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Organizational Sustainability

'How mobile technology has helped farmers in India'

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Sustainability is an increasing trend that is central for maximizing the output of something. Overall sustainable developments can secure better quality of life for all. Countries all over the world are adopting more sustainable practices whether it is economic, social, or environmental. While developed countries have an easier time adopting sustainable practices due to the abundant amount of resources and work, emerging, or developing nations on the other hand may have more of a hard time implementing some of these practices. In terms of my ethnicity I am half Indian, therefore I pay special attention to issues occurring within India. One important issue that is being addressed in India on a large-scale basis is farmer's lack of, or access to, technology. Throughout my paper, I will be discussing how Indians are addressing this issue and bringing scientific advancements along with their knowledge in information technology together in order to develop new techniques in farming, changing the way of life for these farmers, and creating more sustainable practices through the use of mobile technology.

While India has many regions with high levels of education and while they are very scientifically advanced, there are also some regions that experience extreme poverty and poor living conditions. One city that is a prime example of this is Calcutta. Most of the poor are farmers who live and work in rural areas. First, it is important to know what conditions are like for these farmers and what issues they face. India can encounter many harsh and warm temperatures throughout the year, so the weather can be detrimental to crop growth if the crops are not properly taken care of. To provide some statistics, India's Chief Minister stated "due to unfavourable climatic conditions, last year there was a drought-like situation in 20,000 villages of the state, which has swelled to 24,000 this year and production has suffered drastically in the entire Marathwada and eastern part of Vidarbha."<sup>1</sup> Nature is very unpredictable and most of the time these farmers and villages are not properly prepared for sudden changes. As a result of

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<sup>1</sup> <https://www.indiaagroneet.com/Agriculture-Technology/agricultural-technology-adoption.html>

this, they experience crop loss. In addition, a large number of these farmers are not very well educated, or are even illiterate for that matter, so it is hard for them to know what to do when unexpected events occur. Furthermore, there is not much access to technology on the farms and fields. Even though ten years ago access to technology may not have seemed that important, in today's society it is extremely beneficial to stay connected when on the farms so one can be aware of weather changes, storm alerts, changes in agriculture and prices of crops, and also to keep up with disease control and regulations.

I predict that by having the proper technology, farmers can make the best negotiations, keep up with competing farmers, and make sure they are receiving the most income they can. I feel as if farmers want to make sure they have the correct information so they can maximize their farming and increase economic profit as well. The useful information they will receive as a result of technology can provide them with more power to bargain. It can also make them adopt better farming practices which means they can feed more people with the food they raise and help eliminate hunger problems that exist across the country. They can even export their products, which positively affects each part of the triple bottom line of economic value, social value, and environmental value. Selling their products to overseas markets increases profit, which helps individual human life. It also helps feed people in other countries, which is caring for the value of relationships. Finally, it promotes naturally grown products as well, which is caring for living creatures and the universe as a whole. Technology can really be helpful if taken advantage of.

Some of Indians who live closer to the bigger cities can benefit from Wi-Fi if they are connected to a local service tower. But most of India is rural, and those individuals could not take advantage of the large service towers and facilities located within the city. There was a

discovery that mobile device carriers' coverage reaches into the outskirts of the urban regions, which is the best and quickest way of bringing the large facilities from the city to a rural area via wireless technology. If farmers could take advantage of the wireless technology, they can increase their overall work practices. The Indian government wanted to make sure that the wireless technology was very cheap, therefore they made it so someone can purchase a smartphone for around \$100 and only pay as little as \$20 for a year of service. Some companies even allow farmers to send 150 free text messages a day. The reason the farmers can now obtain these devices is because "many mobile phone makers, including big hitters like Nokia and Sony and smaller Indian companies like Micromax and Maxx Mobile, have kept devices basic and affordable and payment plans are often pay-as-you-go, making mobile phones accessible to people of nearly all income levels."<sup>2</sup> The government has even made SMS for some farmers in extremely poor areas completely free. These SMS texts can be sent to farmer's phones relaying important information that they might need to know. For example, the SMS texts they receive regarding weather is compiled from 146 different weather stations of the India Meteorological Department,<sup>3</sup> so they can be at ease knowing the information is accurate and is coming directly from their website. They can also select which language they prefer to communicate in, for example Hindi or English. While these farmers can easily obtain important information that they may need, it is also important that there is two-way communication and they can ask questions if they have any as well. The Indian Institute of Technology has a department set up which answers any questions that farmer's text in. In addition to this, Sheffield Hallam University in England, even allows farmers to send in pictures of problems

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<sup>2</sup> <http://blogs.worldwatch.org/nourishingtheplanet/texting-on-the-farm-mobile-technology-provides-farmers-with-useful-information-in-india/>

<sup>3</sup> <https://www.indiaagronet.com/Agriculture-Technology/Free-SMS-Service-for-Farmers.html>

taken on camera phone.<sup>4</sup> Since these pictures are taken on higher quality smartphones, the image will be clearer and more easily able to investigate and find potential issues or solutions, as well as tracking and analysis. Applications can also be used to provide aid. According to an Indian company Mobile Harvest, they have an app that can be downloaded onto these smartphones that actually allows farmers to connect with those in the agricultural sector. The app is said to not only provide useful tips but it “records farmers discussing successful yields and detailing how these can be replicated. The reports are then catalogued using a set of recognizable symbols meaning that farmers with little-to-no literacy skills can also access the information”.<sup>5</sup> In addition to adopting more sustainable agriculture practices, farmers can also develop new crops with this technology to set them apart from others. One major company that is leading the mobile technology industry on farms is LifeLines Agriculture. The farmers can use their mobile devices to place a call to LifeLines, and a voice menu will allow them to inquire about crop failure or whatever it is they are calling about. A representative of LifeLines will then search for an answer in their internal frequently asked questions database, and an expert in the field will review the answer. The proper response is then sent back to the farmer as a voice clip for them to play back on their mobile devices. According to the LifeLines website, presently the service reaches out to a total of 1000 villages of India. The LifeLines service has benefited over 150,000 farmer households. As on date more than 350 queries are being received from farmers on a daily basis”.<sup>6</sup> This company is a great sustainable way of moving forward in helping farmers be aware of disease control, pest management, funding, market prices, and more without spending a lot of money, and without promoting the use of

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<sup>4</sup> <http://blogs.worldwatch.org/nourishingtheplanet/texting-on-the-farm-mobile-technology-provides-farmers-with-useful-information-in-india/>.

<sup>5</sup> <https://en.reset.org/knowledge/mobile-technology-and-sustainable-development>

<sup>6</sup> <http://lifelines-india.net/agriculture/LifeLines%20Agriculture>

harsh chemicals that would potentially damage the environment. They encourage reusing agricultural materials as well as finding organic alternatives and solutions. Mobile technology can also specifically help dairy farmers. The National Dairy Development Board produced an app that will provide information about how farmer's buffaloes and cattle can get a balanced diet, and it will raise their income by cutting the cost of feed and raising milk yield.<sup>7</sup> As a result, the overall production will increase as well as the profit.

Another thing mobile technology has been doing is helping the water system that farmers use. Farmers have to manage water pumps and irrigation systems in order to make sure their crops and fields are properly hydrated, and that unwanted animals do not come and disrupt their system. They also do not want to spend too much time and energy physically doing the watering either. A product called Nano Ganesh, produced by Indian company Ossian Agro Automation, has come up with a way to wirelessly control the water system and manage water levels. Their remote controls the pump from any location and can set it for when it comes on and goes off. They can also see the changes in power supply and will be alerted if there is any sort of problem. Their mission is to “manufacture irrigation automation systems with focus on appropriate technology for the rural zones. Proving of technology in hazardous areas, varying weather & poor power supply conditions, illiterate class of user and make it available at reasonable cost”.<sup>8</sup> This is also a sustainable effort because it monitors and eliminates unnecessary watering that can cause nutrient and soil depletion. Additionally, it not only helps in water conservation but it eliminates unnecessary electric costs, which will help farmers out financially as well. Furthermore, another way to monitor weather and rainfall can be through the use of drones. Drones are new flying devices with cameras that are unmanned but can be

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<sup>7</sup> <https://www.indiaagronet.com/Agriculture-Technology/Mobile-App-Dairy-Farmers.html>

<sup>8</sup> <http://nanoganesh.com/>

controlled and used to carry out a particular function. In Indian region Marathwada, there have been sightings of drones flying over the fields, assessing crop losses due to deficit rainfall.<sup>9</sup> This is a great way of detecting crop disease, and can also be a low cost way to analyze crops on a larger scale across many villages. Farmers are also increasingly using solar and wind power to help sustain energy demands. Since there are such warm temperatures in India, taking advantage of solar energy pumps is a great sustainable action. The Indian government is actually granting people a small portion of money to install these solar energy pumps and encourage better farming. As a result of the installation, farmers have the opportunity to enhance their irrigation and crops.

In addition to farmers, general citizens of India who are lucky enough to obtain these devices can also have access to a variety of other items such as weather reports, banking and money transfer, music, entertainment, news, and even healthcare benefits by getting sent updates through text messages, voicemail, and even FaceTime. They can even use their device as a flashlight if faced with a power cut.<sup>10</sup> Mobile devices have also transformed the health system and made it much easier for people to obtain medical information. Mobile technology has come up with the term mHealth, which “provides pathways between health practitioners and patients that may not have previously existed or may have been too far away/costly to make use of”.<sup>11</sup> This is a sustainable effort in making healthcare accessible to people in all areas and of all social classes and backgrounds.

Mobile devices are a huge part of sustainable development. Not only do they allow one to stay connected with the rest of the world, but also they are portable which makes it easy for

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<sup>9</sup> <https://www.indiaagronet.com/Agriculture-Technology/Maharashtra-pilot-project.html>

<sup>10</sup> <http://voices.nationalgeographic.com/2012/06/05/mobile-learning-how-smartphones-help-illiterate-farmers-in-rural-india/>

<sup>11</sup> <http://lifelines-india.net/agriculture/LifeLines%20Agriculture>

travelling. The United Nations Development Programme actually “marks the top-down approach to tackling sustainability and development using mobile technology while the situation on the ground and in communities is yielding enormous results”.<sup>12</sup> This top down approach is good for a large society with a centralized political organization such as India. Since the government leaders have an overview of the state they can help to address these issues that others may not be aware of. However, the government realizes that giving people mobile devices without any training may be a challenge for some, especially if they face little to no prior education. As a response to this issue, the government created the State Agricultural Management and Extension Training Institute and Agricultural Technology Management Agency,<sup>13</sup> to help train individuals on how to use the technology in a “farmer friendly” way. These farmers will be aware of the modern farming technology, techniques, and trends. One of these trends includes organic farming, which is another sustainable agriculture practice.

Not only do mobile phones help farmer’s everyday needs, they help to reduce the poverty rate by increasing farmers annual income since they are more educated in their industry and more connected globally through the capability approach. Basic needs are met and they have more freedom to do certain things. It also reduces social class gaps by connecting people. Educated and uneducated people come together to exchange information. By keeping the farmers connected, hopefully they can spread their newfound knowledge by word of mouth to others. People living in poverty also do not have to try and travel to the urban areas in search for a job because they now have the proper tools to help the economy in their rural areas. This sustainable development can be looked at closer in terms of a systems analysis. In a traditional system there are inputs, processes, and outputs. The inputs for this particular situation are the

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<sup>12</sup> <https://en.reset.org/knowledge/mobile-technology-and-sustainable-development>

<sup>13</sup> <https://www.indiaagronet.com/Agriculture-Technology/technology-boost-to-go.html>



implementation of mobile devices. The processes that follow that are what the farmers actually do with the devices, for example looking up the weather or sending and receiving text messages. Lastly the outputs are the overall results the farmers see after they use mobile technology, for example better crops and less disease. This system however is not complex, since there are not any levels of uncertainty. Complex systems usually eliminate predictability but there is a pretty clear understanding of what the outputs for this particular issue will be and can easily be forecasted.

Aside from the obvious outputs such as immediate access to information, another possible output of mobile technology is that money can be given directly to farmers instead of having any middlemen. The creation of the world's largest biometric database was made, where every Indian including the farmers have a bank account, social security, and welfare checks. This is more sustainable than the central bank that was used in the old days because corruption occurred and the money was used up by authorities, which were the middlemen. The uneducated farmers were being cheated of funds and did not realize it. Now the government can send them a check via direct deposit and it will go straight into the account on their mobile device so no one else has access to the account and no hard earned money will be lost. While now over 1 billion citizens in India have access to this database, it was originally intended to help the farmers. This was a huge undertaking for an emerging nation because of the costs, however since India has such high literacy they believed that it was a good investment. It is important that Indians use all the resources in their country to the fullest advantage so they can demonstrate that they too have a sense of power as an emerging nation. This power comes from the citizens doing everything themselves and not seeking any external help or collaborations from any other nations. They know that by utilizing the talent in their own country and by

caring about the success of others, they will increase their social value and can stand out from other nations.

While there is already so much progress being made around the world and in India particularly, there is room for improvement regarding mobile technology and sustainable development. There are still so many parts of India that do not have access to mobile devices or even are aware of the benefits it has for farmers. A good solution to this issue would to have representatives of mobile carriers go into these poor areas and inform the citizens that this technology is out there and tell them how it can improve their lives. The representatives can go into the farms and give on-site instruction on how to use the devices to better the farming practices. The issue with this idea is that even if these poor villages were aware of the technology, they would not have money to pay for even the low rates that come with having the device. One possible solution that I have come up with is for some of the large mobile carriers to distribute the devices to the farmers for free, and then the farmers can pay for the monthly service through donation. I think that if some of the mobile farming apps such as Mobile Harvest partnered with Venmo, a mobile payment service, a portion of its profits can be donated through Venmo and directly deposited into the accounts on the farmer's phones so that they can afford the monthly fee. An account on Venmo can be created specifically for giving money to farmers. Also, the general public can directly send donations from their wallets through Venmo to this newly created account to help the farmers as well. With charitable donations, the farmers can make use of this mobile technology and can hopefully start to make money for themselves. This can be viewed as a tradeoff, since the mobile carriers benefit by making money from the monthly fee that comes with each mobile device, and the farmers

benefit from having new technology to work with. I feel as if this solution will work in this particular environment since people know that India is still an emerging nation and still has parts of the country where resources are limited. People will know that these farmers will truly benefit from the donations and will put them to good use. Often people are hesitant to invest their money into projects that may not have a high success rate, or will not truly be used for what they say it will be used for. However, the mobile app companies and Venmo can assure that the money is going to be used for the intended purpose by depositing it directly into farmers accounts. The benefits that come from this project can they be noticed right away as the farmers are able to pay for their monthly services and can increasingly educate themselves on up to date practices as well as implement them immediately.

There are a number of advantages that mobile technology brings to farmers and the decision to implement it is not seen as unethical. Unless a diachronic action occurs, where the technology causes this person to be worse off than they were before, nothing is being compromised in the process of implementation. It is highly unlikely that technology will make someone worse off unless they misinterpret the information they receive or are presented with incorrect weather forecasts. When analyzing this situation in terms of moral theories, utilitarianism can come into play. Utilitarianism promotes well being for the greater aggregate for everybody. It ultimately maximizes happiness for all. The only issue with this can be that while mobile technology is helping all farmers, each farmer's idea of happiness may be different. Some might not believe in the use of technology to help their everyday needs and may prefer more traditional practices. If this is the case, there are ethical implications that come along with it and it is important to not offend these people's beliefs. Another moral theory is rights based, where basic rights protect interests of persons. This can be used in obtaining free

phones from mobile carriers because every person has a right to have access and use these devices.

The use of mobile technology as a sustainable development has taught me that technology really can increase the well being of people's lives. It is especially helpful that these devices are portable and can be taken anywhere and people can access them at any time. While we as Americans are so blessed to have access to iPhones, iPads, laptops, and other mobile devices, we often take them for granted and do not realize how much they impact our lives. In present day if someone does not know what a word means, it is natural to 'Google' the definition, where an answer can easily be found on our smartphones in a matter of seconds. I fail to realize there are many people across the world that unfortunately do not have this luxury and how their lives must be different without the help of mobile technology. This sustainable advancement has opened my eyes to the possibilities of other ways technology can help people as well. It can help those who are in developing countries connect with others around the world to network. They can create social media accounts and reach out to others to help advance their career. It can also teach people a new language to help build their resume for potential employers. Setting up a career-networking base can be completely free and can ultimately lead people to make a living for themselves outside of the villages. This paper is important for others to read to understand the positive impacts technology can have on the world. It not only helps increase the lives of farmers, but it helps eliminate social injustice that is a result of poverty and lack of education. It allows the less fortunate to have the same benefits as others and helps them feel included in society. All these articles that I found during my research were inspiring to me because it showed how simple it is to help others. It is easy for people like myself who are more privileged to take a minute and donate old devices, or give money to help

these farmers and poor people obtain mobile devices. With the proper resources, change can occur and anyone can have opportunity to increase his or her overall lives.

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