಗೆ.

Mesh Advocacy Ephemera

By 2040, the villages of Karnataka are exemplars of possible new approaches to the development of decentralised networks, a grassroots phenomenon that has achieved widespread popularity in both rural and urban areas. What began as a campaign by a single rural hack lab in Durgadahalli quickly grew, with pamphlets and murals helping it spread across India.

Asha and Jayalakshmi are exhausted. They've just closed the door on the Mesh Museum's 'We Did It' party. The whole of Durgadahalli turned out to celebrate. They can still hear the chants of "Mesh it up good!" in the distance as people make their way home past late night coffee and snack stalls. It's not every day that film stars, heads of state, and village communities party together. This is what change looks like. The after-party of a national movement that started in a village in south Karnataka. The museum had never been so busy. Asha's phone beeps constantly, as messages pour in from friends congratulating her on the news in India Today about 'full mesh coverage' being achieved across the country. No longer can any government listen in on people's conversations. No longer can US and Chinese big tech organisations steal data from people in India. No longer can Monsanto use the Internet to advertise sterile seeds to India's farmers.

It has been 15 years since Dinesh and Vidya first wrote out the instructions meant to guide the development of the mesh. And just 8 years since Asha first met Jayalakshmi and began working with her. Not long after, they had started being interviewed about the future of the Internet, having to explain again and again what a Mesh Maker was and what the role of a Data Steward was. This morning the lead story on the Times of India app was "The end of digital colonialism": they had come a long way. Dinesh's tears as he left the party before things got too wild said everything. From a village in Karnataka to Delhi and beyond, he had kicked off a movement that changed everything.

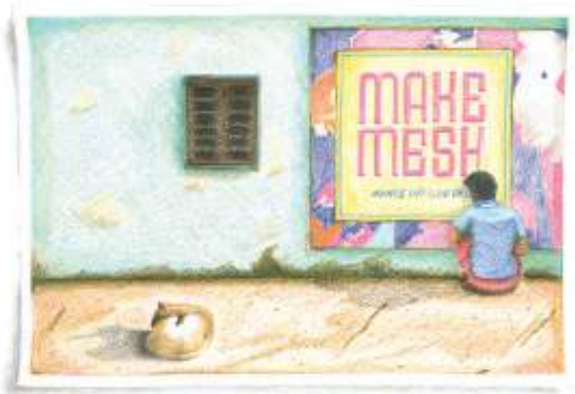
ಬಲೆ ಕುರಿತು ವಕಾಲತ್ತು

2040ನೆ ಇಸ್ವಿಯ ಹೊತ್ತಿಗೆ, ಕರ್ನಾಟಕದ ಹಳ್ಳಿಗಳು ವಿಕೇಂದ್ರೀಕರಿಸಿದ ನೆಟ್ವರ್ಕುಗಳಿಗೆ ಮಾದರಿಯಾಗಿವೆ. ಎಲ್ಲೊ ದುರ್ಗದಹಳ್ಳಿಯ ಜನಸಾಮಾನ್ಯರ ನಡುವೆ ಸಣ್ಣದೊಂದು ಗ್ರಾಮೀಣ ಹ್ಯಾಕ್ ಲ್ಯಾಬಿನಲ್ಲಿ ಶುರುವಾದ ಈ ಕೆಲಸ, ಕೈಬೀಟಿ ಮತ್ತು ಭಿತ್ತಿಚಿತ್ರಗಳ ಸಹಾಯದಿಂದ ದೇಶದ ಎಲ್ಲೆಡೆಗೆ ಹಬ್ಬಿಬಿಟ್ಟಿದೆ.

ಅಶಾ ಮತ್ತು ಜಯಲಕ್ಷ್ಮಿ ಸುಸ್ತಾಗಿ ಕೂತಿದ್ದಾರೆ. "ನಾವ್ ಮಾಡಿದ್ವಿ!" ಎಂಬ ಸಂಭ್ರಮ ಈಗಷ್ಟೇ ಮುಗಿದಿದೆ. ಇಡೀ ದುರ್ಗದಹಳ್ಳಿಯೇ ಪಾಲುಗೊಂಡಿತು. "ಬಲ್ಬಲೆ ಬಲೆಬಲೆ!" ಕೂಗು ದೂರದಿಂದ ಇನ್ನೂ ಕೇಳಿಬರುತ್ತಿದೆ. ಸಿನೆಮಾ ತಾರೆಗಳು, ರಾಜಕೀಯ ಅಧ್ಯಕ್ಷರು ಹಾಗೂ ಹಳ್ಳಿಗರು ಒಟ್ಟಿಗೆ ಸಂಭ್ರಮಿಸುವುದು ಸಾಮಾನ್ಯವೇನಲ್ಲ. ಇದೇ ಬದಲಾವಣೆಯ ಮುಖ. ದಕ್ಷಿಣ ಕರ್ನಾಟಕದಲ್ಲಿ ಹುಟ್ಟಿದ ರಾಷ್ಟ್ರೀಯ ಆಂದೋಲನದ ಯಶಸ್ವಿ ಅಂತ್ಯವಿದು. ಇವತ್ತಿನಂತೆ ಮ್ಯೂಸಿಯಂ ಯಾವುತ್ತೂ ಭರ್ತಿಯಾಗಿರಲಿಲ್ಲ. ಆಶಾ ಅವರ ಫೋನು ಒಂದೇ ಸಮ ಗುಂಯ್ಗುಟ್ಟುತ್ತಿದೆ. "ಇಂಡಿಯಾ ಟುಡೇ" ವಾರಪತ್ರಿಕೆಯಲ್ಲಿ ಇಡೀ ದೇಶದಲ್ಲಿ "ಸಂಪೂರ್ಣ ಬಲೆ ಬೀಸು" ಆಗಿರುವ ವರದಿಯನ್ನು ನೋಡಿ ಎಲ್ಲಾ ಗೆಳೆಯರು ಅಭಿನಂದನೆಗಳನ್ನು ಕಳಿಸುತ್ತಿದ್ದಾರೆ. ಇನ್ನು ಮುಂದೆ, ಸರ್ಕಾರಕ್ಕೆ ಜನರ ಫೋನುಮಾತಿನ ಮೇಲೆ ನಿಗಾ ಇಡಲಾಗುವುದಿಲ್ಲ. ಚೈನಾ ಮತ್ತು ಅಮೆರಿಕಾದ ದೊಡ್ಡದೊಡ್ಡ ಸಂಸ್ಥೆಗಳು ಭಾರತದ ಜನಗಳಿಂದ ಇನ್ನು ಮುಂದೆ ಡೇಟಾ ಕದಿಯಲು ಸಾಧ್ಯವಿರುವದಿಲ್ಲ. ಮೊನ್ಸ್ಯಾಂಟೋ ಎಂಬಂತ ಬಹುರಾಷ್ಟ್ರೀಯ ಕಂಪನಿಗಳು ಬಂದು ಇಲ್ಲಿನ ರೈತರಿಗೆ ಬರಡು ಬೀಜಗಳನ್ನು ಮಾರಿ ಮೋಸ ಮಾಡಲಾಗುವುದಿಲ್ಲ.

ದಿನೇಶ್ ಮತ್ತು ವಿದ್ಯಾ ಬಲೆ ಸೃಷ್ಟಿಸಲು ಬೇಕಾದ ಮೊದಲ ಕೈಪಿಡಿ ಬರೆದು 15 ವರುಷಗಳಾಗಿವೆ. ಅಶಾ ಮತ್ತು ಜಯಲಕ್ಷ್ಮಿ ಭೇಟಿಯಾಗಿ ಒಟ್ಟಿಗೆ ಕೆಲಸ ಮಾಡಲು ಶುರುವಾದದ್ದು 8 ವರುಷಗಳ ಹಿಂದೆ. ಅದಾದ ಕೆಲವೇ ತಿಂಗಳ ನಂತರ, ಅಂತರ್ಜಾಲದ ಭವಿಷ್ಯದ ಬಗ್ಗೆ ಅವರನ್ನು ಸಂದರ್ಶಿಸಿದಾಗ ಅವರು ಮತ್ತೆಮತ್ತೆ "ಬಲೆ ತಯಾರಕ" ಮತ್ತು "ಡೇಟಾ ನಿರ್ವಾಹಕ"ರ ಬಗ್ಗೆ ಅರ್ಥೈಸಬೇಕಾಗುತ್ತಿತ್ತು. ಈ ಬೆಳಿಗ್ಗೆ, "ಟೈಮ್ಸ್ ಆಫ್ ಇಂಡಿಯಾ" ಆಪ್-ನಲ್ಲಿ ದೊಡ್ಡದಾಗಿ "ಡಿಜಿಟಲ್ ವಸಾಹತಿಯ ಅಂತ್ಯ" ಎಂದು ವರದಿ – ಎಲ್ಲಿಂದ ಎಲ್ಲಿಗೆ ಬಂದಿದ್ದಾರೆ ಈ ಜನ ! ದಿನೇಶ್ ಕಣ್ಣಲ್ಲಿ ನೀರು ಹಾಕಿಕೊಂಡು ಸಂಭ್ರಮಕ್ಕೆ ಬೀಳ್ಕೊಟ್ಟಿದ್ದು ಆತನ ಮನಸ್ಥಿತಿಗೆ ಸಾಕ್ಷಿಯಾಗಿತ್ತು. ಕರುನಾಡಿನ ಸಣ್ಣ ಹಳ್ಳಿಯಿಂದ ದಿಲ್ಲಿಯವರೆಗೆ ಮತ್ತು ಅದರಾಚೆಗೂ ನಡೆದ ಚಳುವಳಿಗೆ ದಿನೇಶ್ ಅವರೇ ನಾಂದಿ ಹಾಡಿದ್ದರು.

Mesh Advocacy Ephemera. 'Our Internet' Sticker. Iruway Farm. 2025. 'Make More Mesh' flyer for meeting held in Durgadahalli. 2033. Photograph of a mural being painted in Bangalore. 2037. Clipping from The Times of India. 2040.



THE TIMES OF INDIA · Chennai, July 18, 2040

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The end of digital colonialism

Mesh-Network phenomenon developed in rural Karnataka communities sweeps through urban India reversing centuries of precedent.

Ramya Krishnan

Mesh Bowl and Data Tokens

As the mesh expanded across India it created a new network; an Internet that could be transmitted from house-to-house and across villages, towns, and cities in a radically decentralised way, each iteration reflecting local needs and benefitting from diverse knowledge. The mesh placed privacy controls in the hands of everyone in a transparent manner with people and households given agency to steward their own data.

As the network grew in Karnataka, a partnership sprang up between the lacquered wood-toy-making village of Channapatna and rural hack labs. They collaborated to make bowls and tokens that people could use to create glanceable interfaces to control the privacy of different types of data on their home's mesh network.

The 'Mesh Bowl' acts as a node within a broader mesh network. It also gives people the ability to control the data that flows from their devices through the Mesh. The five tokens represent five different types of data; Aadhar, Text, Camera, Location, and Sound. A token inside the wooden dish indicates that the data type is private. Moving the token to the fabric mat changes it into a transferable data type. As new forms of data are recognised, new tokens can be added to control them. Beyond Karnataka, different areas are developing their own tokens – often drawing from local craft cultures, privacy customs and behaviours peculiar to the people of the area.

"Tanveer! Stop messing with the mesh... I need photos. Put it back. Give me back my photos. "

"I need privacy. You don't need the photos".

"Muuuuum".

Tanveer lets the brightly coloured token fall into the Mesh bowl just as his mum enters the room.

"Tanveer, the Mesh is for the whole family. Your sister wants to send her friends photos of her project. We can turn photos off when she's finished". Tanveer is clearly disgruntled. Last Tuesday, one of the founders of data stewardship, Jayalakshmi K, had come to visit his school and given the best talk he had ever heard. Privacy, she had said, was a basic need in the same manner that water was but it also had to be constantly cared for and managed within homes and villages. He had heard of an update to the Mesh Tokens that would allow one to exclude photos of specific people. He could hardly wait for that update! He could then glue its token into the mesh bowl and protect himself from his sister's constantly clicking camera. Until then, he would continue to take the Photo token out anytime he could.

Mesh Bowl and Data Tokens. Mesh Bowl. Turned, oiled wood, various electronic components. 2045. Five Data Tokens. Turned, lacquered wood, various electronic components. 2045. Mesh Mat. Khadi Cotton with hand embroidered detail. 2045.

ಬಲೆ ಬಟ್ಟಲು ಮತ್ತು ಡೇಟಾ ನಾಣ್ಯಗಳು

ವಿಕೇಂದ್ರೀಕರಣ ಮತ್ತು ಗೌಪ್ಯತೆಯ ನಿಯಂತ್ರಣಗಳನ್ನು ಎಲ್ಲರ ಕೈಯಲ್ಲಿರಿಸುವ ಒಂದು ವಿಧಾನವೇ ಬಲೆ ನೆಟ್ವರ್ಕ್. ಮೊದಮೊದಲ ಬಲೆ ನೆಟ್ವರ್ಕುಗಳು ಕರಡು ಮಟ್ಟದ್ದಾಗಿದ್ದವು. ಆದರೆ ಕ್ರಮೇಣ ದೇಶದ ಆಯಾ ಭಾಗದ ಪರಿಸರಕ್ಕೆ ಒಗ್ಗುವಂತಾಗಿ ಬೆಳೆಯತ್ತ ಹಬ್ಬಿದವು. ಬರುಬರುತ್ತ ಡೇಟಾ ಹೆಚ್ಚೆಚ್ಚು ವಿಕೇಂದ್ರಕೃತವಾಗಿ ಅದನ್ನು ಸಂಭಾಳಿಸುವ ಬಲ ಎಲ್ಲರಿಗೂ ದೊರೆಯುವಂತಾಯ್ತು – ಮೊದಲು ಪಂಚಾಯತಿಯ ಕೈಯಲ್ಲಿದ ಬಲ ಕ್ರಮೇಣ ಒಬ್ಬ ಸಾಮಾನ್ಯ ವ್ಯಕ್ತಿಯ ಕೈಗೂ ದಕ್ಕಿತು. ಪ್ರತಿಯೊಬ್ಬರೂ ತಂತಮ್ಮ ಡೇಟಾದ ನಿರ್ವಾಹಕರಾದರು.

ಕರ್ನಾಟಕದಲ್ಲಿ ಚಳುವಳಿ ಬೆಳೆದಂತೆ, ಗೊಂಬೆಗಳಿಗೆ ಹೆಸರಾದ ಚೆನ್ನಪಟ್ಟಣ ಮತ್ತು ಗ್ರಾಮೀಣ ಹ್ಯಾಕ್ ಲ್ಯಾಬುಗಳ ನಡುವೆ ಒಂದು ಸಂಬಂಧ ಬೆಳೆಯಿತು. ಕೈಜೋಡಿಸಿ, ಅವರು ಬಲೆಬಟ್ಟಲು ಮತ್ತು ಡೇಟಾನಾಣ್ಯಗಳನ್ನು ತಯಾರಿಸಲಿಕ್ಕೆ ಶುರು ಮಾಡಿದರು. ಇವುಗಳನ್ನು ಬಳಸಿ ಜನರು ಅವರ ಮನೆಯಲ್ಲಿರುವ ಬಲೆ ನೆಟ್ವರ್ಕ್ ಮೇಲೆ ಹೆಚ್ಚು ನಿಗಾ ಇಡುವುದು ಸಾಧ್ಯವಾಯಿತು.

'ಬಲೆ ಬಟ್ಟಲಿ'ಗೆ ಎರಡು ಮುಖ್ಯ ಉಪಯೋಗಗಳಿವೆ. ಒಂದು, ಹೆಚ್ಚು ವಿಸ್ತಾರವಾದ ಬಲೆ ನೆಟ್ವರ್ಕಿನೊಳಗೆ ಅದೊಂದು ಮುಖ್ಯ ಬಿಂದು. ಇದರಿಂದ ಅಂತರ್ಜಾಲವನ್ನು ಹಳ್ಳಿಗಳಲ್ಲಿ ಮತ್ತು ಊರುಗಳಲ್ಲಿ ಸರಾಗವಾಗಿ ವಿಕೇಂದ್ರೀಕರಿಸಿದ ರೀತಿಯಲ್ಲಿ ಪಸರಿಸಬಹುದು. ಇನ್ನೊಂದು – ಜನರಿಗೆ ಬಲೆ ಮೂಲಕ ಬಂದು ಹೋಗುವ ಡೇಟಾ ಬಗೆಗಳನ್ನು ನಿಯಂತ್ರಿಸಲು ಅನುವು ಮಾಡಿಕೊಡುತ್ತದೆ. ಐದು ನಾಣ್ಯಗಳು ಐದು ಬಗೆಯ ಡೇಟಾವನ್ನು ಪ್ರತಿನಿಧಿಸುತ್ತವೆ: ಆಧಾರ್, ಟೆಕ್ಸ್ಟ್, ಕ್ಯಾಮರಾ, ಸ್ಥಳ ಮತ್ತು ಸದ್ದು. ನಾಣ್ಯ ಬಟ್ಟಲೊಳಗಿದ್ದರೆ, ಅದು ಡೇಟಾ ಗೋಪ್ಯವಾಗಿದೆ ಎಂದರ್ಥ. ಇದೇ ನಾಣ್ಯವನ್ನು ಬಟ್ಟೆಗೆ ವರ್ಗಾಯಿಸಿದರೆ, ಡೇಟಾ ಪ್ರಸಾರಾರ್ಹವು ಎಂದರ್ಥ. ಹೊಸ ಬಗೆಯ ಡೇಟಾ ಸೃಷ್ಟಿಯಾದಂತೆ, ಹೊಸ ರೀತಿಯ ನಾಣ್ಯಗಳನ್ನು ಸೃಷ್ಟಿಸಬಹುದು. ಕರ್ನಾಟಕದಾಚೆ, ಜನರು ಅವರದೇ ವಿನ್ಯಾಸದ, ಅವರ ಸಂಸ್ಕೃತಿ ಮತ್ತು ಸಂಪ್ರದಾಯಗಳಿಗೆ ಹೊಂದುವ ನಾಣ್ಯಗಳನ್ನು ಏರ್ಪಡಿಸುತ್ತಿದ್ದಾರೆ.

"ತನ್ವೀರ್! ಬಲೆ ಜೊತೆ ನಿನ್ನ ಕಪಿಚೇಷ್ಟೆ ನಿಲ್ಲು. ನನಗೆ ಫೋಟೋಸ್ ಬೇಕು. ನನ್ನ ಫೋಟೋಸನ್ನು ವಾಪಸ್ ಹಾಕು."

"ನನ್ನ ಗೌಪ್ಯತೆ ನನಗೆ ಬೇಕು! ನನ್ನ ಫೋಟೋಗಳು ನಿನಗೇಕೆ?"

"ಅಮ್ಮಾಽಽ". ಒಮ್ಮೆಲೆ, ನಾಣ್ಯ ತನ್ವೀರ್ ಕೈಗಳಿಂದ ಜಾರಿ ಬಟ್ಟಲೊಳಗೆ ಬೀಳುತ್ತದೆ. ಅಮ್ಮ ಒಳಗೆ ಬಂದು, "ತನ್ವೀರ್, ಆ ಬಲೆ ಎಲ್ಲರಿಗಾಗಿರುವುದು. ನಿನ್ನ ತಂಗಿ ಅವಳ ಫ್ರೆಂಡ್ಸಿಗೆ ಅವಳ ಪ್ರೊಜೆಕ್ಟಿನ ಫೋಟೋಗಳನ್ನು ಕಳಿಸಲಿಕ್ಕೆ ಬಿಡು! ಆಮೇಲೆ ಅದನ್ನು "ಒಫ್" ಮಾಡ್ಬೋದು."

ತನ್ವೀರ್ ಗುರ್ರ್ ಎನ್ನುತ್ತಿದ್ದಾನೆ. ಹೋದ ವಾರವಷ್ಟೇ, ಜಯಲಕ್ಷ್ಮಿ ಅಕ್ಕ ಅವನ ಶಾಲೆಗೆ ಬಂದು ಡೇಟಾ ನಿರ್ವಹಣೆ ಬಗ್ಗೆ ಎಷ್ಟು ಚೆನ್ನಾಗಿ ಮಾತಾಡಿದ್ದಳು. ಅನ್ನ ಮತ್ತು ನೀರಿನಷ್ಟೇ ಮೌಲ್ಯವಾದುದು ಗೌಪ್ಯತೆ (ಪ್ರೈವಸಿ) ಎಂದಿದ್ದರು. ಅದನ್ನು ಎಚ್ಚರಿಕೆಯಿಂದ ನಿರ್ವಹಿಸಬೇಕು. ಸದ್ಯದಲ್ಲೇ 'ಬಲೆ ನಾಣ್ಯ'ಗಳಿಗೆ ಹೊಸ "ಅಪ್ಡೇಟ್" ಆಗುವುದರ ಬಗ್ಗೆ ಕೇಳಿದ್ದ. ಅದರಲ್ಲಿ ಜನರಿಗೆ ತಮ್ಮ ಫೋಟೋಗಳನ್ನು ಬೇರ್ಪಡಿಸುವ ಅನುಕೂಲತೆ ಬರುವಲಿತ್ತು. ತನ್ವೀರ್ ಅದಕ್ಕೆ ತುದಿಗಾಲಿನ ಮೇಲೆ ಕಾಯುತ್ತಿದ್ದ. ಅದು ಬಂದ ಮೇಲೆ, ಅವನ ತಂಗಿಯ ಕ್ಯಾಮೆರಾ ಚಟಕ್ಕೆ ಅವನು ಮತ್ತೆಂದೂ ಸಿಲುಕಲಾರ! ಅಲ್ಲಿಯವರೆಗೆ, ಬಟ್ಟಲಿಂದ ಫೋಟೋ ನಾಣ್ಯವನ್ನು ತೆಗೆಯುವುದೇ ದಾರಿ.

Digital Farm Tool

Farmers across India have long embraced Jugaad, the philosophy and practice of informal repair and mending. When extended to localised digital practices, these farmers become coders, hackers, and makers – adapting and developing low cost, context-specific,and customisable digital farming tools that can harvest both data and crops.

These tools support individualised farming practices and build on traditional knowledge. They allow the small farmer to build a competitive advantage and enhance the best aspects of their practice whilst offering a counter-narrative to embedded IoT-sensing technology, big data, and artificial intelligence that drives large-scale agribusiness.

In the landscape of mesh-enabled decentralised digital products and services, a national network of hyper-local organisations emerges to support digital farmers. FarmLab is a community-led NGO that embraces culture, tradition, creativity, intuition and time-honoured knowledge to enable farmers and farm communities to build digital tools, steward data, and distribute new technological knowledge. Every region or small town has its own autonomous FarmLab tailored to the region's needs and coordinating between individual farms and other regional labs. Open learning and localised data stewardship ensure that no single lab or other entity can profit from extracting data from the network.

By safely connecting to a wider mesh-network of other farms, national trends in weather, seasonal climate, and economic conditions are available to the regional farmer. This is an example of big data blending with finely-honed traditional knowledge. The tools may hold the data, but the farmer wields the knowledge and power to use this data in ways that work best for them.

Narasimha leans back on his spade after digging a shallow trench to plant ragi in. Reaching for the pouch in his belt, he removes the soil sensor that his daughter, Usha, made for him three years ago. That was when they decided to switch his two hectares to non-chemical farming, or 'organic farming' as Usha calls it. The sensor is simply a soil spike connected to a small mesh-connected sensor board which holds a couple of indicator lights. But with Usha's coding skills, Narasimha's knowledge, and the data of FarmLab, this tiny sensor has become an invaluable addition to the farm. Narasimha lifts the spike from the sensor and inserts it into the freshly-turned soil, pressing a green button as he does so. This will give him a reading and tell him if his soil is finally antibiotic-free. Tell him if he has finally extracted himself from the iron grip of the agro-industry. Tell him that his plants are now his and his alone. The lights wake and start to excitedly blink and flicker. The upload is happening...

Digital Farm Tool. Woven jondu grass pouch, recycled tin containing various electronic components, soil spike. 2032.

ಡಿಜಿಟಲ್ ಬೇಸಾಯ ಸಲಕರಣೆ

ದೇಶದ ಮಿಕ್ಕವರಂತೆ, ರೈತರು ಕೂಡ 'ಜುಗಾಡ್' ಎಂಬ ತತ್ತ್ವವನ್ನು ಒಪ್ಪಿಕೊಂಡು ಬಂದಿದ್ದಾರೆ. 'ಜುಗಾಡ್' ಎಂಬುದು ಜಾಣು ರಿಪೇರಿಗೆ ಅಥವಾ ತೇಪೆ ಕೆಲಸಕ್ಕೆ ಮತ್ತೊಂದು ಹೆಸರು. ಇಂಥ ಕೆಲಸದ ದಿಜಿಟಲ್ ಅವತಾರವೆಂದರೆ ರೈತರು ತಂತ್ರಜ್ಞಾನಕ್ಕೆ ಸಂಬಂಧಪಟ್ಟ ಜಾಣು ರೀತಿಯನ್ನು ಕಂಡುಹಿಡಿಯುವುದು.

ಈ ಜಾಣತನದಿಂದ ರಚಿತವಾದ ಸಲಕರಣೆಗಳು ಬೇರೆಬೇರೆ ಬೇಸಾಯದ ಬಗೆಗಳನ್ನು ಬೆಂಬಲಿಸುತ್ತ ಪಾರಂಪರಿಕವಾಗಿ ಬಂದ ಅರಿವನ್ನೂ ಬಳಸುತ್ತದೆ. ಇದರಿಂದ ಒಬ್ಬ ಸಣ್ಣ ರೈತ ಕೂಡ ತನ್ನ ಜಾಣತನದಿಂದ ತನ್ನದೇ ಆದ ರೀತಿಯಲ್ಲಿ ಬೇಸಾಯ ಮಾಡುತ್ತ ಅಂತರ್ಜಾಲದ ಸೌಲಭ್ಯಗಳನ್ನು, ಬೃಹತ್ ಡೇಟಾ ಮತ್ತು ಕೃತಕ ಬುದ್ಧಿಶಕ್ತಿಯಿಂದ ಬಲಿಷ್ಠ ಕೃಷಿ ಉದ್ಯಮಗಳ ಜೊತೆ ಪೈಪೋಟಿ ನಡೆಸಬಹುದು.

ವಿಕೇಂದ್ರೀಕರಿಸಿದ, ಬಲೆ-ಆಧಾರಿತ ಡಿಜಿಟಲ್ ಪರಿಸರದಲ್ಲಿ, ಡಿಜಿಟಲ್ ರೈತರಿಗೆ ಬೆಂಬಲವಾಗಿ ಸ್ಥಳೀಯ ಸಂಸ್ಥೆಗಳು ರಾಷ್ಟ್ರದ ಉದ್ದಗಲಕ್ಕೂ ಹುಟ್ಟುತ್ತವೆ. 'ಫಾರ್ಮ್-ಲ್ಯಾಬ್'' ಇಂಥದ್ದೊಂದು ಸಂಸ್ಥೆ. ಇದರಲ್ಲಿ ಸಂಸ್ಕೃತಿ, ಪರಂಪರೆ, ಹೊಸ ಯೋಚನೆ – ಎಲ್ಲಕ್ಕೂ ಅವಕಾಶವಿದೆ. ಇದೆಲ್ಲವನ್ನು ಬಳಸಿ, ರೈತರಿಗೆ ಡಿಜಿಟಲ್ ಸಲಕರಣೆಗಳನ್ನು ರಚಿಸಲು, ಡೇಟಾ ನಿರ್ವಹಿಸಲು ಮತ್ತು ಹೊಸ ತಂತ್ರಜ್ಞಾನವನ್ನು ಹಂಚಲು ಸಹಾಯ ಮಾಡುತ್ತದೆ. ಪ್ರತಿ ಹಳ್ಳಿಗು ಅದರದೇ ಆದ ಫಾರ್ಮ್-ಲ್ಯಾಬ್' ಅಲ್ಲಿನ ಬೇಡಿಕೆಗಳನ್ನು ಪೂರೈಸುತ್ತಾ ಸುತ್ತುಮುತ್ತಲಿನ ಫಾರ್ಮ್-ಲ್ಯಾಬುಗಳ ಜೊತೆ ಕೆಲಸ ಮಾಡುತ್ತದೆ. ಉಚಿತ ಶಿಕ್ಷಣ ಮತ್ತು ಸ್ಥಳೀಯ ಡೇಟಾ ನಿರ್ವಹಣೆಯು ಬಹುರಾಷ್ಟ್ರೀಯ ಸಂಸ್ಥೆಗಳ ದಾಳಿಯನ್ನು ನಿಯಂತ್ರಿಸುತ್ತದೆ.

ಈ ಫಾರ್ಮ್-ಲ್ಯಾಬಿನ ಬಲೆ ನೆಟ್ವರ್ಕಿನ ನೆರವಿನಿಂದ ಒಬ್ಬ ರೈತ ರಾಷ್ಟ್ರಮಟ್ಟದ ಹವಾಮಾನ ಮತ್ತು ಆರ್ಥಿಕ ಪರಿಸ್ಥಿತಿಗಳ ಬಗ್ಗೆ ಮಾಹಿತಿ ಪಡೆದುಕೊಳ್ಳಬಹುದು. ಇದರಿಂದ ಉಂಟಾಗುವ ಅನುಕೂಲ "ಬೃಹತ್ ಡೇಟಾ" ಮತ್ತು ಪಾರಂಪರಿಕ ಅರಿವಿನ ಬೆಸುಗೆಗೆ ಒಂದು ಒಳ್ಳೆ ಉದಾಹರಣೆ. ಡಿಜಿಟಲ್ ಸಲಕರಣೆಗಳಲ್ಲಿ ಡೇಟಾ ಅಡಗಿರಬಹುದು; ಆದರೆ ಅವುಗಳಿಂದ ಕೆಲಸವನ್ನು ತೆಗೆಯುವುದು ರೈತನ ಜಾಣತನ.

ರಾಗಿಯನ್ನು ಬಿತ್ತಲು ಸಣ್ಣ ಹಳ್ಳ ಅಗೆದು ಸನಿಕೆ ಮೇಲೆ ಒರಗುತ್ತಾನೆ ನರಸಿಂಹ. ಅವನ ಜೇಬಲ್ಲಿರುವ ಮಣ್ಣ ಅರಿವುಕವನ್ನು (ಸೆನ್ಸರ್) ತೆಗೆಯುತ್ತಾನೆ. ಇದನ್ನು ಅವನಿಗೋಸ್ಕರ ಮಗಳು ಉಷಾ ಮೂರು ವರುಷಗಳ ಹಿಂದೆ ಮಾಡಿಕೊಟ್ಟದ್ದು. ಆವಾಗಲೇ ಅವರು ರಾಸಾಯನಿಕರಹಿತ ಬೇಸಾಯವನ್ನು (ಮತ್ತೆ) ಶುರು ಮಾಡಲು ಹೊರಟಿದ್ದು.

ಅರಿವುಕವಾದರೊ ಪುಟ್ಟದು. ಆದರೆ, ಉಷಾಳ ಚಾತುರ್ಯ ಮತ್ತು ನರಸಿಂಹನ ಅನುಭವದಿಂದ ಅದೊಂದು ಅಮೂಲ್ಯವಾದ ವಸ್ತುವಾಗಿಬಿಟ್ಟಿದೆ. ಅರಿವುಕದ ಮುಳ್ಳನ್ನು ಈಗಷ್ಟೇ ಬಗೆದ ಮಣ್ಣೊಳಗೆ ಇಡುತ್ತ ಹಸಿರು ಬಣ್ಣದ ಬಟನ್ ಒಂದನ್ನು ಒತ್ತುತ್ತಾನೆ ನರಸಿಂಹ. ಜಮೀನಿನ ಮಣ್ಣು ಕೊನೆಗೂ ಆಂಟಿಬಯೊಟಿಕ್ಕುಗಳಿಂದ (ಜೀವಿನಾಶಕ) ಮುಕ್ತವಾಗಿದೆಯಾ ಎಂಬುದನ್ನು ತೋರಿಸುತ್ತದೆ. ಮೂರು ವರುಷಗಳ ಹಿಂದೆ ಶುರುವಾದ ಪಯಣ ಗುರಿ ಮುಟ್ಟಿದೆಯಾ ಎಂದು ಹೇಳುತ್ತದೆ. ದೀಪಗಳು ಮಿಣಿಮಿಣಿಸಲು ತೊಡಗುತ್ತವೆ...

FarmLab Seeds

Decentralised technology supports the development and legitimisation of decentralised farming practices, like the use of local seed varieties rather than the standardised ones from Big Agro. Heritage seeds offer a great variety of cultivars that respond differently to the soil, the nutrients, and the weather. By growing a range of crops, farmers protect themselves against monocropping failures resulting from infection or extreme weather.

FarmLab supports small-scale farmers in the identification, cataloguing, storing, and distribution of heritage seeds. This network of decentralised AIs allows for the use of the farmers' indigenous wisdom at scale. Combining long range weather prediction with hyper-localised data collected on soil, air and water quality, creates a robust data set for farmers to consider and plant the right seeds.

Farmers rely on indigenous knowledge, but can choose to complement this with suggestions from FarmLab to create unique companion crop planting combinations, specific not simply to each farmer's farm but each separate field too. Each season, the farmer's insights become part of the lab's data, strengthening the network's understanding of seeds, the surrounding environment, and local farming practice.

Usha has spent the last week helping her father plant in their fields, but today she gets to plant her seeds in her field. It wasn't difficult to convince her dad to experiment; he'd already seen an increase in yields upon using some of the basic tools she'd made for him. Now she wants to run some experiments to see how companion-planting might work. She's heard a few stories about FarmLab's algorithms making a mess of people's crops in the early years, but it has recently been getting good reviews and, in any case, she has tweaked its suggestions based on her own experience in this specific field. Today she has received three bike-bag-sized packets of averaki, castor and ragi seeds – each pack providing a 'perfect-plant' date. In a month or so, she's going to get another set of seeds. Per the algorithm, this progression should ensure an ideal continued harvest, tailored to their crop-harvesting speed. Since this year is going to be wetter than usual, Usha adjusts the seed distributor to make its seed-distribution setting less dense. As she pushes the bike through the furrowed field, the You-Learn dispenser automatically switches between rows of the intercropped three seeds - two rows of each. Its hypnotic tickity-tak sounds like the keyboard on her grandmother's retro laptop. Usha has added a modification to the dispenser so that it rings her bike bell at the end of each row. This allows her to turn in time and to keep to the shape of the field she uploaded to the dispenser. Next year, she has plans to fit new quad bike wheels and a battery to make the process even easier. But that's next year – for now, the bell is ringing, reminding her that one of the seed packets needs changing.

FarmLab Seeds. Three packets of heritage seeds for bespoke companion planting. 2035.

ಫಾರ್ಮ್ ಲ್ಯಾಬಿನ ಬೀಜಗಳು

ವಿಕೇಂದ್ರೀಕರಿಸಿದ ತಂತ್ರಜ್ಞಾನ ವಿಕೇಂದ್ರೀಕರಿಸಿದ ಸಣ್ಣ ಪ್ರಮಾಣ ಬೇಸಾಯದ ವಿಧಾನಗಳನ್ನು ಬೆಂಬಲಿಸುತ್ತದೆ. ಉದಾಹರಣೆಗೆ, ಬಹುರಾಷ್ಟ್ರೀಯ ಕಂಪನಿಯಿಂದ ಕೊಂಡ ಬೀಜಗಳ ಬದಲಾಗಿ ಸ್ಥಳೀಯ ಬೀಜಗಳ ಬಳಕೆ. ಪರಂಪರೆಯಿಂದ ಬಂದ ಬೀಜಗಳು ಬಗೆಬಗೆಯಾಗಿದ್ದು ಅಲ್ಲಿನ ಹವಾ ಮಾನಕ್ಕೆ, ಬೀಳುವ ಮಳೆಗೆ ಒಗ್ಗಿರುತ್ತವೆ. ಅಂತೆಯೇ, ಸಾಕಷ್ಟು ಬೇರೆಬೇರೆ ಪಯಿರುಗಳನ್ನು ಬೆಳೆಯುವುದರಿಂದ ಒಂದೇ ಪಯಿರಿನಿಂದ ಆಗಬಹುದಾದ ನಷ್ಟ ತಪ್ಪುತ್ತದೆ.

ಫಾರ್ಮ್-ಲ್ಯಾಬ್ ಸಣ್ಣ ಪ್ರಮಾಣದ ರೈತರಿಗೆ ಅವರ ಬೀಜಗಳನ್ನು ಗುರುತಿಸಿ, ಪಟ್ಟಿ ಮಾಡಿ, ಸುರಕ್ಷಿತವಾಗಿರಿಸಿ, ಹಂಚಿಸಲು ಅನುವು ಮಾಡಿಕೊಡುತ್ತದೆ. ಈ ರೀತಿಯ ವ್ಯವಸ್ಥೆ ರೈತರ ದೇಶೀಯ ಜ್ಞಾನಕ್ಕೆ ಬೆಲೆ ಕೊಟ್ಟು ಅವರಿಗೆ ಸಹಾಯ ಮಾಡುತ್ತದೆ. ದೀರ್ಘಕಾಲದ ಹವಾಮಾನ ನಿರೀಕ್ಷೆಯನ್ನು ಸ್ಥಳೀಯ ಹವಾಮಾನ, ಮಣ್ಣು, ಗಾಳಿ, ನೀರು ಇತ್ಯಾದಿ ಕುರಿತು ಶೇಖರಿಸಿದ ಮಾಹಿತಿಗ ಜೊತೆ ಒಗ್ಗೂಡಿಸಿ, ರೈತರಿಗೆ ಯಾವ ಕಾಲಕ್ಕೆ ಯಾವ ಬೀಜಗಳನ್ನು ಬಿತ್ತಿದರೆ ಲೇಸೆಂದು ಒಂದು ಬೃಹತ್ ಡೇಟಾಸಂಗ್ರಹ ನೆರವು ನೀಡುತ್ತದೆ.

ಹೀಗಾಗಿ, ರೈತರು ಅವರಿಗೆ ಪಾರಂಪರಿಕವಾಗಿ ಬಂದ ತಿಳುವಳಿಕೆಯನ್ನು ಅವಲಂಬಿಸುತ್ತಲೇ ಅವರ ಜಮೀನಿಗೆ ಹೊಂದುವ "ಪಯಿರುಕೂಟ"ಗಳ ಬಗ್ಗೆ ಫಾರ್ಮ್-ಲ್ಯಾಬು ನೀಡುವ ಸಲಹೆಗಳ ಸಹಾಯ ತೆಗೆದುಕೊಳ್ಳಬಹುದು. ಇದು, ಒಬ್ಬ ರೈತನ ಜಮೀನಿಗೆ ಮಾತ್ರವಲ್ಲದೇ ಗದ್ದೆಗದ್ದೆಗೂ ಹೊಂದುತ್ತದೆ. ಹಾಗೇ, ಕೊಯ್ಲು ಮಾಡಿದ ಮೇಲೆ ರೈತರ ಅನುಭವಗಳು ಲ್ಯಾಬಿನ ಡೇಟಾಸಂಗ್ರಹಕ್ಕೆ ಸೇರಿಕೊಂಡು ಬೀಜಗಳು, ಪರಿಸರ ಮತ್ತು ಕೃಷಿವಿಧಾನಗಳ ಬಗ್ಗೆ ಲ್ಯಾಬಿನಿಂದ ದೊರೆಯುವ ತಿಳುವಳಿಕೆ ಕ್ರಮೇಣ ಹೆಚ್ಚಾಗುತ್ತದೆ.

ಹೋದ ವಾರ ಉಷಾ ಅವಳ ತಂದೆಗೆ ಅವರ ಹೊಲದಲ್ಲಿ ಬಿತ್ತಲು ಸಹಾಯ ಮಾಡಿದಳು. ಇವತ್ತು ಅವಳದೇ ಹೊಲದಲ್ಲಿ ಬಿತ್ತುತ್ತಿದ್ದಾಳೆ. ಅವಳಿಗೆ ಪಯಿರುಕೂಟಗಳ ಬಿತ್ತನೆ ಬಗ್ಗೆ ಕುತೂಹಲ. ಮೊದಮೊದಲು ಫಾರ್ಮ್-ಲ್ಯಾಬಿನ ಕ್ರಮಾವಳಿ ಅಸ್ತವ್ಯಸ್ತವಾಗಿದ್ದು ಈಚೆಗೆ ಸುಧಾರಿಸಿಕೊಂಡಿದ್ದನ್ನು ಉಷಾ ಓದಿದ್ದಾಳೆ. ಹಾಗೇ, ತನ್ನ ಹೊಲಕ್ಕೆ ಸರಿ ಹೋಗುವ ಹಾಗೆ ಕ್ರಮಾವಳಿಯನ್ನು ಬದಲಾಯಿಸಿದ್ದಾಳೆ.

ಇವತ್ತು ಅವಳು ಅವರೆಕಾಯಿ, ಹರಳೆಕಾಯಿ ಮತ್ತು ರಾಗಿ ಬೀಜಗಳನ್ನು ಬಿತ್ತಲಿದ್ದಾಳೆ. ಪ್ರತಿ ಪ್ಯಾಕೆಟ್-ನಲ್ಲಿ ಅದನ್ನು "ಯಾವಾಗ ಬಿತ್ತಿದರೆ ಮೇಲು" ಎಂದು ಬರೆದಿದೆ. ಮುಂದಿನ ತಿಂಗಳು ಮತ್ತೊಂದು ಬೀಜಗಳ ಗುಂಪು ಬರಲಿದೆ. ಕ್ರಮಾವಳಿಯ ಪ್ರಕಾರ, ಇದು ಒಳ್ಳೆ ಸುಗ್ಗಿ ಬರುವ ಹಾಗೆ ಮಾಡುತ್ತದೆ. ಈ ವರ್ಷದಲ್ಲಿ ನಿರೀಕ್ಷಿಸಿದ ಅತಿವೃಷ್ಟಿಯ ಕಾರಣ, ಉಷಾ ಬೀಜಗಳ ನಡುವೆ ಜಾಸ್ತಿ ಅಂತರ ಬರುವ ಹಾಗೆ "ಬೀಜವಿತರಕ"ವನ್ನು ಸಿದ್ಧಗೊಳುಸುತ್ತಾಳೆ. ಈ ವಿತರಕವನ್ನು ಅವಳ ಸೈಕಲಿಗೆ ಕಟ್ಟಿದ್ದು ಅದನ್ನು ತುಳಿಯುತ್ತ ಹೋದಂತೆ ಬೀಜಗಳ ಬಿತ್ತನೆಯಾಗುತ್ತದೆ. ಒಂದು ಸಾಲು ಮುಗಿಯುತ್ತಲೆ ಸೈಕಲಿನ ಘಂಟೆ ಹೊಡೆಯುವ ಹಾಗೆ ಮಾಡಿದ್ದಾಳೆ ಉಷಾ. ಸೈಕಲ್ ತುಳಿಯುತ್ತ, ಮುಂದಿನ ವರುಷಕ್ಕೆ ಸೈಕಲ್ ಚಕ್ರಗಳನ್ನು ಬದಲಾಯಿಸುವುದರ ಬಗ್ಗೆ ಯೋಚನೆ ಮಾಡುತ್ತಿದ ಉಷಾ ಘಂಟೆಯ ಸದ್ದು ಕೇಳಿ ಸೈಕಲನ್ನು ತಿರುಗಿಸುತ್ತಾಳೆ.

Slow Story Food Packaging

The emergence of narrational AI and open source voice assistants connects consumers to farmers in new ways. The prevalence of open source You-Learn kits and the trend towards digital jugaad amongst farmers has made hyperlocal data collection on Karnataka's small holdings and farms commonplace, but it is the combination of this with Slow-AIs that has really helped farmers.

Vishala of the 'Buffalo Back Collective' was instrumental in working with developers to transform this technology into one that worked for busy farmers who wished to to tell their story to their customers– the results of these collaborations were Slow-AIs, that gradually track the growth of crops. Using data from DIY farm tools and with the ability to capture and translate local dialects, these AIs take snapshots and moments from everyday farm life and convert them into stories and insights about crops and the people who grow them.

At food markets across Karnataka, farmers now wrap their produce in on-demand printed paper bags that provide consumers with context and information about their hyperlocal purchases. These Slow-AI stories, combine farmers' tales, recipes, and advice with data from FarmLab kits such as weather and soil quality.

In his farm, Narasimha sits under the banyan tree that borders the village. The rains have cleared and the air is cool. August is his favourite month. He can see the ragi millets pushing their way through the red soil. They are robust plants that thrive on just the regular monsoon rains. Nowadays, they are also so much tastier than they used to be when he was a child; and though these won't be ready to harvest until October, Usha is already out on her bicycle with its attached camera-kit, photographing both the still-wet soil and him under the tree! What had she said? ... "It's how we tell our story, Appa". In a few days, his picture will likely show up on a paper bag full of ragi somewhere in Bangalore. "Every bag will be unique" she'd said and, apparently, according to Usha, people will collect these packets and see what life – their life – on the farm looks like. Narasimha chuckles to himself – his father would have scoffed at the notion, but Usha's idea has been working. By telling their stories, they have increased sales and are able to charge a fair price for their hard work ... or, rather, Usha's hard work. They now have regular sales across the city and even visits from city folks. Before the rains started, a group had arrived for a tour in an air-conditioned 4x4; each one clutching paper bags with pictures of Narasimha's okra crop. They had left with boxes full of tomatoes, end-of-season-mangoes, and peas. City folk here - another thing his father would have laughed at.

Slow Story Food Packaging. Recycled brown paper bag featuring on-demand print. 2035.

ಮಂದಗತಿಯ ಆಹಾರ ಪದ್ಧತಿ

ಮಾತಾಡುವ ಕೃತಕಬುದ್ಧಿ (ಕೃ.ಬು.) ಮತ್ತು ಮುಕ್ತ ಮೂಲ (ಮು.ಮೂ.) ಸಹಾಯಕಗಳ ವಿಕಾಸವು ರೈತರನ್ನು ಗ್ರಾಹಕರೊಡನೆ ಬಗೆಬಗೆಯಾಗಿ ಬೆಸೆಯುತ್ತವೆ. ಮು.ಮೂ. ಯೂ-ಲರ್ನ್ ಕಿಟ್ಟುಗಳು ಮತ್ತು ಡಿಜಿಟಲ್ ಜುಗಾಡಿನಿಂದ ಎಲ್ಲ ರೈತರಿಗೂ ಡೇಟಾ ಸಂಗ್ರಹಣೆ ಸುಲಭವಾಗಿಸಿತ್ತು. ಇದನ್ನು ಮಂದಗತಿಯ ಕೃ.ಬು. ಜೊತೆ ಸೇರಿಸಿದಾಗ, ರೈತರಿಗೆ ತುಂಬ ಸಹಾಯವಾಯ್ತು.

"ಎಮ್ಮೆ ಸಮೂಹ"ದ ವಿಶಾಲಾಳ ಸಹಯೋಗದಿಂದಲೇ ರೈತರಿಗೆ ಕಥೆ ಹೇಳುವ ಒಂದು ತಂತ್ರಜ್ಞಾನ ಸೃಷ್ಟಿಸಲಾಯಿತು. ಅದೇ ಮಂದಗತಿಯ ಕೃ.ಬು. ತಂತ್ರಜ್ಞಾನ ಬೆಳೆಯ ಬೆಳವಣಿಗೆಯನ್ನು ಅನುಸರಿಸುತ್ತದೆ. ಇವುಗಳು ಡಿಜಿಟಲ್ ಸಲಕರಣೆಗಳಿಂದ ಸಿಕ್ಕ ಮಾಹಿತಿಯನ್ನು ಬಳಸಿ, ಗದ್ದೆಯಲ್ಲಿ ದೈನಂದಿನ ಕೆಲಸಗಳ ಫೋಟೋಗಳನ್ನು ತೆಗೆದು, ಅವುಗಳನ್ನು ಶೇಖರಿಸಿ, ಆ ಗದ್ದೆಯ ಕಥನವೊಂದನ್ನು ಹುಟ್ಟುಹಾಕುತ್ತದೆ.

ಕರ್ನಾಟಕದುದ್ದಗಲಕ್ಕೂ ಸಂತೆಗಳಲ್ಲಿ ರೈತರಿನ ಉತ್ಪಾದನೆಗಳು ಬೇಡಿಕೆಗೆ ತಕ್ಕ ಹಾಗೆ ಮಾಡಿದ ಪೇಪರ್ ಪೊಟ್ಟಣಗಳಲ್ಲಿ ಇರಿಸಲಾಗುತ್ತವೆ. ಈ ಪೊಟ್ಟಣಗಳ ಮೇಲೆ ರೈತರನ್ನು ಕುರಿತ ಕಥೆಗಳು, ಉತ್ಪಾದನೆ ಕುರಿತ ವಿವರಗಳು, ತಯಾರಿಸಬಹುದಾದ ರೆಸಿಪಿಗಳು ಮತ್ತು ಫಾರ್ಮ್-ಲ್ಯಾಬ್ ಕಿಟ್ಟುಗಳಿಂದ ಸಂಗ್ರಹಿಸಿದ ಡೇಟಾ – ಇವೆಲ್ಲ ಇರುತ್ತದೆ.

ನರಸಿಂಹ ತನ್ನ ಹೊಲದಲ್ಲಿರುವ ಆಲದ ಮರದ ಕೆಳಗೆ ಕೂತಿದ್ದಾರೆ. ಮುಂಗಾರು ಮಳೆ ಮುಗಿದಿದೆ. ಗಾಳಿ ತಂಪಾಗಿದೆ. ರಾಗಿ ತೆನೆಗಳು ಸಣ್ಣಕ್ಕೆ ಮೊಳೆಯಲು ತೊಡಗಿವೆ. ಈಚೆಗೆ, ಅವುಗಳ ರುಚಿ ಎಷ್ಟೋ ಚೆನ್ನಾಗಿದೆ. ಅವುಗಳನ್ನು ಕುಯ್ಯುವುದಾದರೊ ಅಕ್ಟೋಬರಿನಲ್ಲಿ, ಆದರೆ ಉಷಾ ಆಗಲೇ ಸೈಕಲನ್ನು ತುಳಿಯುತ್ತ ಒದ್ದೆಯಾದ ಮಣ್ಣಿನ ಮತ್ತು ನರಸಿಂಹನ ಫೋಟೋ ಹಿಡಿಯುತ್ತಿದ್ದಾಳೆ! ಅವಳಂದಿದ್ದು ನೆನಪಿಗೆ ಬಂತು, "ನಮ್ಮ ಕಥೆ ಹೇಳೊ ರೀತಿ ಮುಖ್ಯ, ಅಪ್ಪ." ಇನ್ನು ಕೆಲವೇ ದಿನಗಳಲ್ಲಿ ನರಸಿಂಹನ ಮುಖ ಯಾವುದೊ ರಾಗಿ ತುಂಬಿದ ಪೊಟ್ಟಣದ ಮೇಲೆ ಕಾಣಿಸಿಕೊಳ್ಳುತ್ತದೆ. "ಪ್ರತಿ ಪೊಟ್ಟಣ ಬೇರೆಯಾಗಿರತ್ತೆ...ಅದನ್ನು ನೋಡಿ ನಮ್ಮ ಹೊಲ-ಗದ್ದೆಗಳ ಬಗ್ಗೆ ಜನರು ತಿಳೀತಾರೆ," ಎಂದಿದ್ದಳು ಉಷಾ. ಅವಳ ಮಾತ ನೆನೆಯುತ್ತ, ನರಸಿಂಹ ನಗುತ್ತಾನೆ. ಅವನ ತಂದೆ ಬದುಕಿದ್ದರೆ, ಇದೆಲ್ಲವನ್ನು ಹೀಯಾಳಿಸುತ್ತಿದ್ದರು. ಆದರೆ, ಉಷಾಳ ಉಪಾಯ ಯಶಸ್ವಿಯಾಗಿದೆ. ಅವರ ಕಥೆಗಳನ್ನು ಹೇಳಿ ಅವರ ಶ್ರಮಕ್ಕೆ ತಕ್ಕ ಬೆಲೆಗೆ ಮಾರಾಟ ಮಾಡಲು ಸಾಧ್ಯವಾಗಿದೆ. ಊರಲ್ಲಿ ಒಳ್ಳೆ ಮಾರಾಟ. ಕೆಲವೊಮ್ಮೆ ಊರಿನವರೇ ಅಲ್ಲಿಗೆ ಬರುವದುಂಟು! ಮಳೆಗಾಲದ ಮುಂಚೆ, ಒಂದು ಗುಂಪು ಬಂದಿತ್ತು. ಬಂದಾಗ ಕೈಯಲ್ಲಿ ನರಸಿಂಹನ ಬೆಂಡೆಕಾಯಿ ಪೊಟ್ಟಣ ! ಹೊರಟಾಗ ಟೊಮಾಟೊ, ಮಾವು ಮತ್ತು ಬಟಾಣಿತುಂಬಿದ ಡಬ್ಬಿಗಳು ಕೂಡ. ಅವನ ತೋಟದಲ್ಲಿ ಊರಿನ ಜನರು – ಏನಂತಿದ್ದನೊ ಅವನ ತಂದೆ!

Electronics Hospital Flyer

With India enthralled by an emergent digital swadeshi movement, the decolonisation of the Internet, and the decentralisation of networks, we have started to see new kinds of repair shops that embrace what many are calling digital jugaad. ‘Repair, mend, and restart’ is now for people’s Internet-connected devices what it once was for bicycles and farm tools. New regulations control India’s right-to-repair and holds for all domestically-manufactured goods, including the Internet of Things. This, combined with a nationwide training program in creative technology from You-Learn, has led to an explosion of micro-workshops across cities, neighbourhoods, and villages, geared towards repairing and repurposing everything from fitness trackers and voice assistants to GPS seed planters and mesh controllers.

Usha leans her bike against the front of ‘Namma A-One Electronics Hospital’. The hospital is a small three-by-three metre shopfront, housed within a two-story building that runs along the main street. It is part shop, part workshop, part school. The window is packed with boxes, old and new, containing home and farm electronics: pick and mix data tokens from Channapatna, an 8th gen GPS seed planter, a You-Learn water pump adapter, an aged weather-trowel, and a host of regular tools that have been rigged-up to include all sorts of AI-powered sensors. Shalini, who set up and ran the electronics hospital, is as much a part of the DNA of this building as the bits flying through the mesh network. The shop manager now, she is a local legend and regular data offerings are left outside her shop and on the mesh. Usha is here to attend one of Shalini’s You-Learn workshops. This one is about microbial-soil-matter upgrades for farm tools. Usha is happy to take off her heavy backpack and unpack the ten soil sensors she is upgrading for her village. She’d received a message from Shalini a couple of days ago: You-Learn’s neural networks were now ready to resolve a new set of identification metrics for microbial measurement. Managing the upgrade was not beyond Shalini’s capability, but it was complex enough that Shalini was worried about not having the time and resources to upgrade everything individually. Usha had happily agreed to assist; she knew too that looking after her soil sensors was just like looking after her crops. It was something her dad had taught her when he was still alive: if she treated her crops well and gave them the care they needed, she’d be able to look forward to a healthy harvest.

Electronics Hospital Flyer. Paper advertisement for Namma A-One Electronics Hospital. 2040.

ಎಲೆಕ್ಟ್ರೊನಿಕ್ ಆಸ್ಪತ್ರೆ

ಸ್ವದೇಶೀ ಡಿಜಿಟಲ್ ಚಳುವಳಿ, ಅಂತರ್ಜಾಲದ ಕ್ರಾಂತಿ, ನೆಟ್ವರ್ಕುಗಳ ವಿಕೇಂದ್ರೀಕರಣ ಎಲ್ಲದರಿಂದ ಹೊಸ ಬಗೆಯ ಡಿಜಿಟಲ್ ರಿಪೇರಿ ಅಂಗಡಿಗಳು ಹುಟ್ಟಿವೆ. ಇದು ಒಂದು ರೀತಿಯ “ಡಿಜಿಟಲ್ ಜುಗಾಡ್”. 20-30 ವರುಷಗಳ ಹಿಂದೆ ಸೈಕಲ್ಲು, ಮೋಟರ್ಸೈಕಲ್ಲುಗಳ ಮೇಲೆ ನಡೆಸಿದಂಥ ರಿಪೇರಿ ಈಗ ಅಂತರ್ಜಾಲಕ್ಕೆ ಹೊಂದಿರುವ ವಸ್ತುಗಳ ಮೇಲೆ ನಡೆಯುತ್ತಿದೆ. “ರಿಪೇರಿ ಮಾಡುವ ಹಕ್ಕು” ನಿಯಮಾವಳಿ ಭಾರತದಲ್ಲಿ ಎಲ್ಲ ಬಗೆಯ ದೇಸಿ ಸಾಮಗ್ರಿಗಳಿಗೆ – “ವಸ್ತುಗಳ ಅಂತರ್ಜಾಲ”ವನ್ನೂ ಸೇರಿ - ಅನ್ವಯಿಸುತ್ತದೆ. “ಯೂ-ಲರ್ನ್” ನಡೆಸಿದ ದೇಶಾದ್ಯಂತ ತರಬೇತಿ ಕಾರ್ಯಕ್ರಮಗಳು ನೂರಾರು ಸಣ್ಣಸಣ್ಣ ಅಂಗಡಿಗಳ ಪ್ರಾರಂಭಕ್ಕೆ ಕಾರಣವಾಗಿದೆ. ಇವು ಊರೂರಲ್ಲಿ, ಹಳ್ಳಿಹಳ್ಳಿಗಳಲ್ಲಿದ್ದು ಉಲಿ ಸಹಾಯಕದಿಂದ ಹಿಡಿದು ಬಲೆನಿಯಂತ್ರಕಗಳ ರಿಪೇರಿಯನ್ನು ಮಾಡುತ್ತಿವೆ.

ಉಷಾ ಅವಳ ಸೈಕಲನ್ನು “ನಮ್ಮ ಏ-ವನ್ ಎಲೆಕ್ಟ್ರೊನಿಕ್ ಆಸ್ಪತ್ರೆ” ಹೊರಗೆ ನಿಲ್ಲಿಸಿ ಒಳಗೆ ಹೊಕ್ಕುತ್ತಾಳೆ. ಸಣ್ಣ ಕಟ್ಟಡದೊಳಗಿರುವ ಆಸ್ಪತ್ರೆ, ಶಿಬಿರ ಮತ್ತು ಶಾಲೆಯಂತೆಯೂ ಕೆಲಸ ಮಾಡುತ್ತದೆ. ಕೋಣೆ ತುಂಬ ಡಬ್ಬಗಳು ತುಂಬಿವೆ – ಅವುಗಳೊಳಗೆ ಬೇಸಾಯಕ್ಕೆ ಬೇಕಾದ ಯಂತ್ರಗಳು, ಬೀಜನೆಡುಗ, ಯೂ-ಲರ್ನ್ ನೀರಪಂಪಿನ ಅಡಾಪ್ಟರ್ ಮುಂತಾದ ವಸ್ತುಗಳು ತುಂಬಿವೆ. ಈ ಅಂಗಡಿಯನ್ನು ಹುಟ್ಟುಹಾಕಿ ಕಾರ್ಯರೂಪಕ್ಕೆ ತಂದು, ಈಗ ನಿರ್ವಾಹಕರಾಗಿರುವುದು ಶಾಲಿನಿ. ಅವರು ಆಗಲೇ ಅಲ್ಲಿನ ದಂತಕತೆ ಆಗಿಬಿಟ್ಟಿದ್ದಾರೆ. ಪಕ್ಕದ ಹಳ್ಳಿಗಳಿಂದ ಬಂದ ಜನ ಅವರಿಗೋಸ್ಕರ ಡೇಟಾ ಕಾಣಿಕೆ ತರುವುದುಂಟು.

ಉಷಾ ಶಾಲಿನಿ ನಡೆಸುವ ಯೂ-ಲರ್ನ್ ಶಿಬಿರಕ್ಕೆ ಬಂದಿದ್ದಾಳೆ. ಈಗಿನ ಶಿಬಿರದ ವಿಷಯ ಬೇಸಾಯ ಸಲಕರಣೆಗಳ ಉನ್ನತೀಕರಣ. ಉನ್ನತೀಕರಿಸಬೇಕಾದ ಹತ್ತು ಮಣ್ಣ ಅರಿವುಕಗಳನ್ನು (ಸೆನ್ಸರ್) ಉಷಾ ತಂದಿದ್ದಾಳೆ. ಶಾಲಿನಿ ಒಟ್ಟಿಗೆ ಈ ಕೆಲಸವನ್ನು ಮಾಡಲಿರುವುದು ಉಷಾಳಿಗೆ ಹೆಮ್ಮೆಯ ವಿಚಾರ. ಅವಳಿಗೆ ಅರಿವುಕದ ಮಹತ್ವ ಗೊತ್ತಿದ್ದು ಪಯರಿನಂತೆ ಜೋಪಾನವಾಗಿ ಅದನ್ನು ನೋಡಿಕೊಳ್ಳುತ್ತಾಳೆ. ಈ ಪಾಠ ಅವಳು ತನ್ನ ತಂದೆಯಿಂದ ಕಲಿತದ್ದು. ಪಯರಿಗೆ ಪೋಷಣೆ ಕೊಟ್ಟಷ್ಟು ಸುಗ್ಗಿ ಶ್ರೀಮಂತವಾಗಿರುತ್ತದೆ.

Creative responses

We wanted to widen the scope of our imagined hopeful futures by commissioning artists, writers, craftspeople, and designers to respond to the project. Their responses offer several prospective futures rooted in Indian culture. It is only natural that the things we make and how we make them frames the world for us in different ways. A writer's way of placing us in the future is likely to be very different from a potter's. We know from our present that we are the sum of all things not just said or written, but of things made and the people that make them. Like the writer Deepa Bhasthi notes, we need "to value a farmer and not just the farm". We need to recognise that people, places and things all hold value and have futures that are intricate, complex, and contextual. The variety of these responses serve as a reminder of the role that creative practitioners play in shaping the way that the future unfolds. They also illustrate the contrast between these futures that are colourful, rich, and rooted and the often-deracinated futures envisioned by technologists.

Deepa Bhasthi

Bibri, this same word for one or many in Kannada, make strange bedfellows. The noob too knows them screechy little big ones to be mighty useful. But to put up with their calls! – announcing rain to come (life is weather, after all), seeking mates or just friendly gossip – the question of how loud they can get is irrelevant. Think of the loudest thing you know, think it up perhaps sixty times higher now. About that loud, roughly.

Bibri may or may not be a kind of cicada, of which www tells me there are thousands of types. It may or may not be a pretty little thing the size of a really fat thumb with wings that look like translucent lace. It may or may not have the ability to camouflage, melding into whatever leafy surface they are perched on. Not too unlike Liu Bolin. Unlike him though, the bibri is not making much of art. Or maybe they are, who are we to say? What are people for, after all?

My co-farmer will make me a worm box – he is good at making things. He stipulates that it will be a big box of so many into so many inches, lined with cardboard to keep the squigglers warm here in this misty valley. Here, everything is measured in terms of the weather. I shall need to dip these hands into the layers of them, caressing them, coaxing them to work now and again. My work hands have rarely known tactility beyond the kut-kut of the keyboard and the hurried swish of a pen/pencil across paper. The squish of living worms is new. Strange textures, the feel of life below one's fingernails. Odd adventure, as is the rest of this farming thing we set out to do.

The proportions need to be somewhat perfect. One of this to two of that to half of the rest of it. And so on. Maths was never a strong point. But then again, these are no rules, more like advisories and guidelines that one adopts and adapts to needs and sensibilities highly specific to season, land, crop. Quite like alliteration.

Patience, oh patience! If I were to reduce this palimpsest of trees, soil and unmapped living things underland to a simple city, and then to assign to it just a single word, it would be that – patience. To farm is to believe in a tomorrow, even in these strange times. To farm is to acquire patience, slowly, slowly, like the sister of time. Weathered thus by patience, that we are changing too, swiftly and without warning or time is disconcerting.

Friends from the city we left behind tell us it shall soon be the weekend. They might come over for a visit, if the weather got better. We are only just sinking our feet wholly into the skin of the earth here, yet the idea of weekends sounds like a layer removed from time. Here Saturday is Sunday is Monday the same as Thursday and so on. Soil brown under nails, a dozen holes from leech bites on both feet, gumboot fashion wear. The 'good and outside' clothes are in boxes and boxes that gather dust and distant memories.

We are beginning to live the dream, we are repeatedly told, urging us to be thus reductive. It is the dream of the urbanised, to seek what feels simple, even indolent, laid-back, slow and therefore easy. The reality of the provinces is anything but that simplified. Roots, hipster, cool, fun, radical, such other words thrown in for good measure. We have learnt the art of the somewhat smile; not a whole yes, not a firm no, rather a non-committal huh. It is fun, this adventure of growing food, etc., but it is also petrifying, it is also messy and dirty. It is also a little bit all up to the winds that blow, their whims and daily fancies. #Farmerlife is, quite literally this: Life is weather. Life is meals. (After James Salter)

Is farming, growing one's own food, living off the land and such, like an act of revolution for the urbanised? It feels so, if one has the proclivity to romanticise, exoticise acts that millions have no choice but to practice, generation upon generation. But also, the only sustainable response to the unsavoury amalgam of agribusiness is to hold space for small farmers. Like the archetype of the friendly family doctor who was really part of the family in the popular pre-70s short stories, and family saga cinema in later decades, to have a family farmer might be the new radical invention to get used to. It is a relationship that can only be mutually beneficial to both parties.

I borrow liberally from the sentiments the American writer and farmer Wendell Berry has been exploring in his very long career when I say this; whatever this overwhelming urge in an industrialised society is to be an urban farmer or reconnect with nature on weekends, agriculture is too important to be reduced to a movement. For the creation of a movement divides responses into for or against, further simplifying it into the very problematic 'right' and 'not-right.' Following a movement sparks a certain self-righteousness and a sense of moral superiority about doing what is 'right.' There is then little room for serious dissent, for questioning both the movement and/or its proponents, or for accommodating the many, too many layers of complexities that go into leaning toward any such choices of lifestyles. Yes, one is with nature, and the air is purer, food is healthier, etc. but the grass is greener too on both sides. The thing is, farming as an ideal is a misrepresentation of reality, as is the case with most ideals.

Then there is the rural and urban dichotomy to process. Berry helpfully calls it the periphery and the centre respectively, thus ironing out some of the stereotypes that can seep in when one sees the world as the village versus the city. The fact is that the centre is mostly ignorant, even dismissive, of what happens in the periphery, whereas for those standing on the periphery, the centre is aspirational, awe-inspiring and nearly fantastical. Technology and the good ol' Internet have certainly merged and erased some of the dividing lines, but fresh off the city into the provinces, I have wondered if these accessible communication lines are enough. Berry calls for a conversation instead, between the two, asking that the centre remove itself from the fantasy that the periphery will always readily supply it with its every need, that the lands will never fall fallow, that the abundance of food crops will be a constant, even if the farmer is on her way to the centre herself, family in tow.

The farmer and the urban consumer might have a plethora of tools in hand for faster information, accurate data and everything else. But what is most urgently needed is mutual respect. If I may dare, more from the urbanite's end than the other way around. The worrying condescension, the taking for granted, the perpetuation of stereotypes – that the periphery is conservative, narrow-minded, even rigid in its ways – these must go. As should the want/need of those on the periphery to seek validation, approval and applause from the urban market. The difference between parochial and provincial is vast, and important to note. The choice of being in one or the other system is not wrought with moral hierarchy, nor should it be a podium of judgement. The basic respect for those on the other side of the chain, the acknowledgement that farm, land and everything else it encompasses should not be taken for granted, that different is not necessarily an improvement is a necessary change in attitudes.

Perhaps the farmer gets a shoddier treatment because the agrarian life is rarely about money-making. Perhaps, if the family farmer got very rich very effortlessly, the city-slicker would treat his compatriot with better care. We were taught in schools that India is an agriculture-dominated country, but predominant narratives rarely teach us that the land, the farmer, the soil and the food that emerges are not infinite. To value a farmer and not just the farm, to be concerned about the land, to be accountable for individual actions, to acknowledge that land will carry memories, to worry after the weather… that all this too is culture and heritage. To grow one's own food is all that. And so much else. The castle for the cottage, the malls for the garden, the conveniences for the bibri.

*

Lines from a poem, Berry's 'A Vision'

> Memory,
> native to this valley, will spread over it
> like a grove, and memory will grow
> into legend, legend into song, song
> into sacrament.

This is no paradisal dream.
Its hardship is its possibility.

*

Speaking of Bibri looks at #farmlife beyond the cute photos and portraits of the wholesome lifestyle that we have learnt to consume with envy and longing. The essay calls for a conversation between the provincial, rural, periphery and the city, urban, centre to make both farm and the farmer a long-term, sustainable life choice.

*

Alliteration, 2020 is set of photographs made of the entrance to the writer's farm in different seasons over three years. Seen together, the effects of the changes in each likely seem minor, inconsequential to the urban eye. To a farmer though, these differences serve as a dictionary of clues to the land. #farmlife is mostly a series of days understanding every change in light, every flight of a leaf and everyday entirely dictated by the weather. This work accompanies the essay Speaking of Bibri.

Yuvraj Jha

It is widely understood that one of the hardest parts of farming, to put it mildly, is, farming. Labour intensive, unpredictable, and in the long run, backbreaking. And this is one of the primary reasons for the younger generation moving to the cities for a better future. This has led to fewer people working in the fields, which means less food or more technology on our farms. Neither of which is a good idea. Even though tech and automation are good overall, in the long run the health of the farm depends on the health of the farmer. And the potential disconnect with the land proves to be extremely debilitating over decades. However, the back-breaking load of farm work over prolonged periods of time causes health issues such as hernia - issues that at the moment do not have sufficient solutions and continue into old age. This speculative illustration accompanies a short story on the lives of people in a village who have deployed exoskeletons on their village farms, instead of drones.

Short feeble footsteps rush on in aged hurry. Heavy breathing. "This village is too small. We are not good enough for him." Pauses for breath. "Those people are better in their big-big town. Hain?! Huh!" she mumbles as her nose furiously works to pace her aged knees. Anger keeps her feet steady. Her heart is in pain."That tiny thankless rat! I will show him today!"

In the trees the Drongo chirps its goodbye to the orange in the sky. The Suraga mimes the suffocated hum of the farm drones parking themselves on the sides. The machines wind down and relay their locations to the centre. Sriram slows his bicycle to greet her. Cheerfully. "Good-morning, Avva. Where are you walking to, so fast-fast?" Ignored.

She walks. A goddess twitches in confusion in the sky. Decisions come harder these days. "He thinks he can leave his mother! HIS MOTHER!!! That good for nothing, hollow-empty-wire!" Sriram, confused, hurries on to deliver the last package of the day.

The folks in the paddy fields plant their last saplings just as Arun is pulling down the shutters, "Shr-rr-rr-rr-rr". The Community Store or The Gram Seva Kendra is a multipurpose kiosk. It works as a fair price depot, provides exoskeletons for the field workers and keeps track of the weather data to sound the alarm when required. This is also the place where farm-related decisions are taken thanks to the larger community database it is connected to. To sum it up this is the heart of the village, and Arun, the man shutting the shutter, is its guardian.

The shutter hits the concrete and ruffles the dust. But all this is inconsequential today. Arun is surprised to see Avva so far from her house. "Avva? Is everything ok? Where are you headed to so late?" he asks as she turns to face him. Her heart racing, she reaches the steps breathless and furious as he pulls up a chair that was kept in the corner. "Here sit. Why Avva?! The doctor has asked you not to walk so much. You should have asked for me to come if you needed to see me. I hope everything is fine though?" he says with concern in his voice.

"Shut up! Both you and the doctor can wash your face with cow dung. I can take care of myself!"

Arun puts his hand in the khakhi bag he carries. He lifts out a flask and pours tea. Her temper is world famous in the village. There are only so many ways Avva can be calmed and one of them was the tea that Shanta makes. He had saved two cups from his daily quota to share with her when he got home. She takes the earthen cup from his hands. "You tell me everything right now! Those exoskeletons. Are they not the best in the world? Is this village not the best place to be? Every other village is jealous of us! Is that not true? Then why would anyone want to leave when everyone wants to come back?"

Sip. She forgets. The smell of tulsi fills her heart. The Goddess has decided. "This tea is very good. How is Shanta?" without waiting for his reply she continues, "Forget that, you tell me. It was so hard to grow food in my time. Yes, the rain and sun was better then, but everyone was in pain all the time." She rants to herself, "Raghu died of something like hernia, Sriram's grandfather of a bent back and wrecked joints..." she pauses as her mind opens the gates to her memories. Her temper rises and falls. "And then you made these eksoskull-a-tons! Such a good thing!

EXOSKELETON
Farming

Now see all the girls want to marry into this village. So much good fortune you brought. You are a good man. Your father was also a good man. But he was very naughty, you are kinder. I remember when he was born. It was right after the harvest. We had all danced for two days outside your house. Those were good times. But forget that. You explain to me son. Today I will understand everything from you. Even in the city you will not find such good things. Is it not best to stay here at home?"

"Avva what is the matter?" Arun is not sure what is going on. But her agitation is enough to suggest that something is amiss. In the distance a thresher; threshes.

"You tell me how these things are better than what is in the city and I will go and tell Sridhar." Her voice shudders as horrid anticipations form in her mind. "He says he will leave." She breathes faster. Desperate, her hands tremble. "He will leave for the city he said. It is better there, he said. That rat!"

By now a group of hardened faces had collected behind her in curiosity. But everyone freezes as they realise what is going on. 'Sridhar is leaving' instant messages murmur through the village network. People sit up straight in their houses, grandmothers and grandfathers pray to their respective deities. She turns. "What are you insolent liver-wasters listening to?" nodding, no one replies. They understand her fears and her anger. They too had felt it when their loved ones decided to leave before the exoskeletons came to the village.

"Avva let me take you home and I can tell you on the way." Arun takes charge.

"NO! HERE! NOW!" she says with authority.

"Ok Avva. Yes, these have helped everyone." he points to the exoskeletons lying outside the warehouse. "These drones as well. They could have been better, but they are made from local things so they are cheaper and more suited for us. And of course they help us with all the manual work which was so hard you remember? But I did not make them alone, we all made this together. Over the years we gathered up all our local records of the techniques and traditions that your's and my father's generation had, and using that information the computer makes decisions to make sure that the sowing, or plowing, or harvesting happens properly and on time. You understand what I am saying. But, listen, can I take you home and then we can talk to Sridhar together and tell him all about this and then he will not have to leave?"

Avva does not understand a word. She heard it, and she got it, but she did not know how any of this would help her convince Sridhar. Her heart sinks to the centre of the earth. Her shoulders droop as if the devil put weights on her. "Oh Saraswati! Sridhar will leave! He will go, my child! My piece of liver!"

Arun continues, "and best of all, all this is made here as you know. None of this came from the city. So there is no need to go to the city." Her back straightens, her resolve rekindled. "Amma. Let me come with you and we can talk to Sridhar together."

"Yes, Yes. That is the best idea."

Thankful, she closes her eyes in a quick prayer. She knows the goddess is with her.

Sarah Kaushik

Indigenous people have the closest relationship to our planet's ecology. They know the balance of relationships of soil, animals, plants and humans and already have a heightened sense of perception around their surroundings. We can say in a way, that they 'see and hear' the trees and animals and can judge their health. If this knowledge were to be translated seamlessly into our digital world, we would then need to rely on technological advancements to make this possible. The biodata from plants has been translated into music already by researchers. Would this then mean that there is a network that flows through that connects the soil with the network of veins in the plants? There are studies that suggest that naturally occurring and artificially generated sound waves contribute to a plant's robustness. Would this mean that there was a way to control climatic urgencies by changing the environment's sonic signature and better ways of coexisting? The artwork explores an Earth where humans and nature coexist as they did, restoring the tipping balance of the cosmos. Where the cues from our past - 'The past contains the seeds of the future' - can be taken into practice.

The Yaligh Ways

Thomas Louis

I have been doing ceramics and pottery and things related to the craft for about 22 years now. I went to NID to study Product design in 1996 and started learning ceramics in '98. In 2014 I got a call from my friends Pete and Rida, Pete had studied ceramics with me at NID and then disappeared into the hills and remote villages in the northeast, working mostly in the development of bamboo crafts. He was also learning to play local musical instruments, mostly made in bamboo, including the duitara, a 4 stringed instrument. When Pete called to say that he would like to refresh his pottery skills, I proposed that they come and stay at my studio for a couple of months and explore different kinds of musical instruments, in clay.

We combined our skills and explored different kinds of percussion, string and wind instruments. After the first lot of percussion instruments came out of the kiln, and some practice, we had our first performance: Pete played the duitara, Rida played the guitar and sang, and I played different forms of udus that we had tried making. They were easy enough for anyone to learn and fun to play with. Ever since I have been putting in small batches of different variations of mostly percussion instruments and experimenting with pieces of clay in different forms just to see what kinds of sounds come out of them. By experimenting like this they might be developed into an interesting instrument. A lot of them didn't work but it was really exciting when some of them did!

A lot of work was done on the simple African udu drum. It is a pot with a small hole on the upper surface (not the mouth of the pot). I have tinkered with volumes, proportions and combining different forms to get lengthier and deeper sounds. Then I started playing with the sculptural quality of the forms, along with the sounds they produced and that opened up a completely new space. Subsequently, I made a garden sculpture taking inspiration from the Serotonin molecule (the happiness molecule). It is a sculpture made of three different types of udus so three people could come and play together. Then I figured that more atoms could be added to the molecule, which are fixed on the sculpture, and can be played with ease. One could also have wind and string instruments attached to it.

I started digging deeper into this idea, making one in which five people have to come together to make the sounds come to their full potential. This piece was exhibited at the Piramal Art Gallery in Mumbai, for the show called 'Mutable' in 2017. The following year, Pete and I did a 2 week open elective course at NID Ahmedabad, where we explored a host of different instruments with the students there, mostly in terracotta - simple whistles, multi chambered flutes, shehnais, banjos, and a host of different percussion instruments. They even had a little time to practice with their experiments and jammed together for the community on the last day! It was great fun!

The need to take these instruments out into the field was getting stronger. Since all these instruments could be made using terracotta and traditional firing techniques, I thought it would be a good idea to look for traditional pottery clusters and communities in villages to collaborate with and build one of these molecular sculptures with different kinds of instruments, and get local musicians to try them out. I wanted to do this experiment in at least three different clusters in India to begin with, where the tradition of terracotta and folk music is really strong.

I decided to start in Rajasthan, West Bengal and Meghalaya, before exploring pottery communities in the south. This was when I got an opportunity to do a terracotta craft development workshop with about 15 traditional potters in Kutch. This workshop was facilitated by the Living and Learning Design Centre, which is a part of Srujan, an institution that has already been doing a lot for the embroidery craft of the region for over 40 years now. This provided the perfect setting to do some field trials for my udu like forms, using the matka making technique of beating and paddling on the wheel, a few wind instruments like flutes, along with other products like animal and bird forms. The potters found the musical instruments the most interesting. Once they got a hang of the idea, they started exploring forms on their own and traditional decorations were applied by the women. They were so excited that they took it to show some sound engineers to amplify the sounds and performed with them at the local festivals.

When I began working with the musical instruments and collaborating with potters in Kutch, I began to realise how they were so linked to place and how in each region, they would take on a life of their own. People would try out their own versions. If I tried the same thing in Meghalaya with potters there, the results would be so different. Local musicians could come and try them out. Any changes and feedback about the instruments could then be directly communicated with the potters and another collaboration would begin to form in the refinement of these instruments. The molecular sculpture would contain samples of the different instruments, which people could play. If they liked any of them, they could then buy them from the local craftspeople. The instrument becomes a focus for people to come together to talk about it, to tell stories and to sing and play music. Something that sits in the Village Square.

The intent of my work is always to bring people together, in community. And somehow, through these instruments, that always seems to work. A lot of these instruments are from traditional roots, they are crafted and craft has always been close to farms and the land. Imagine what it would be like if they could use technology to also record and transmit their sounds. What I propose to do in the future is to have a locally made piece in different clusters across the hinterlands of India. While bringing people together, they could also record local oral traditions and songs while they are being sung by shepherds, folk musicians or other groups of people who want to come together, play music and sing. The piece would be equipped to transmit sound as well. The recorder could be voice activated and it could also be accessed remotely as well. Imagine this as a musical object that collects and stores traditional knowledge and songs. This could be a way for communities to connect within themselves and also with other communities. It is a piece that requires people to come together, with curiosity and joy, to share.

Poornima Sukumar & Sadhna Prasad

While our response to the research was really hopeful and happy, we enjoyed visualising technology and the usage of it in a rural perspective. What came as a surprise for us while we worked on this was our lack of knowledge, especially about narratives and visualising technology in the rural scenario. What came to us naturally was the fact that rural people remained unperturbed and intertwined the utility of the technology in an organic way. However, since our work deals with a lot of people from diverse backgrounds including rural folks, it made us more aware of the observations we have made on ground and yet, take such discoveries, inventions and/or visualisations created by the rural people for granted. People in rural areas are far more balanced and well versed when it comes to sustainable choices. Our composition narrates the everyday scenes of some people from rural India. The most important being technology that adapts to their environment and everyday utility. For example, the scarecrow being an important part of receiving and distributing the signal. Another aspect of the artwork is about challenging our seemingly stereotypical and one-dimensional way of assuming people in rural contexts are lesser intellectual or creative. This ignorance and way of thinking has also led to a very poor way of appreciating this topic. We hope to provide an alternative perspective to this through this work.

Bharat Mirle & Pia Meenakshi

Perhaps the most challenging aspect of speculative storytelling is that, though it deals with the future, it is intended for a present-day audience. As a writer-illustrator duo with first-hand insights into the workings of a coffee estate, it was important for us to depict a digital future that was both hopeful and plausible. Among the most common concerns of Indian farming communities, disease is one of the most pressing. Insects and parasites have been known to cause irreparable damage to farms. In coffee estates, stem borers not only wreak havoc, but can also spread very quickly to surrounding farms. Often, the devastation could have been prevented, if only the farms had communicated better. Not just plants, but even animals are susceptible to diseases. With the Coronavirus pandemic making zoonotic disease a top global concern, it only seemed natural to suggest a device that could help prevent such catastrophes. In India, the decline of agriculture can partly be attributed to the rapid movement of people from the villages to the cities. However, with every major city being locked down due to the Coronavirus pandemic, people have been forced to return home. This served as the starting point of our narrative, with our device serving as the catalyst for a revolution.

Treefingers

A close look at the 'magical' hands behind India's thriving farming collectives

Author Bharat Mirle | *Illustrator* Pia Meenakshi

In the long standing debate of mechanization of agriculture vs a more hands-on farming approach, cooperative farms are demonstrating a way of making the best of both worlds. Shankari Kurrasamy takes us around her family estate and lets us in on their secret.

"For me, the most interesting aspect of it is that you have to make physical contact with the land" Shankari reaches into a coffee bush, deftly cradling a cluster of ripe berries in her hand. Almost instantly, a green light flashes from the ring on her finger with a long, gentle 'beep'. She proceeds to pluck the berries and drop them into her sack, "You have to literally connect with nature for the Maranga to work," she gestures to the ring. Around us,

a strange melody of soft beeping fills the air, quickly blending into the soundscape as the other coffee pickers make their way through the twenty-five-acre plantation. To the untrained ear, the sounds of Marangas could easily pass for birdsong.

An approximation of the Kannada words 'Mara' (Tree) and 'Ungura' (Ring), the Maranga is a device that is slowly becoming a standard tool across farming collectives and communities in South India. Fashioned from commonly-found materials like coconut and bamboo, the Maranga looks like a rustic rendition of a common bio-sensory ring. However, for small farms and plantations like the one owned by Shankari's family, these rings have had a transformative effect. "There are twenty nine other farms that are part of our cooperative, almost a thousand acres in total. All of it is connected through these rings," beams Shankari.

Designed to help identify diseases in crops and livestock at a pre-symptomatic stage, Marangas quickly became popular with smaller, more traditional farming communities, where hand-grown produce continues to be one of the biggest value propositions. As she takes me around the estate, Shankari explains to me that every farmhand in every farm that is part of the cooperative, is required to wear a Maranga. As they proceed with their routines and come in contact with live organic matter, the bio-sensor transmits data over a private network, where it is analyzed and updated into a database. "There is

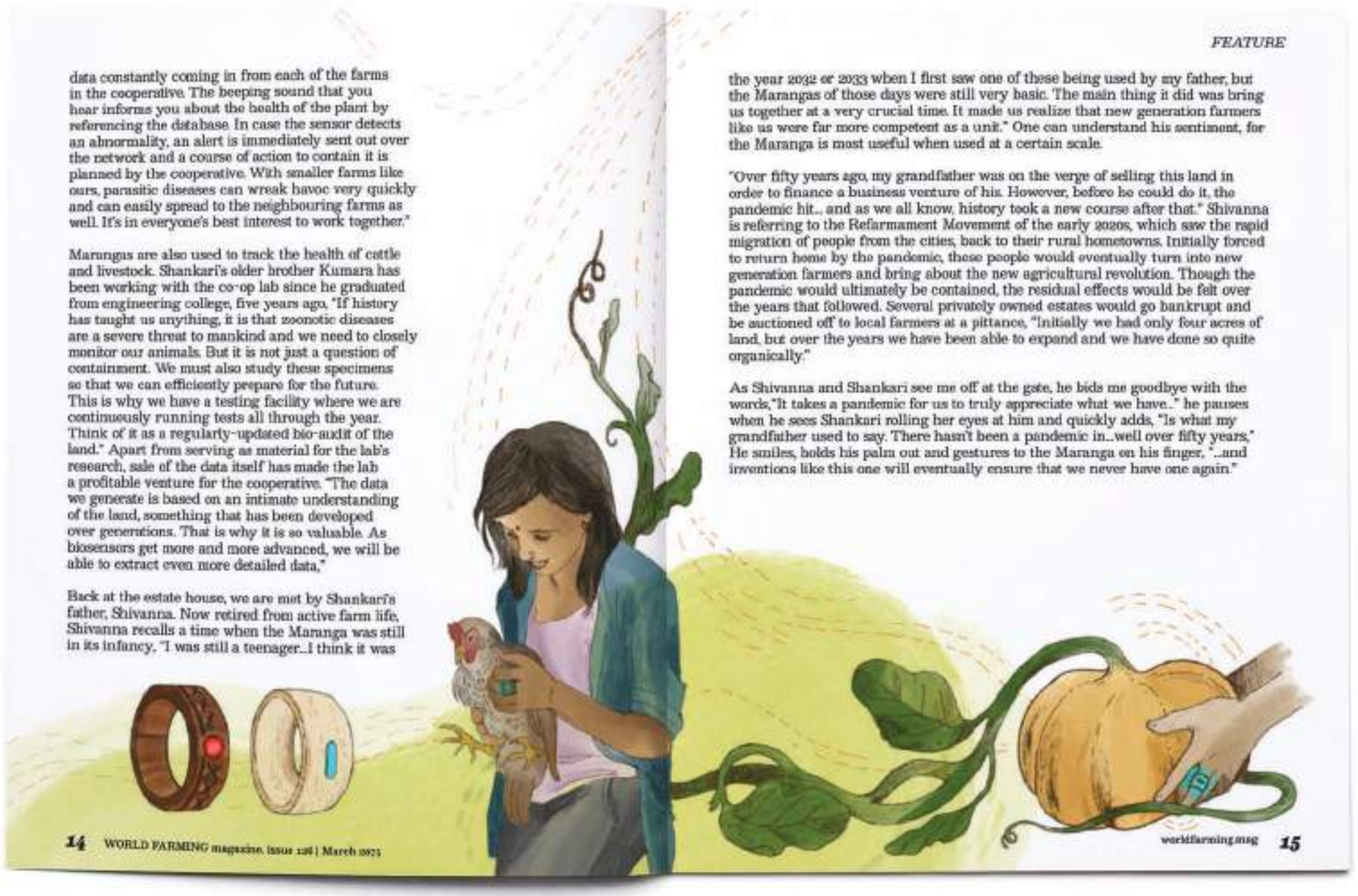
data constantly coming in from each of the farms in the cooperative. The beeping sound that you hear informs you about the health of the plant by referencing the database. In case the sensor detects an abnormality, an alert is immediately sent out over the network and a course of action to contain it is planned by the cooperative. With smaller farms like ours, parasitic diseases can wreak havoc very quickly and can easily spread to the neighbouring farms as well. It's in everyone's best interest to work together."

Marangas are also used to track the health of cattle and livestock. Shankari's older brother Kumara has been working with the co-op lab since he graduated from engineering college, five years ago, "If history has taught us anything, it is that zoonotic diseases are a severe threat to mankind and we need to closely monitor our animals. But it is not just a question of containment. We must also study these specimens so that we can efficiently prepare for the future. This is why we have a testing facility where we are continuously running tests all through the year. Think of it as a regularly-updated bio-audit of the land." Apart from serving as material for the lab's research, sale of the data itself has made the lab a profitable venture for the cooperative. "The data we generate is based on an intimate understanding of the land, something that has been developed over generations. That is why it is so valuable. As biosensors get more and more advanced, we will be able to extract even more detailed data."

Back at the estate house, we are met by Shankari's father, Shivanna. Now retired from active farm life, Shivanna recalls a time when the Maranga was still in its infancy. "I was still a teenager...I think it was the year 2032 or 2033 when I first saw one of these being used by my father, but the Marangas of those days were still very basic. The main thing it did was bring us together at a very crucial time. It made us realize that new generation farmers like us were far more competent as a unit." One can understand his sentiment, for the Maranga is most useful when used at a certain scale.

"Over fifty years ago, my grandfather was on the verge of selling this land in order to finance a business venture of his. However, before he could do it, the pandemic hit... and as we all know, history took a new course after that." Shivanna is referring to the Refarmament Movement of the early 2020s, which saw the rapid migration of people from the cities, back to their rural homestowns. Initially forced to return home by the pandemic, these people would eventually turn into new generation farmers and bring about the new agricultural revolution. Though the pandemic would ultimately be contained, the residual effects would be felt over the years that followed. Several privately owned estates would go bankrupt and be auctioned off to local farmers at a pittance, "Initially we had only four acres of land, but over the years we have been able to expand and we have done so quite organically."

As Shivanna and Shankari see me off at the gate, he bids me goodbye with the words,"It takes a pandemic for us to truly appreciate what we have.." he pauses when he sees Shankari rolling her eyes at him and quickly adds, "Is what my grandfather used to say. There hasn't been a pandemic in...well over fifty years." He smiles, holds his palm out and gestures to the Maranga on his finger, "...and inventions like this one will eventually ensure that we never have one again."



Reflections from our partners

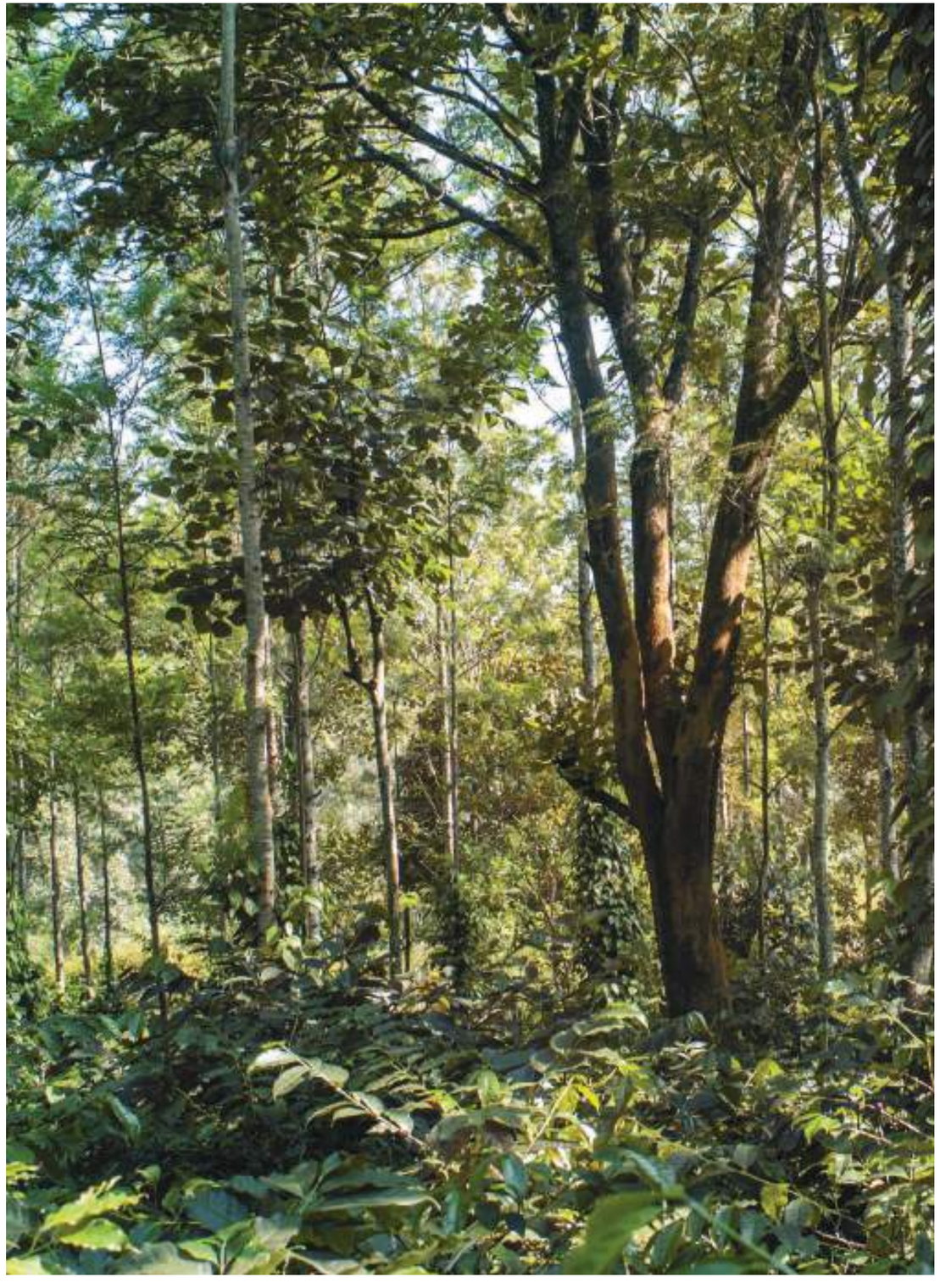
This project was structured around a relationship between design researchers, partner organisations, and communities. Expertise was spread across researchers with a background in design and technology, partner organisations that had deep hands-on experience in contextual systems, and participants drawn from these living systems with expertise in farming and forestry, and intimate knowledge about the land. Our partners were at the centre of these relationships – acting as translators of knowledge and context between researchers and participants and making sure we were asking the right questions. Within these pages, you can read what our partners had to say, their reflections on their involvement in the project, and how being part of it influenced their own work.

Dr Arshiya Bose
Black Baza Coffee

These days more than ever before, we have been trying to imagine the future. Imagining the future is challenging, tricky at best to wonder what the forest would look like fifty years from now. Would invasive species like lantana sweep over the forest floor? Would the summer extend into the monsoon and as a result would the dry deciduous forest replace the wet evergreen? Would coffee only grow in the higher elevations? Would there be a shift back to shifting cultivation or would there be no cultivation? While places like BR Hills have been shielded from being pulled along into dominant narratives of development, we wonder how we might continue to sustain this autonomy into the future. A hopeful future therefore is one wherein indigenous community like the Soliga in BR Hills have the freedom to self-govern and make independent and autonomous decisions about their community, livelihoods and surrounding ecosystem. This might mean a more collective approach to leadership and decision making about the big and small things - like where to build a concrete road or construct a health care centre or how to design school curriculums. Fundamental to the current landscape in BR Hills is its legal status as a Protected Area, which provides the state with the management rights to the region. While communities can be involved in decision making about the wildlife sanctuary, the decision to, or not to, involve them ultimately rests with the state. A hopeful future for the forest is one wherein traditional indigenous knowledge and conservation practices like lighting litter fires to control larger forest fires or to control invasive species, can be at the centre of conservation plans for the region. This might mean that decisions about how best to conserve forests and biodiversity, including the tiger can be taken by community members instead of state agencies.

Of course, coffee is only incidental to this hopeful future! Coffee is important so as long as it is a means to improved livelihoods, exposure to fair market partners and also a means to build capabilities to self-govern. If coffee persists, then a hopeful scenario is one wherein the marketplace is not just a marketplace and consumers are not just consumers. And coffee is not just coffee! Rather it is one by-product of a process of living mindfully in an ecosystem and sharing the space with other living beings. A consumer therefore is a co-partner in this journey, someone who understands a little bit more about the intricacies of sharing space with nature and is willing to see 'imperfections' in the process and coffee beans as indicators of a thriving, diverse ecosystem. Maybe this year the monsoons have been heavier, the forest floor is wetter and therefore the coffee beans have held more moisture and have a different flavour as a result. Essentially if a hopeful future is one wherein there is an inherent acknowledgment of variability and non-linearity, then questions of how to build trust become even more relevant. A seal of trust is unlikely to do the job. Maybe we need complex, long-winded stories that draw producers, consumers and the uncontrollable ecosystem together into a system. Could these stories be imagined like nothing we've imagined before? Could these stories be sounds, smells and tastes instead of seals and certification labels?

Historically, forest-dwelling communities have not enjoyed a seat at the decision-making table. Whether large scale policies concerning land tenure or more everyday ones, like collection and sale of forest products, decisions have been taken in their absentia. Decisions are taken by those in power and



then rolled out in the landscape. The standing joke amidst community members is that they learned of India's Independence six months after it had happened! In our work and indeed for most practitioners who believe strongly in co-designing and co-creating processes, community-led decision-making is a first and foremost prerequisite. This is especially true when imagining futures. However, our experience shows that there are inherent tensions in this idea of agency and self-deciding about the future. Many of the community members we work with are ambivalent about holding formal power and there is little collective memory of what holding power in contemporary India means. Few community members have held leadership positions in local, state or central governments. There is a dual relationship with the state, often contested especially on issues of recognising individual or collective rights to land. However, the idea that the state can protect community members, can enable development and distribution of public goods and services is also strongly present in the dialogue about the future. It would be valuable to enable community members from BR Hills to visit and engage in depth with communities elsewhere in the Indian subcontinent who have a longer history of self-governance. It would create practical reference points with a roadmap for what this journey would look like. We might also facilitate a more structured, focussed dialogue on the future - who are the actors, who holds power, formal and informal authority and how are decisions made?

During the course of the past few months, it has been equally important to create prototypes that respond to conversations with community members around self-governance. Some of these prototypes were shared at the UnBox festival and GCRF symposium at the University of Dundee. These prototypes were not only an attempt at solutions but also starting points for discussions around what the core need is in the community. Many of the prototypes attempted to shift a set of feelings and therefore seemed powerful ways to engage and transform.
A producer as a superhero shifts the narrative that farmers hold less knowledge and fewer capabilities - a collective feeling held by many communities and also exploited by those with vested interests. A weighing scale that attempts to tell a story, mapping the journey taken by the coffee bean, slides into the consumers consciousness before they can quickly weigh, pay and get away. Similarly, a colour detection meter that can select ripe coffee fruit, empowers a smallholder coffee producer to fight the bias that small farmers cannot grow the best quality coffee. These prototypes, while they seem like technical fixes, do actually challenge the dominant narratives that seek to marginalise smallholder producers and indigenous communities.

These prototypes can now be pushed on further. One of the spaces for emergent technologies is in strengthening indigenous knowledge, whether traditional ecological knowledge, knowledge of the land and ecosystem, changing climate and traditional medicine - enabling communities to build self-reliance for the future. From our work it seems that communities need support in documenting indigenous knowledge, protecting their knowledge systems while accessing and adapting knowledge for what is relevant in the current context. Building an evidence base of current land and resource practices would enable community members to contest the lack of recognition of rights, tenure insecurity and steps taken by the state to disempower community members. Could these technologies protect communities from eviction, displacement and disempowerment?

On a more personal note, as someone knee deep in the conservation and development space as a practitioner, the collaborative thinking allowed for directions in our work that we had not previously thought of. The idea of futures and hopeful futures are new ways of thinking for us. We are most often found fighting fires and addressing the most urgent or contingency livelihoods needs of community members. When we think about futures, we only gloss this over and move straight on to planning – planning projects, planning activities and outcomes. Imagining a hopeful future has allowed me as the founder of Black Baza Coffee to reflect on the values that feel most integral to our process. It has also enabled me to feel more agency and be a more empowered decision-maker myself.

Vishalakshi Padmabhan
Buffalo Back Collective

A key challenge in imagining hopeful futures is to be able to do it with the communities that are typically excluded from future imaginations. How are they seeing their own futures? How do they want to play a part in creating those? A design led method presents a unique way in being able to open up new possibilities. For most farmers, technology and innovations are things that trickle down from universities or are explained to them by experts; in other words they are imposed on the farmers. Traditionally, this has been considered the safer way because these experts are also meant to have a larger view of new things that are happening. Agency for farmers has never been an active consideration in this process. However bringing design into this process is interesting because while there might not be in-depth knowledge of the intricacies and complexities of farming among designers, there is an openness to deeply engage with the farmers. It was still hard to engage with the farmers however, many of whom have pre-existing mind blocks, having only been exposed for years to the likes of agricultural scientists.

Even when we are constantly engaged with these communities, it takes a lot of time, years of relationship building for them to be able to open up and share. For example, we have been working with the women in a village for over two years now. Very recently, one of them, a young woman in her 30's told me how she can identify 21 different indigenous herbs and leaves in the forest and how to cook them. Despite all that we had worked on together, she had not seen the value in sharing her deep knowledge about this. She didn't see it as relevant to what we were doing. So how then do we get them to imagine for the future? Another example is of this young boy in my village who has a great relationship with all the cows and goats, but this is always ridiculed. He is told that this is useless and he should go to school and educate himself. This disconnect with their environment is only deepening.

The most significant deterrent to communities being able to share, is the systematic way in which experts have shunned their knowledge. And this has resulted in communities not valuing the knowledge they have. This deep knowledge, built from an intimate connection with the landscape and through generations is systematically being invalidated. Even within farming, the notion that innovation - technology, growth, development - has to come from the world outside and not from within, seems to be cemented in now. And this has caused intrinsic harm, in the loss of imagination, creative thinking, being unable to think in abstraction, even amongst the young in villages, causing a deep disconnect with the reality of what is around them and what is actually important. In this context, thinking of hopeful futures becomes especially hard for these communities.

To address this, we need to work with them longer and have deeper engagements. And this needs to happen at a local level and in response to local culture, values and practices. We need to find design prompts and probes that emerge from their everyday lives and routines. In this project, using actual objects as probes (rather than more abstract activities) helped. They could hold and feel these objects and that made them think beyond the objects themselves. Providing them potential scenarios of use for these objects, even if they weren't meant to provide solutions, helped them engage and actually articulate their core problems, which they might not have been able to if simply asked. A probe that we imagined would trigger discussions around consumer - farmer relationships was seen by them instead as a way to keep animals out of their farms. This for me, is a really useful way to get them to talk about the issues they face. Another interesting thing about the probes we presented was how they were flexible enough to prompt different

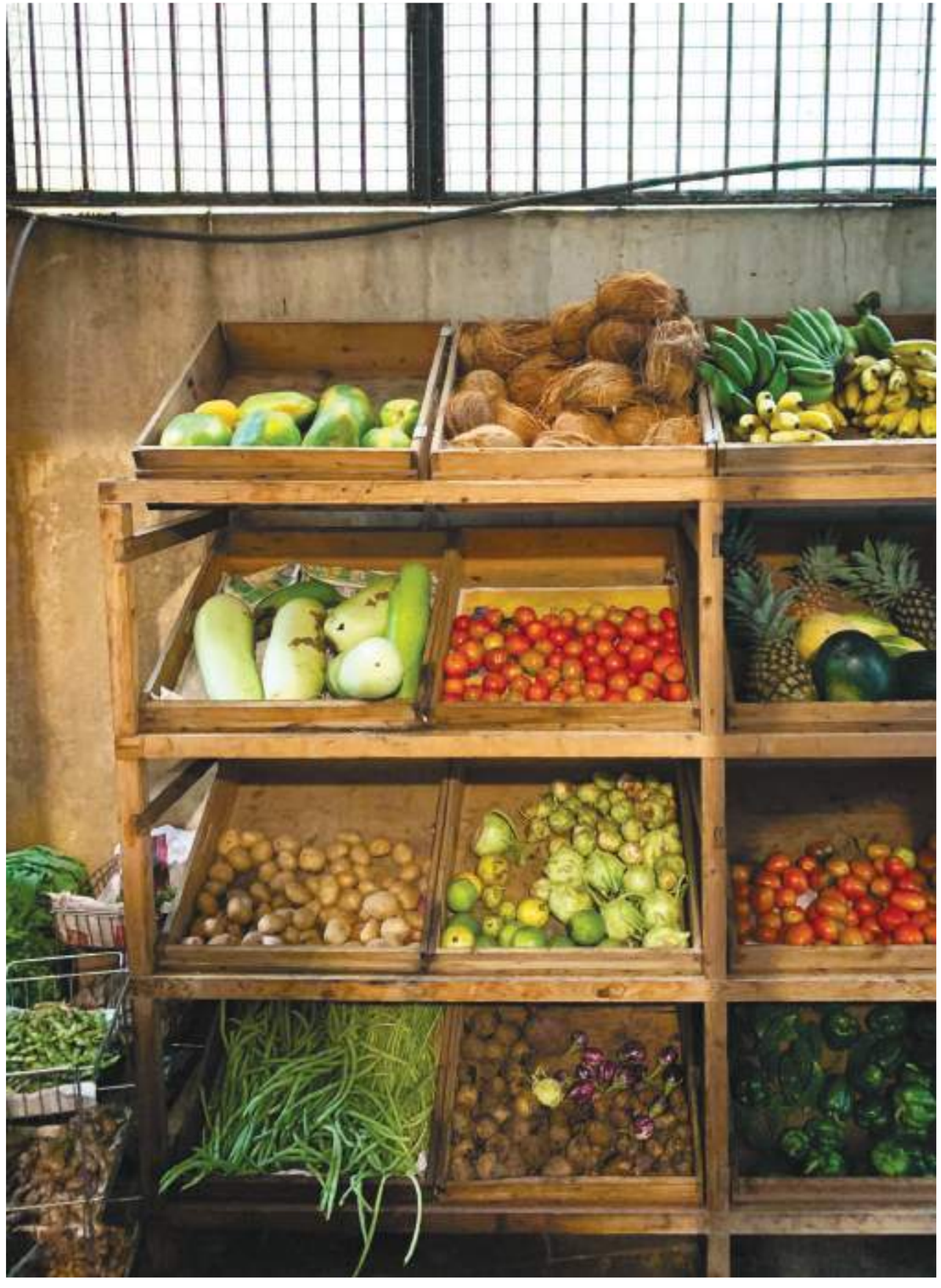
imaginations of how it could be relevant for the farmers. This is a contrast to what is typically done in technology first frameworks. Localised, decentralised technology that is built by people who are connected to a place, who have the inclination to understand what is actually needed, can be more useful, relevant and inclusive. Finally, I think, design processes and methods can bring farmers and consumers together and help them engage with each other, which will in turn make consumers more empathetic to the farmer's context and challenges.

In addition, in my own work with communities, there are a lot of things I have learnt from this approach. I have been using them formally and informally in my engagements with farmers and the larger community. Some of these approaches have been particularly helpful for me in engaging with children in the village; they are ready to imagine their futures and share their dreams.

How can we hope for a different future where technology emerges from the people who actually need and use it? So far, we have always worked with a top-down structure and this implies that we have to challenge the entire system, not just how technology is made. Just like it is not only about adopting organic farming. Actual transformation can come only with deep change in people's lives, from each person figuring what they need and actively participating and driving the change needed for that.

The most crucial aspect of agriculture is the deep human connection with crops, soil, living beings. Unfortunately, agri-technology seeks to break that, to take away the deep connection between humans and the living ecology. It is alienating, and attempts to replace this human connection with machines. The current rage of sensors and sensing tech is also problematic; sensing needs deep connection, it needs observation, your human senses are deeply involved. Are we losing these senses to parameterised measurements? I remember a batch of students from an agricultural college using these soil thermometers, writing down parameters, without ever touching the brinjal plants they were studying. And to me, the brinjal plants just looked sad. The students first needed to be working with the soil and the brinjal plants, before bringing in their parameters and thermometers.

Agricultural solutions can only work at a local level. The problems we face today are because we haven't allowed local systems to flourish, including deciding what seeds to sow and what crops to grow. Even that is decided at a state level based on some statistical projections, resulting in farmers just buying the seeds that are made available to them. Instead when decisions are made locally, it takes into account personal situations and perspectives and are sought to be built on a foundation of care. Maybe the urban way is to look at individual decision-making. But with agriculture, so much of it is based on shared resources and working as a community. Landholdings might be personal, but the choices you make can cause larger ecosystem-level damage. For example, the implications of an individual farmer's choice to use GM seeds, when the larger community wants to use heirloom seeds. Of course there are issues with collective decision-making especially when it leads to further enhancing patriarchy and giving women no rights. But that does not mean that the solutions lie in individualising everything. When individuals can bring along larger communities, like some of our organic farmers, there could be nothing better. At a community level, the connection with soil and other resources is deep and it affects them personally. But now we are giving charge of these resources to external experts who do not have a stake in it, who do not comprehend the very personal vulnerabilities that the farmers have. What we have to do is to imagine and work towards different futures, that are pluralistic and embedded in place and community.



TB Dinesh
Janastu

Storytelling is an innate human need. Think about the Sanskrit saying Atithi Devo Bhava: a guest is akin to god. It implies something deep. It means that even if my household goes hungry, I will not turn away an unscheduled visitor (atithi = a - thithi = sans - schedule). Why is that? It is because the stories the visitors bring with them are also nourishment. In a way, this need for stories is a part of human evolution. Back when such proverbs were first constructed people were physically distant. Somebody had to come from far away to bring these stories. The journey would take days; they went through all that to bring you these stories, so you can't turn them away.

How were these stories preserved and sustained? What were the rural and tribal structures that supported the longevity of these stories? Perhaps, sometime in our history there was a push to codify some of these stories as significant for the well being of the population or for governance by the lords of the times into the vedas; so they could be carried forward in time. So there were these massive efforts across generations of communities to learn, repeat and regurgitate these stories over time and space, for thousands of years. Reflect on the effort. These communities, we may call them Brahmins today, but we need to go to the roots of the need for these efforts. Isn't it so these stories could be sustained? Millions of people over thousands of years, working to make it happen.

And then came the printing press and that was a revolutionary technology because after that stories could be sustained in other ways. People could foresee sustaining their own stories for a community of their interest. You could re-learn in a different way. This was democratisation of knowledge. However, it necessitated people to be literate which in turn led to a proliferation of schools as we know them. And now what does it take? You push a button and record; compare the efforts through history. These are fundamental changes.

The role of literacy here is integral, because the absence of it means exclusion from these knowledge systems, from these techniques of creating, sharing and remembering stories. This is the reality for so many people. If you can't read or write, then sorry, how do we engage? For those who are not part of this literate community, their knowledge systems, their stories, face invalidation. We have seen how difficult this pursuit of literacy is among the poor and rural populations. Dropout rates in schools are very high and so many young people end up feeling like failures. They end up in low paying jobs that no one educated wants to do. This is part of the system. Meanwhile what about these people's skills? Blacksmiths, cobblers, weavers and all other craftspeople are disappearing, as their production skills are replaced with an industrial process that they cannot engage with as skilled people.

This is where we are at and we at Janatsu want to use technology to enable and facilitate these channels of communication that have been lost. We want to rediscover these channels where literacy is not mandated for participation. We want to bring a sense of validation by enabling communication and broadcast. This also means that we are encouraging local communication along with long distance communication. To bring these opportunities to all people, to publish for their neighbours, which will allow local stories to be built over time. People can listen to what their neighbours published and tell them what they felt when they heard their stories. This is what we are trying to do with our radio projects. For example the community radio project where

we are supporting students while they build devices to record and archive audio stories in a community mesh network. Our 'Web Annotation for Renarrations' is also connected; it is about enabling access without literacy. It proposes a human in the loop approach for renarrating web content, where a renarrator creates an alternative narrative of some web content with the intent of extending its reach. I think the state of technology that we are in is very nascent in terms of where we want to go with community engagement. The ambient technologies that are all around us are not really concerned or aligned with these objectives and that is a big bottleneck for change in many ways. For example our social semantic web renarration technology requires a certain way of thinking and we need groups, including developers and technologists who are willing to think this way to come together. This has been a challenge.

Take organic certification as another example. How can technology enable the transformation of agriculture in India to become more organic? Can technology give us a better understanding of what is organic? Can it help us understand what is local? Can it help us prioritise efforts and steps towards more widespread organic agriculture? But the reality is this narrow implementation of technology, which is focused on certification, where data has to be entered in excel sheets and maintained, so an organic certification can be given by the state. This is the impact of tech-deterministic dominant and ambient technological regulatory narratives of the state.

To co-create with rural, marginalised and poor communities we have to first accept them. Accept them in-spite of our own education and accept them into our process in-spite of their inability to read and write. Then we need to think about how we can enable expression without reading and writing? This is a critical challenge. How do you instigate a process of enquiry or of storytelling? What are the steps involved? There is a lot of demoralising that happens in discussions when there are equations of power involved, even within these communities. We have to overcome these barriers and considering how entrenched these power equations are, you are reminded of the patience that is needed. This is not going to change overnight. Local futures are not an immediate possibility. It needs dedicated work for some time. Maybe we can see change in ten years.

In this project when we approached rural communities with physical technological prototypes, we had immediate engagement, they could relate to every one of the prototypes. It was interesting because it was not about yes, I need this or no, I don't need this. This is a step in the right direction. It was not a corporate solution trying to meet a specific need. Instead it was meant to make you think, and it did make them think about what these things could be in their lives. But there is a barrier in going beyond that. You need patience – you need to go again and again for them to get comfortable and play, imagine and build with these prototypes. In some ways, this barrier is of abstraction. Designing futures, imagining and building with prototypes and other such activities requires practice in abstraction. These communities have been removed from the practice, so instead they end up focusing on immediate needs. Can this address my immediate needs? In a way this is true even for many of us who have practice in abstraction. After a point you are uncomfortable with abstractions and you want to think about what you can do with this knowledge. For many in these communities, it is challenging to engage with even basic abstractions. To overcome this, we need to convince them that they are our equals. For us, this means, instead of just going to them and asking them what they need as poor Indians, we need to engage them in the process of discovering issues and investigating them deeply. This is the long term roadmap to co-creation of futures and it requires time.

Reflecting on the project, it merges with many other activities that we have been trying to do for the past decade in this direction. It contributes to that. Perhaps most importantly, it creates this new community of actors, which includes us and other organisations and people who have been part of this project across India and the UK. In the long term, this community will share ideas and perspectives to deal with these issues and hopefully contribute to the many transformations we have been talking about.

Learning to speak to an elephant

Given that this book explores decentralised digital futures in India, you may be wondering why we titled it ‘Learning to speak to an elephant and other stories of decentralised digital futures’. For us this is a deeply resonant reflection on the nature of this project. It was our friend Nishant Srinivasaiah, a wildlife biologist from the National Institute of Advanced Studies, Bangalore who first made us question whether a human centred approach to design was the right approach for this project. His expertise in understanding elephant behaviour led us to a series of concepts for technology designed around animals rather than people. We talked about this a lot, and in the early stages of the project developed a number of more-than-human centred design concepts. In the end these concepts were integrated into various artefacts such as the Soliga voice assistants, the Drishti 2040 report, and Dr Nagamma’s research record. Through his insights, we were better able to understand the way in which the Soligas relate to the forest that they call their home. When we went into the forest to meet the Soligas we were focussed on a human centred approach to design, leading the research through people rather than through technology. What quickly became apparent was that their lives were intertwined with the life of the forest, with the animals, with the plants, and with the seasons. Whilst we didn’t end up designing devices for elephants, we felt it was crucial that we recognised this approach to life that is more-than-human centred. We have much to learn from the people of the forest, just as we have much to change in the digital practices that are rapidly sweeping across both our and their worlds.

Biographies

Quicksand
Quicksand is an interdisciplinary design research and innovation consultancy based in India. Our work is driven by an approach that seeks to build on a rich, evocative understanding of people and environments, This is done through multidisciplinary collaborations, expressed through manifests that thread product, service and systemic interventions. Quicksand's guiding framework is - Meeting People, Telling Stories, and Crafting Experiences. All our work is grounded in the realities of people who we aim to design for and with, co-creating with rather than for; tuned to inform and inspire, and focused on realising experienceable value. We seek to involve users and stakeholders at each stage of the process. We also incubate UnBox Cultural Futures Society, as a platform exploring new narratives and building action at the intersection of disciplines, to reimagine India's plural futures. As part of its agenda, UnBox curates and produces festivals, labs and publications that bring together diverse practitioners from India and abroad for collaboration and new expressions.
quicksand.co.in

Duncan of Jordanstone College of Art and Design
Duncan of Jordanstone College of Art and Design has an established track record in research and teaching at the interface between people, technology and things. The research studios, workshops, and make space provide a creative environment for research and impact that places design, and the construction of real things, at the forefront of its work. The college is part of the University of Dundee which has a clear mission to transform lives, locally and globally, by the creation, sharing and application of knowledge and is committed to intensifying its global impact, by addressing the many challenges facing our planet. As part of this mission, the college and university work together to strengthen partnerships that are aimed at tackling the most pressing development challenges, which disproportionately impact the poorest and most vulnerable.
dundee.ac.uk

Our partners

Dr Arshiya Bose
Dr Arshiya Bose is a political ecologist with a research interest in the interplay of markets, livelihoods and biodiversity conservation. She is the founder of Black Baza Coffee, which works in coffee landscapes in India to strengthen biodiversity-friendly farming practices, including using their enterprise approach to support coffee growers to maintain a diversity of native shade tree species and restore wildlife habitats on farms and their surroundings. With Black Baza Coffee and Arshiya, we worked with the Soliga coffee growers of the Biligiri Coffee Producers Society in BR Hills in Karnataka. We also worked with Dr Nishant Srinivasaiah whose research is on the behavioural ecology and sociality of Asian elephants in the changing human-dominated landscapes of Southern India.
blackbazacoffee.com

Vishalakshi Padmanabhan
Vishalakshi Padmanabhan is the founder of Buffalo Back Collective, a network of small-holding organic farmers around Bangalore. Buffalo Back is seeking to change the relationship between urban consumers and their food, striving constantly to evolve a better and healthier food system. Their work also centres on building awareness and knowledge to strengthen our ability to exercise sustainable choices. Buffalo Back Collective also hosts the Secretariat for the Participatory Guarantee Systems Organic India (PGS OC), which is a cause driven social organisation of 17 farming collectives across India, dedicated to bringing about an inclusive platform for small and marginal organic producers, to collaborate and flourish in the domestic market through a process based on verifiable trust.
buffalobackcollective.com
pgsorganic.in

TB Dinesh
TB Dinesh has been associated with Servelots and Janastu for about two decades as their Technical Director. Janastu.org and Servelots.com have been doing research and technology development along with NGOs and SMEs across regions of Karnataka. This has led them to work on Archives, Annotations, Indigenous Radio and Storytelling tools and to foresee renarration and spatial navigation for the needs of the large diversity in literacy among emergent Internet users. Amongst other things, Dinesh's work also builds on independent mesh networks, distributed learning contexts and handmade and sustainable futures.
janastu.org
iruway.janastu.org

Creative collaborators

Deepa Bhasthi
Deepa Bhasthi is a writer and farmer-in-progress who lives and works in the hills of Kodagu, Karnataka. She occasionally works in visual art projects. Her current research interests are in the areas of sociolinguistics, politics of food and the intersection of land and landscape. Her essays, criticism and other writings have been published in several national and international publications.
deepabhasthi.wordpress.com

Yuvraj Jha
Yuvraj Jha is a concept artist, illustrator and storyteller for films, games and publications. He graduated from Feng Zhu School of Design where he studied concept art for entertainment. His work combines speculative design and lived contexts in an attempt to engage, inform and entertain. In 2018, he founded MONKEYVERSE, an entertainment design studio that creates immersive and memorable experiences and outreach for clients including NETFLIX, APPSOLUTE Games, Quicksand Design Studio, EYEMYTH Media Arts Festival, Plexus Motion, and many more.
monkeyverse.in

Sarah Kaushik
Studying design in India helped sensitise Sarah Kaushik to observe the heritage, culture, the stereotypes, socio-political aspects of the country and communities. Sarah began her professional journey in September 2010 with Siddhartha Das Studio in Delhi, where she worked on a permanent exhibition as a part of restoring a heritage monument. Her interest in narrative environments grew exponentially during this period. Working on the scenography for Asia's largest Art Program at the Mumbai International Airport next, the project took her through the process of closely working with more than a hundred artists and artefacts, and translating content into its physical form at the site. Sarah began working with digital montages in 2017, applying the same knowledge of building narratives, only in a two-dimensional space creating provocative juxtapositions to explore the concepts that intrigued her.
instagram.com/thebigeyed_collagist

Thomas Louis
Thomas Louis studied ceramic design at the National Institute of Design in Ahmedabad, but his journey with clay started in school, digging up mud pits in the garden in the Kerala monsoons. Thomas set up a studio in Bangalore, working on various products and projects for about 10 years. He now lives and works in Goa. For the past seven years, his work has been mostly inspired by nature and natural phenomena and he makes a wide range of ceramics, both functional and decorative, often looking for a fine balance between the two. Thomas also teaches ceramics at NID, and at his studio in Corjuem in Goa for beginners and adults at any level, but he truly enjoys teaching kids.
instagram.com/thomaslouis777

Poornima Sukumar
Poornima Sukumar is an independent artist, muralist, visual thinker and explores artistic interventions and collaborations along with people from various backgrounds. Her expertise of working with large, sometimes vulnerable communities from difficult backgrounds with art as a strong medium, has allowed her to explore 'art' more than just its form and medium. She is also the founder and director of the Aravani Art Project. For the last decade she has worked on projects with marginalised communities and on social issues. She continues to do so with the Aravani Art Project, based in Bangalore, India.
aravaniartproject.com

Sadhna Prasad
Sadhna Prasad aka Sadh.Press is an artist and storyteller currently based in Bangalore, India. She divides her time as an illustrator (drawing colourful everyday stories), an Art Director for the Aravani Art Project and in her daily routines. She has been an illustrator and muralist for the last 5 years where she transforms her strong sense of colour and form to walls. She has a multifaceted approach to both her personal and commissioned work that includes showcasing the everyday, stereotypes, women, colours and the many Indian forms.
aravaniartproject.com

Bharat Mirle
Bharat Mirle is a filmmaker and writer based in Bangalore, India. Working in both fiction and documentary formats, his films have won multiple awards and have been screened at various festivals across the world. His 2015 short documentary '175 Grams' was the winner of the Sundance Short Film Challenge. As a storyteller, Bharat is interested in exploring the uniquely diverse Indian socio-cultural landscape and bringing to light its complexities through compelling narratives. He is currently in the process of completing his first full-length film.
bharatmirle.com

Pia Meenakshi
Pia Meenakshi is an artist and coffee-planter-in-training based in Bangalore, India. She explores the world through painting, printmaking and projects involving paper, sculpture and mixed media. Commercially, she enjoys creating children's books and illustrating for publishers. Her love for plants, animals and magic help her create inspirational pieces that blur the lines between real, fantastical and the occult. Outside of her studio, Pia helps run her family's coffee estate in Coorg, Karnataka.
pia-m.com

Acknowledgements
This project was made possible with the help of many people and organisations across the UK, India and beyond. Their work, questions and companionship has provided us with much inspiration and food for thought. We look forward to continuing these conversations.

Our team
Loraine Clarke, Babitha George, Romit Raj, Jon Rogers, Neha Singh, Martin Skelly and Pete Thomas.

Our partners
Janastu & Iruway: TB Dinesh, Gopi Krishna, Sanketh, Shalini, Neelkant mama, Girish NP, Rajeshwari, Siddava and other crafters from the Crafter Space. Buffalo Back Collective: Vishalakshi Padmanabhan, Roopa Prabhakar, Karthik Gunasekar, Ravi and other farmers of the Buffalo Back Collective as well as members of the 16 Doddi Trust. Black Baza Coffee: Arshiya Bose, Sannarangegowda, Achugegowda and other Soliga coffee growers of the Biligiri Coffee Producers Society in BR Hills. National Institute of Design, Ahmedabad: Praveen Nahar, Sahil Thappa, Siddhi Patil and Supreetha Krishnan

Funded by
Global Challenges Research Fund
The Scottish Funding Council

Supported by
The University of Dundee. Mozilla Foundation Fellowship - with thanks to the Mozilla Foundation who supported Jon Rogers and Loraine Clarke through their fellowship programme (2018-2019). Manchester Metropolitan University, Northumbria University and University of St Andrews for supporting Pete, Jon and Loraine's time (2020 - 2021).

Special thanks to
Bablu Ganguly, members of the Timbaktu Collective and other members of PGS-OC India (Participatory Guarantee System - Organic Council). Nishant Srinivasaiah, Thejesh GN, Vishwanath Srikantaiah, who have been trusted advisors and friends through the course of the project. Grant Davidson, Rob Jackson, Christine Kingsley (whose illustration from UnBox features in our timeline), Sean Kingsley, Ali Napier, Beth Spowart, Alastair Strickland, Nick Taylor and Sandra Wilson at the University of Dundee. Jayne Wallace and Justin Marshall at Northumbria University for their inputs around craft, digital and cultures of making. Bas Raijmakers, Davide Gomba (whose image of Babitha and Pete features in the timeline), Shannon Dosemagen, Michelle Thorne, Vladan Joler, Jignesh Khakhar, Sam Burton and John Thackara. Reema Deshpande for her work with lost food stories. Gaurav Sharma for his amazing work in developing and drawing our ideas for the comics. Rhea Muthane and Hugo Pilate for their contributions at Quicksand. Madhav Ajjampur for his editing and translation skills. Emily Thomas and Adina Ziebart for their illustrations that helped us develop our ideas for the comics.

Learning to speak to an elephant and other stories of decentralised digital futures.

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Translations
Madhav Ajjampur

Design
Pete Thomas, theotherwork.com

Typeface
Aktive Grotesk, Dalton Maag
Noto Sans Kannada, Google

Printing
Brand Mavericks, India
Pression, UK

Published by the University of Dundee
First Published 2021

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ISBN 1-899837-83-3

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Scottish Funding Council
Comhairle Maoineachaidh na h-Alba