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# Organic Agriculture in Bhutan: Barriers Going to 100%

Mark McCrae-Hokenson  
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# Organic Agriculture in Bhutan

Barriers to Going 100%

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Asia, Bhutan, Pinakha, Lobsa

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## **Abstract:**

This study seeks to provide an overview of organic agriculture in Bhutan. In an effort to promote sustainability and achieve the goals set by a Gross National Happiness inspired government, Bhutan has pledged to go 100% organic by 2020. This pledge is at odds with the country's goal to increase self sufficiency and food security. I look at the barriers to going organic, the programs and initiatives in place to overcome or mitigate those barriers, and the path of least resistance in the future. I asked farmers, scholars, researchers, and members of the government for their opinions on the prospects of a 100% organic Bhutan. Through their answers, I hope to have identified what prevents Bhutan from becoming organic, what is pushing the movement forward now, and what is most important for the movement in the future.

## **Methods:**

This study was completed primarily from the College of Natural Resources in Lobesa, Punakha, Bhutan. I spent a total of three weeks in Bhutan with time equally split in Thimphu and CNR. I interviewed farmers, scholars, researchers and government officials to gain an insight into views on the prospects of organic in Bhutan. For farmers, I used a questionnaire. For others, I led a semi-structured interview, using in-service students at CNR for translation when the interviewee was unable to speak in English.

## **Acknowledgments:**

This project would not have been possible- let alone successful- without the help of Madame Rehkha Chhetri at the College of Natural Resources. At every turn she guided my research in the proper direction. Whether she was setting up meetings with farmers, extension agents, researchers, government officials, or offering simple advice, she was an ideal and invaluable resource to my research.

By extension I would like to acknowledge CNR for hosting me and providing the space and environment to conduct a fruitful study. Tandin Gyeltshen played a crucial role and organized my logistics. President Dorji Wangchuk made my stay possible and made me feel at home. Between the students and lecturers, I had more help than I could imagine needing and each and every person I met was a helpful part.

Specifically, I thank Nam Gil, an in-service student who offered not only translation but company throughout my research. I would not have been able to translate without him, and would have had less peace of mind as well.

The farmers that took time from their days to answer my questions deserve thanks as well. They were generous to spend time answering questions when they could have been doing actual farming, and the information they gave me was vital to my project.

I would not have been able to dream about this study without the assistance Tshering Choden at the Royal University of Bhutan. The time she took to approve my proposal and allow me access to the University system made the project possible. Without her consideration, I would have been out of luck before I even began.

Finally, I thank SIT for the access and support throughout the entire process. Isabelle Onians, Hubert Decler, Nazneen Decler, Eben Yonnetti, Tenzin Choezom, and Rinzi, have supported my study and my research. Without the countless hours of work behind the scenes, I would have been unable to find my way to the airport, let alone to Bhutan, let alone to CNR, let alone to a completed project. The work they do for us students is invaluable.

## **Acronyms:**

BAFRA: Bhutan Agriculture and Food Regulatory Authority

CNR: College of Natural Resources

CSA: Climate Smart Agriculture

FAO: UN Food and Agriculture Organization

GAP: Good Agriculture Practices

GNH: Gross National Happiness

IFOAM: International Federation of Organic Agriculture Movements

MOAF: Ministry of Agriculture and Forestry

NOP: National Organic Programme

PGS: Participatory Guarantee System

RNR: Renewable Natural Resource

SAP: School Agriculture Prog

SJI: Samdrup Jongkhar Initiative

SNV: SNV Netherlands Development Project

USDA: United States Department of Agriculture

## Introduction





## Organic in Bhutan & Abroad

### *Organic by 2020*

While in attendance at the Rio+20 Sustainable Development conference in 2012, the Prime Minister of Bhutan told the world that his country would be the first to be 100% organic.<sup>1</sup> He explained, "By working in harmony with nature, they can help sustain the flow of nature's bounties."<sup>2</sup> When he said those words, it was a culmination of policy and initiatives toward a sustainable Bhutan. Bhutan is well known for its approach to governance and alternative to Gross Domestic Product, called Gross National Happiness (GNH). At the base of GNH are 4 pillars; sustainable and equitable socio economic development, preservation and promotion of cultural values, preservation of environment, good governance- certification.<sup>3</sup> These principles are taken into account in all decisions in the government, agriculture included. The International Federation of Organic Agriculture Movements (IFOAM) principles to organic farming are quite similar; principle of fairness, principle of care, principle of ecology, principle of health. These separate sets of pillars are in agreement. For Bhutan, sustainable development is a paramount concern and organic agriculture is at the heart of the movement. As Bhutan becomes a member of modernity, it must ask itself how it deals with the traditional and the modern. Is it important to preserve traditional dress? Traditional songs? Traditional agriculture? The confluence of these two trends that appear to be in opposition will determine Bhutan's future. For agriculture, the introduction of chemical additives changes the "organic by nature" methods of traditional agriculture. With that dilemma in my mind, I seek to answer what barriers stand in the way of Bhutan meeting its goal to become 100% organic. For those barriers, I look to what addresses them (programs, initiatives, or policies) and look beyond that to what the future looks like for organic agriculture in Bhutan.

### *International Status*

Organic vegetables and organic farming are on the rise worldwide. In February 2014, Wal-Mart announced its intention to enter the organic vegetable business.<sup>4</sup> This business decision can be traced to the meteoric rise of the organic markets in the United States as well as Europe. Though still a relatively small percentage of total volume at 2.3 %, the premium

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<sup>1</sup> <http://www.npr.org/blogs/thesalt/2012/07/31/157645902/bhutan-bets-organic-agriculture-is-the-road-to-happiness>

<sup>2</sup> ibid

<sup>3</sup> Tshomo, Kesang. "Bhutan's Status on Development Strategy for Organic Sector." Lecture, from College of Natural Resources, Lobesa, April 13, 2014.

<sup>4</sup> "Walmart plots a low-price takeover of the organic food market." The Verge. <http://www.theverge.com/2014/4/10/5600462/walmart-wild-oats-organic-food-prices> (accessed May 4, 2014).

prices of organically certified vegetables make an \$8b market in the United States alone.<sup>5</sup> The United States Department of Agriculture (USDA) defines organic agriculture as

*“an ecological production management system that promotes and enhances biodiversity, biological cycles and soil biological activity. It is based on minimal use of off-farm inputs and on management practices that restore, maintain and enhance ecological harmony”.*<sup>6</sup>

This definition is almost identical to the European definition of organic agriculture and the certification process is considered to be equal between the two. The definition of organic agriculture given by Madame Kesang Tshomo, Director of the National Organic Programme (NOP), in a presentation to students at the College of Natural Resources (CNR) is:

*“Organic agriculture is a production system that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects.*

*Organic agriculture combines tradition, innovation and science to benefit the shared environment and promote fair relationships and a good quality of life for all involved.”*

This definition guides the organic movement in Bhutan. The emphasis on tradition, innovation, and science should be noted. Organic is at the core of Bhutan's history and Bhutan's future.

As you wind through mountains on narrow switchbacks, small farms dot the mountains above and the valleys below. 60% of the Bhutanese workforce is involved in agrarian activities.<sup>7</sup> Still, of all the land in Bhutan only 2.9% is dedicated to agriculture.<sup>8</sup> 2069 acres are under organic agriculture production<sup>9</sup> and that number accounts for all 20 dzongkhags (districts).<sup>10</sup> Forested land covers a total of 70% land, and the Constitution mandates that that number not drop below 60%. Preservation of the forests along with the unfriendly mountainous landscape only leaves space for small farms. Of crops grown, rice is the most common, followed by potatoes, maize, and vegetables.<sup>11</sup> The most important crop grown is chilli's and the importance of the crop can not be understated in Bhutanese society. In Kunzang Choden's book, *Chilli and Cheese: Food and Society in Bhutan*, she details the

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<sup>5</sup> Gliessman, Stephen R.. *The conversion to sustainable agriculture: principles, processes, and practices*. Boca Raton, FL: CRC Press, 2010.

<sup>6</sup> "Organic Production and Organic Food: Information Access Tools." Organic Production and Organic Food: Information Access Tools. <http://www.nal.usda.gov/afsic/pubs/ofp/ofp.shtml> (accessed May 4, 2014).

<sup>7</sup> Gliessman, *Conversion to Sustainable Agriculture*, page 59

<sup>8</sup> *Ibid.*, pg 81

<sup>9</sup> Kesang Tshomo, *Bhutan's Status on Development Strategy for Organic Sector*

<sup>10</sup> *Ibid.*

<sup>11</sup> *Ibid.*, pg 86

importance of the chilli in all points of production and consumption.<sup>12</sup> The taste of chilli and cheese and roofs painted red with chillies drying during harvest are a part of Bhutanese history and culture.

## Sustainability

### *Why Sustainable?*

Bhutan is closely tied to India in both geography and trade. For agriculture, a recent trend of farmer suicide in India is a matter of concern for Bhutanese farmers. In 2012, over 14,000 Indian farmers took their lives, and in the district most affected, nearly 4000 farmers took their lives. In that district, that number was a quarter of all suicides.<sup>13</sup> These suicides are associated with crushing debt from the expensive chemicals that must be increased each year. When a group of farmers from the southeast district of Samdrup Jongkhar visited farmers in India they learned from fellow farmers the ill effects associated with chemicals. Within the local three district area, 12 farmers had already killed themselves. One Indian farmer said "It is better to commit suicide than not use chemicals."<sup>14</sup>



Sustainability is at the center of the organic movement in Bhutan. In interviews with farmers, bureaucrats, and researchers alike, the terms “sustainable agriculture” and “organic agriculture” are tied together, though not identical. Sustainable agriculture promotes organic methods but does not mean that chemicals are not allowed. Sustainable agriculture can be organic but is most often an integrated method.

Bhutan was introduced to the outside world in 1961 and has managed modernization in domains from daily life to government policies. The guide to this management is GNH. Amidst the 4 pillars of GNH stands a pledge to become environmentally sound. This sustainable method seeps into government agencies, agriculture included. Sustainable agriculture is sustainable in three different sectors; ecological, economic, and social. The World Bank describes sustainable agriculture as systems that are “environmentally sound, financially and economically feasible and socially acceptable.”<sup>15</sup> The term “sustainable

<sup>12</sup> Choden, Kunzang. *Chilli and cheese: food and society in Bhutan*. Bangkok, Thailand: White Lotus, 2008.

<sup>13</sup> <http://www.firstpost.com/politics/farmer-suicides-what-do-the-gujarat-numbers-really-mean-1453851.html>

<sup>14</sup> <http://www.sji.bt/assets/PDFs/Study-tour-report.pdf>

<sup>15</sup> Thimmaiah, Dr. A. *A Guide to Organic Agriculture in Bhutan*. Thimphu: Ministry of Agriculture, 2008. pg 2

agriculture” was first defined in 1992 by the UN Food and Agriculture Organization (FAO) and was revised for developing countries in 2001, saying, “sustainable agriculture must address issues of economic efficiency, social responsibility and environmental quality.”<sup>16</sup>

### *Ecological*

Ecological sustainability is concerned with corrosive effects that chemicals have on soil quality and yield when applied year after year. For the farmers in India, they associated chemicals with unsafe drinking water that forces them to “purchase mineral water for drinking, like the tourists.”<sup>17</sup> This concern is echoed by the farmers in Bhutan that I spoke with. Though they themselves are proponents of pesticide and fertilizer usage, they are wary of the effect that the chemicals over time. “With manure, when you put it once, it stays in the soil and helps all the plants. With fertilizer, it only helps the plants that it touches, and it only helps once. You must buy more and more.”<sup>18</sup>

It is believed that conventional farming has a negative effect on the water retention in soil, and a water shortage pains farmers across the country. Though climate change may be able to shoulder some of the blame, the farmers have to make amends immediately to grow crops. When conventional methods are used, the lack of protective soil cover, narrow crop rotations and frequent tillage help exacerbate an issue that is already troublesome. One farmer I spoke with, Phubtim, told me as I walked away that if after I make it into the Bhutanese government, that I should return to her farm and help irrigate her crops<sup>19</sup>. Another farmer blamed her actions in a past life on her bad luck with water.<sup>20</sup>

Pollution is another ecological concern and motivation to become more sustainable. The health risks associated with chemical pesticide and fertilizers are not fully understood. The absence of such chemicals in organic agriculture is a boon for those who believe the chemicals are a growing health risk. For the farmers in India, pollution is associated with the “Cancer Express,” a train that “travels regularly to hospitals and is filled with cancer patients and their families.”<sup>21</sup> While the imported Indian vegetables test safe under the guidelines in Bhutan, “it is known that they use many chemicals. It is hard to say, but every tenth or twentieth person in Bhutan gets cancer, and you must wonder if there is a connection.”<sup>22</sup>

### *Economic*

Economic sustainability addresses concerns at the local and national level. At the individual farm level, there are concerns that chemical additives will become more expensive

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<sup>16</sup> Ibid., pg 2

<sup>17</sup> Dorji, Cheku. "REPORT ON STUDY TOUR TO INDIA SPONSORED BY SAMDRUP JONGKHAR INITIATIVE (SJI), DEWATHANG, MARCH 21, 2011 to APRIL 9, 2011.." . <http://www.sji.bt/assets/PDFs/Study-tour-report.pdf> (accessed May 4, 2014).

<sup>18</sup> Dao, Interview with author

<sup>19</sup> Phubtim, Interview with Author

<sup>20</sup> Coo Chu, Interview with Author

<sup>21</sup> Dorji, Cheku. Report on Study Tour

<sup>22</sup> Tshering, Kinlay. Interview with Author

year after year and that the dependence on them spells doom for the farmers who are not wealthy enough to keep up. “I worry about chemicals, because what if I don’t have enough money next year? What do I do then?”<sup>23</sup> This concern grows when farmers began to farm commercially, both for domestic and export markets. In a self sufficient house, farmers can produce enough for themselves and their family but do not rely on an external income made at the market to survive. For commercial farmers, yield becomes paramount. With yield in charge, the measures taken to meet a required yield may not be sustainable. If a farmer needs pesticides to save his crop he will use those pesticides, and if that farmer does not have enough money to buy the pesticide, a loan may be needed. Debt becomes an issue. The debt may trap the farmer in a downward spiral. The farmer who said that he would choose death over a year without chemicals is not alone. Farmers reported they "can not stop using chemicals because that will result in a drastic reduction in production, and then an inability to repay loans."<sup>24</sup> To further complicate economic viability, markets are often volatile. In Gasa, which happens to be organic, the farmers were encouraged by two years of solid sales of their mushroom crop. However, the third year, the market for the mushrooms disappeared and they were unable to find a place to offload the newfound surplus.<sup>25</sup> A farmer who relies on a single crop may find himself without a source of income in a down year. The encouragement of bio-diversity seeks to mitigate these negative effects.

At the national stage, a concern over national food security sits heavy on any initiative that has potential to reduce production. Goals of a self-sufficient Bhutan focus on the staples of Bhutanese diet. For rice, Bhutan is 50% self sufficient and the goal is to become 60% self sufficient. This push is encouraged by a scare in 2008 when India cut rice exports to Bhutan.<sup>26</sup> Prices soared during the brief period but the message was clear- it is dangerous to rely on India.

Another byproduct of economic sustainability is an effort to give equal priority to domestic and export markets.



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<sup>23</sup> Coo Chu, Interview with Author

<sup>24</sup> Dorji, Cheku. Study tour of India

<sup>25</sup> Pulmari, Tanka Maya. Interview with Author

<sup>26</sup> <http://www.asiasentinel.com/opinion/rice-shortage-crisis-or-hype/>

Export markets may be lucrative, food sold in India returns rupees that are difficult to come by and products sold in Europe can be sold at premium prices. Profitable exports should be encouraged but domestic production, either for farmers to remain self sufficient or for farmers to sell locally, should be given equal priority .

### *Social*

The final component of sustainability is social sustainability. At the farm level, this begins with social inequities caused by economic success and failure. Some farmers will be wealthy enough to purchase new fertilizers and pesticides, and other farmers will not have enough money to purchase them. This situation that results in “haves” and “have-nots” could lead to political unrest. Sustainable agriculture doesn't hope to alleviate the issue in full, but is more suited toward equality than a conventional method. In addition, conventional methods are a departure from traditional methods of farming in Bhutan. This means that some farmers who are accustomed to traditional methods may have difficulty adopting new technologies. Incorporating those presupposed forms, often indigenous knowledge, is a form of cultural preservation. When one speaks of the different types of agriculture today, traditional agriculture is grouped with sustainable and organic. These types, at odds with the newer conventional methods, are associated with the way that farming was done in Bhutan for centuries. The traditional methods include the tedious process of collecting manure and leaf litter for fertilizer. The carrying of manure is done by women, and “only some villages have changed that tradition. The women collect and carry the manure while the men work on the farm.”<sup>27</sup> This inequality opens a debate about the merit of traditional agriculture's relation to gender roles but it is believed that organic agriculture is a way to improve gender inequality. In a review of organic policy prepared by members of various Research Centers, organic agriculture is seen as a path to gender equality.<sup>28</sup> In a rapidly modernizing society, a sustainable model will include men and women sharing burden and bounty equally.

### History of Farming in Bhutan

The use of fertilizers has an effect after crops leave the fields, are placed in woven bamboo baskets and toted to markets. For those who purchase the vegetables, there is a question about the long term effects that vegetables with chemicals have on the health of consumers. It was said by many of those who I interviewed that Indian imports are passed over because of the large number of chemicals used. “Indian imports are produced commercially with more chemicals. The object is to export them to Bhutan. When I met Indian workers in Bhutan, they were boiling all of their vegetables. I asked why, and they said it was because it was they were trained to do so. The vegetables were unhealthy enough that

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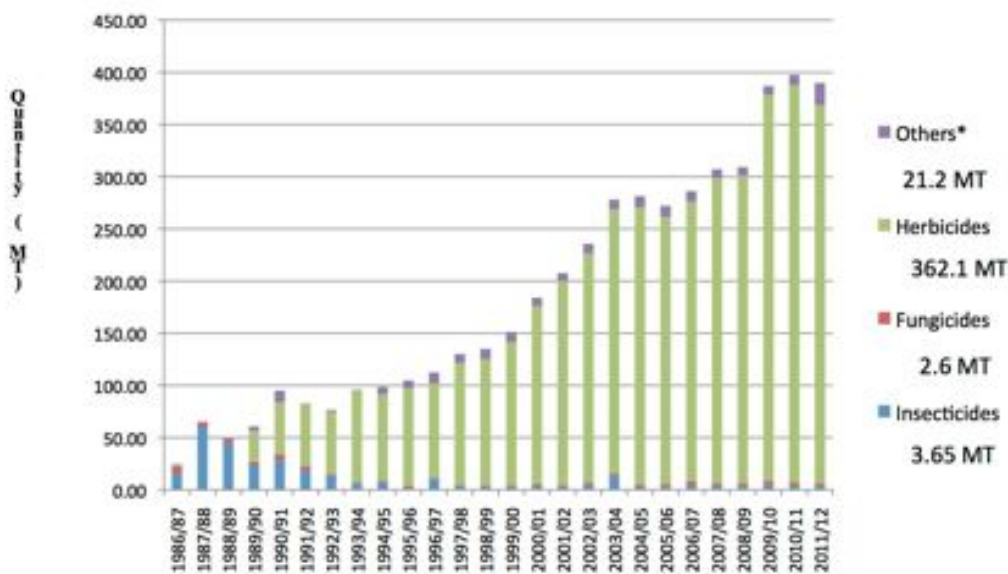
<sup>27</sup> Namgill. Interview with Author.

<sup>28</sup> Duba, Sangay, Mahesh Ghimiray, and Tayan Raj Gurung. "PROMOTING ORGANIC FARMING IN BHUTAN: A REVIEW OF POLICY, IMPLEMENTATION AND CONSTRAINTS." *Council for RNR Research of Bhutan*.

they would not eat them if they were not boiled”<sup>29</sup> This concern does not apply equally to the chemicals used by Bhutanese farmers. “there is not a large difference between locally produced Bhutanese produce and what is produced as 100% organic. The chemicals that are used, are used very little.”<sup>30</sup> Locally produced vegetables may have chemicals but they are not considered to differ greatly from organically produced vegetables. For a consumer, organic and local may as well mean the same thing.

Until 1961, when chemicals were introduced to Bhutanese agriculture<sup>31</sup>, “Bhutan was 200% organic.”<sup>32</sup> There were no chemicals to buy, and no chemicals were used. There were no genetically modified seeds to buy, and no genetically modified seeds were used. Farmers were required to weed their fields by hand instead of spray Butachlor, a heavy pesticide used in paddy fields. Dao, a farmer in Wangdi, said that organic agriculture is “what we used to do.”<sup>33</sup> The traditional farming methods in Bhutan are organic, and the departure from that has been a recent movement. For some like Dao, it is easy to remember a day when days were

**Distribution of Pesticide and Herbicide from 1976-2011**



<sup>29</sup> Pulmari, Tanka Maya. Interview with Author.

<sup>30</sup> Ghimiray, Mahesh . Interview with Author.

<sup>31</sup> Tashi, Sonam . Interview with Author.

<sup>32</sup> Ura, Karma . Interview with Author.

<sup>33</sup> Dao. Interview with Author.

spent in the paddy fields, weeds pulled one by one. That is not the case for all farmers. Dao is 75 and has farmed for the majority of his life. Younger farmers who started after the introduction of chemicals can not remember a time when chemicals were not a part of their farming practices. "We have used chemicals as long we can remember."<sup>34</sup> "There is no one that doesn't use chemicals, and only some people remember a time when no one did."<sup>35</sup>

Those who do remember a time without chemicals suggest that the use of chemicals has increased over time. Madame Yeshey of the Bajo Research Center has worked with farmers on soil fertility for 18 years. "The use of chemical fertilizer then was not as high as it is now. Then, only a few used it. You had to be close to RNR (Renewable Natural Resource center) to use it."<sup>36</sup> The increase in chemicals is a recent trend, and depending on which chemical is under consideration, the trend has either stagnated or grown. In a graph provided by the National Organic Programme (previous page)<sup>37</sup>, it is shown that the use of fertilizer has remained constant over the last 30 years. On the other hand, the use of herbicides (weedicides) has grown each year. The primary examples of herbicides used are Butachlor in the rice paddy fields, and metribuzin in potatoes<sup>38</sup>. It should be noted, as it was noted to me with frequency, that the number of chemicals that are used in Bhutan, on the rise or not, are much fewer in number than of chemicals used in India and around the world. With this limited usage, and chemicals a recent addition, Bhutan is closer to organic than a developed nation steeped in conventional techniques. For this reason, traditional agriculture is seen as a viable sustainable method that should be integrated with modern technologies in a push to go organic.

Bhutan is not alone in the push to go organic. In Mexico, modern techniques of farming have defined agriculture since the Spanish arrived, and in response to several current complications, are moving toward a system of sustainable agriculture for small scale farmers. "Developing agroecosystems in Mexico that are sustainable both ecologically and socially depends on incorporating many of traditional agriculture's sustainable characteristics into the new systems."<sup>39</sup> In Cuba, they "developed a massive movement with wide, popular participation where agrarian production was seen as key to food security for the population."<sup>40</sup> It will be seen that these two countries, developing much like Bhutan, are using sustainable agriculture as a solution to problems brought alongside modernization.

Today, the use of fertilizers and pesticide is most common in the commercial valleys of Bhutan; Paro, Thimphu, Wangdi, Punakha. For my research, I interviewed farmers in these valleys, and did not venture into the more rural communities that could be a day long walk away from the road. These remote communities are filled with farmers who farm with little to no pesticides because there are little to none available. When a researcher makes contact with

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<sup>34</sup> Choden. Interview with Author.

<sup>35</sup> Ibid.

<sup>36</sup> Yeshey, Madame. Interview with Author.

<sup>37</sup> Tshomo, Kesang. Provided to Author.

<sup>38</sup> Dr. Thinley. Interview with Author.

<sup>39</sup> Gliessman, Conversion to Sustainable Agriculture, pg 191

<sup>40</sup> Ibid., pg 207



a farmer, that researcher contacts the extension agent and the extension agent will take you to a farmer that he or she is in contact with. A farmer that is in contact with an extension agent is more likely to have adopted the technologies that the extension agent is offering. For this reason, all of my interviews were with commercial farmers who have close contact with extension agents and that selective population skews my experiential data. This skews the views of those who seek honest answers. “We don’t hear from the people who are away from the road that are less reliant... the further you are away from the road, the less likely you are to produce some for sale.”<sup>41</sup> In addition, there is never a consensus whether organic agricultural practices are good or bad. There will always be a dissenting voice and that voice may be loud. If that voice drowns out the voices of the majority, it may seem there are problems that do not exist. “We don’t hear about Gasa and how they have increased production. When we started in 2004, they imported all of the vegetables. Now, they are self sufficient. When some are asked how they feel about organic, they will tell you they feel restricted, and will voice their displeasure. If you are not careful, you will assume the people in Gasa are quite unhappy.”<sup>42</sup> Again, caution should be used when applying the specific conclusions I have gathered to the nation of Bhutan as a whole. I have attempted to identify the most appropriate facts, barriers, programs, initiatives, and voices (both positive and negative) but realize that I have not completed this task with perfection and hope that more research will be done on the topic in the future.

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<sup>41</sup> Tshomo, Kesang. Interview with Author.

<sup>42</sup> Ibid.

## Organic: Barriers



The push to “go organic” is not a movement to turn Bhutan into pesticide and fertilizer free nation immediately, and it is possible that the goal of 100% organic will never happen. The policy initiatives that have set a deadline of 2020 will be disappointed. In a mere six years, a seismic shift would be needed to go 100% organic. Whether Bhutan ever goes 100% organic or not, each step toward that goal is an increase in sustainable agriculture that will benefit Bhutan. Barriers that bar Bhutan from 100% organic may never be surmounted but movements are being made to become more sustainable. These initiatives and barriers are tied together and with each resolution, Bhutan takes a step towards sustainability.

## Rural to Urban Migration and Labor Shortages

### *Labor Shortage*

Labor shortages plague the farmers of the Bhutanese countryside. For the young Bhutanese, “they do not see themselves going back to the farm.”<sup>43</sup> This comment is imitated by the farmers. “When I sent my kids to school, I sent them so they would have a better life than me. I never expect them to come back, but not having them makes things difficult.”<sup>44</sup> Traditional farming is labor intensive and, in lieu of chemicals, requires hours in the fields cultivating. As you arrive into Thimphu today, the road is lined with newly finished apartment complexes offering deals on rent interspersed with the concrete structures supported by bamboo scaffolding, soon to be completed. These buildings are in response to the increased demand for housing caused by rural to urban migration. Bhutan has the highest internal migration rate in Asia<sup>45</sup> and the process does not seem likely to continue in the near future.

In Mexico, seasonal migration has become an “important phenomenon” in recent years.<sup>46</sup> Young men leave their villages to go to Mexico City, Monterrey, or other large centers to seek employment. The major consequence in Mexico is an “acute labor shortage.”<sup>47</sup> Traditional agriculture requires that there be many hands present to pick, weed, and sow and when those hands are seeking employment elsewhere, “towns are crowded with old people with no strength to work in the home garden.”<sup>48</sup> This situation exists in Bhutan as well. “The villages are empty now, filled with old people. In rural pockets, there are not many people and the young have left to go to the cities, looking for a better job.”<sup>49</sup>

The positive associations connected to an urban lifestyle are shown in the Bhutanese film, *Travellers and Magicians*. In the movie, the main character, Dondup, holds a position

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<sup>43</sup> Ura, Karma. Interview with Author.

<sup>44</sup> Choden. Interview with Author.

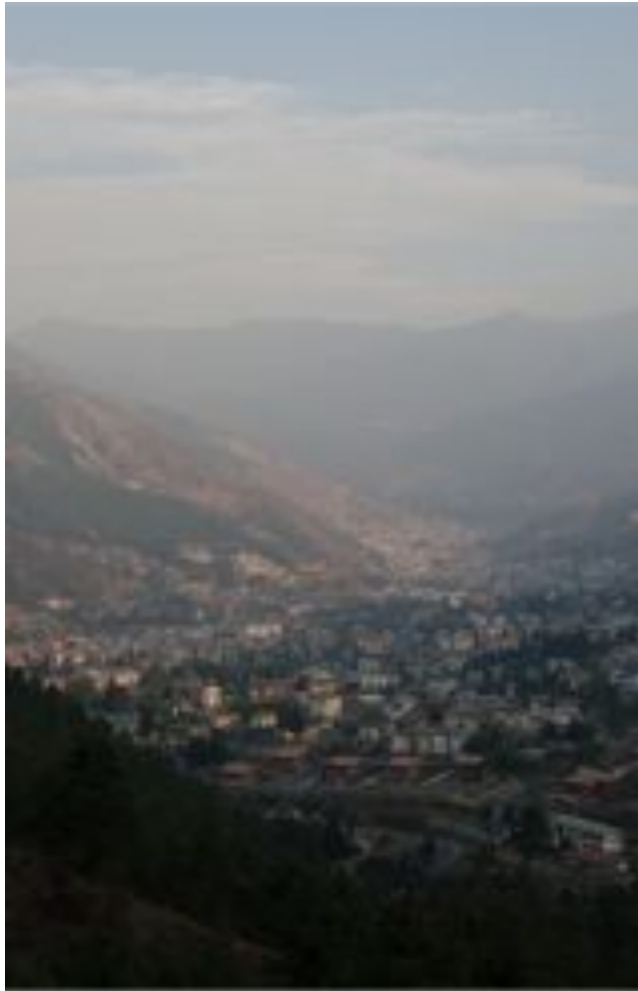
<sup>45</sup> Samdrup dzongkhag administration, profile, 39

<sup>46</sup> Gliessman, Conversion to Sustainable Agriculture, pg 189

<sup>47</sup> Ibid.

<sup>48</sup> Ibid.

<sup>49</sup> Lhamo, Dawa. Interview with Author.



Thimphu at Dusk

as an officer in a rural community, but craves an opportunity to move to the United States, or as he calls it “the land of my dreams.”<sup>50</sup> This can be considered a commentary on the Bhutanese desires. Dondup was prepared to trade a prestigious job for an opportunity to pick apples in America. What does that preference say about the Bhutanese priorities? In my own interaction, most Bhutanese are content with the government and their lives, but the occasional person sought something else. One college student asked if he could come back to the United States with me. There is an allure to the outside world that Bhutanese youth can see on television and Facebook, and the rural lifestyle does not satisfy that desire.

#### *Traditional vs. Modern*

The perceived erosion of culture is not as clearly defined but is at the front of the mind. With youth moving into the city and forgoing their opportunity to learn the traditional techniques and practices of farm life, there is a concern for the loss of traditional knowledge. Karma Phuntso is the creator and director of the Shejun

Foundation, an organization that has tasked itself with the documentation of Bhutanese culture. For this purpose, Bhutanese culture includes artwork and texts inside monasteries, dances, and interviews with Bhutanese elders. When asked about his mission, Karma said, “There is a Bhutanese proverb that says your village is the end of the world. For many years, this was true for the Bhutanese. You knew a world existed outside but it didn’t matter.”<sup>51</sup> That is no longer the case. He has made it his mission to document Bhutanese culture and his organization is working closely with an American university to make all of the photographs and videos available to the public. He expressed that he was worried that he would be too late in some areas, saying, “when people die, they take their knowledge with them.” The Shejun Foundation has not documented traditional farming practices, and if they attempt to, it may be difficult. “Traditional knowledge is not easily detected by the outside observer because it is

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<sup>50</sup> *Travellers and magicians*. DVD. Directed by Jamyang Khyentse. New York, NY: Zeitgeist Films, 2005.

<sup>51</sup> Phuntso, Karma. Interview with Author.

taken for granted by the traditional farmer."<sup>52</sup> With Bhutanese youth using Facebook and wearing Korean hairstyles, the gap between young and old grows with each login and gel application. The common traditional knowledge passed down for generations has become less common.

## Education

Education is a strong draw away from farms. As the farmer, Choden, said, she sent her kids to become educated. "Once they are educated, they do not expect to come back to the farm, but they expect to find an office job in Thimphu."<sup>53</sup> Rural to urban migration happens at this highest clip for Bhutanese aged 15-29. 45% of young Bhutanese are moving.<sup>54</sup> This gap leaves the schools in Thimphu overcrowded. In an article posted in *Kuensel*, the national newspaper, titled *Rural - Migration is a Problem*, it is noted that the national assembly saw rural - urban as a problem.<sup>55</sup> This article was written in 1995 and things have deteriorated since. In the article it was noted that the Ministry of Education is struggling to find enough space for all the students who want to attend school in Thimphu and plan on giving incentives (free stationery, uniforms, food etc.) to students who attend school in more rural areas.<sup>56</sup> For the majority of students, even attending school in a rural environment requires them to live away from home. Many schools above the primary level board students for whom the commute is too long, and by the time students graduate it is not difficult to live away from home; They have lived far from home for several years already. At Lobesa Primary School, the students are only able to help on the farms when they are away from school on holiday.<sup>57</sup>

This trend of educated migrants is supported by the statistics offered by the Ministry of Agriculture in their examination of Rural to Urban migration. 43% of migrants had completed higher secondary or a university degree.<sup>58</sup> This opinion was supported in both informal and formal interactions I had with college students. Most of the students wanted to join the civil service upon graduation, and I did not meet a single student who desired to return to his or her home to farm. Denka, the daughter of the manager at Druk Organic Farm in Toktokha, Punakha, said that when she graduated two years ago, she did not want to come back to the farm to help her father, but now that she has worked on the farm for several years, she is okay with it.<sup>59</sup> She, like the Traveller Dondup, would like to visit New York someday, though she said she would only like to visit for one month.

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<sup>52</sup> Gliessman, *Conversion to Sustainable Agriculture*, pg 186

<sup>53</sup> Choden. Interview with Author

<sup>54</sup> Lhendup, Pema and Jigme Nidup. "Internal Migration in Bhutan." *Population Dynamics of Bhutan: an Occasional Publication of Center for Population and Development Studies*, 1. (2009).

<sup>55</sup> *Kuensel*, "Rural-Urban Migration is a Problem," September 2, 1995.

<sup>56</sup> *Ibid*.

<sup>57</sup> Mr. Kedarnath. Interview with Author.

<sup>58</sup> RGoB, Ministry of Agriculture and Forests. *Rural to Urban Migration*, 24.

<sup>59</sup> Denka. Interview with Author.

The lack of familial labor leaves farmers with a choice between paying for external labor and using chemical inputs. While on occasion there are labor sharing agreements with neighboring farms during peak planting and harvesting times, these arrangements do not meet day to day needs. It is expensive to hire external labor, especially in Bhutan. "In India, labor is very cheap but in Bhutan it is very expensive. Too expensive for me. I could never afford to hire someone."<sup>60</sup> Of the farmers I interviewed, all commercially inclined, none were able to pay for external labor. Even those who would like to avoid chemicals felt they could never be without them because there is not enough labor to weed the paddy fields or spread leaf litter on the chilli's. The decision to use chemicals is, above all, economic.

## Markets

The goal of economic success takes farmers to the market. Unlike the United States and Europe, there are not premium prices placed on organically produced produce.<sup>61</sup> At the market in Thimphu, there is a new organic section on the second floor but it composes a small section and there is not motivation to pay a premium price for the produce. Mahesh Ghimiray, a Researcher at the Research center in Bajo says, "maybe foreigners will buy it, but I wouldn't buy it. There is a mentality that whatever is produced locally, it is not that toxic. There isn't a distinction between organic and locally grown."<sup>62</sup> This sentiment is echoed by his colleague Madame Yeshey, "why go to the expensive vegetables? There are very few people who are high earning, the majority are low earning. If you can't afford it, it doesn't matter how good it is for you."<sup>63</sup> From the perspective of the NOP, they do not advise farmers to go organic if it is not financially sound. "We don't have premium prices in Bhutan, and so we

don't tell them to try to do that. It is important to be self sufficient and sustainable."<sup>64</sup>



Imports at the Market in Thimphu

The difference between locally grown vegetables and organic vegetables is forgettable. That indifference combined with cheaper prices leads consumers to buy local. Yet, the difference between Indian vegetables and locally grown vegetables is even greater. At the market in Thimphu, the local and import vegetables are

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<sup>60</sup> Bida, Padang. Interview with Author

<sup>61</sup> Tshomo, Kesang. Interview with Author.

<sup>62</sup> Ghimiray, Mahesh. Interview with Author.

<sup>63</sup> Yeshey, Madame. Interview with Author.

<sup>64</sup> Tshomo, Kesang. Interview with Author.

separated. I polled the sellers and found that the prices on Indian goods were far cheaper than local produce. This difference was confirmed, “in India, you can produce things for much cheaper because labor is much cheaper and they spray chemicals many times.”<sup>65</sup> On the day I visited the market, I was looking to buy a kilo of tomatoes. The imported tomatoes covered a large stand and cost 40ng. I could find a single kilo bag of locally grown tomatoes and they cost 100ng. My visit was in the afternoon, and perhaps the locally grown tomatoes had been already cleared out by eager buyer. Either way, for someone with 200 ng to spend on a week’s worth of vegetables, the choice is simple. Organic vegetables are costly to produce and when placed against the imported vegetables, they are expensive.

To add to the concern on Indian imports, India cut rice exports to Bhutan in 2008 and caused a panic.<sup>66</sup> This caused the cost of rice to sky rocket and the Bhutanese government remains skeptical of reliance on imported vegetables. This concern has motivated the country to raise rice self sufficiency from 50% to 60% in the next five years.<sup>67</sup> This self sufficiency goal remains one of the greatest barriers to the stated goal of 100% organic. Farmers need to make yields for themselves as well as their nation and adding chemicals makes that short term goal more attainable.

### Policy & Registration

Self sufficiency policy looms over organic agriculture and is the first words from the lips of experts on the issue. Self sufficiency goals will likely not be met if Bhutan goes organic. “I think the political will is there, but if we are organic, we will never be self sufficient. It is a good idea but it will be very difficult because we import from the outside, even now”<sup>68</sup> The self sufficiency goals are more important to this administration than organic farming. “This Prime Minister values organic farming less than the last, and supports the self sufficiency goals more.”<sup>69</sup> This means that the financial and political support are not as strong as they once were, and the movement would benefit from an increase in funding and policy.

### *Pesticide & Fertilizer*

The lack of policy that spells out the exact usage needed for fertilizers is one of the barriers identified by the NOP. The Pesticide Act of 2000 detailed *some* proper guidelines for pesticide usage. The objectives of this act were to ensure integrated pest management, making pesticides a last resort, ensure only appropriate types of pesticides were used, and to ensure pesticides were effective when used as recommended, among others.<sup>70</sup> There is no such act for fertilizers. Even the Pesticide Act lacks clear rules and regulations for usage, but

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<sup>65</sup> Zangpo, Sonam. Interview with Author

<sup>66</sup> <http://www.asiasentinel.com/opinion/rice-shortage-crisis-or-hype/>

<sup>67</sup> Ibid.

<sup>68</sup> Gurung, Tulsi. Interview with Author.

<sup>69</sup> Zangpo, Sonam. Interview with Author.

<sup>70</sup> Tshomo, Kesang. Bhutan’s Status on Organic Sector.

operates as a guideline. With no such guideline for fertilizers, farmers and extension agents are left without proper guidance.

### *Certification*

The international standards of organic farming are defined to minute detail, and the certification process that ensures that the crop is organic is extensive, detailed, and expensive. Almost no one is certified in Bhutan. The process to become certified is long and arduous and requires a foreign agency. BioBhutan, a private company that sells more than a dozen products to domestic and export markets, has certified their lemongrass products. “Certifying was expensive, 2.2 lakhs ngultrum (\$3,550 USD). It needs to be done every year, but it has helped us become more profitable.”<sup>71</sup> Of the 15 or 16 products that they sell, only three are certified organic. “For lemongrass, the process is simple. The lemongrass is grown in the wild. In that particular forest they use no pesticides or chemicals. There is no cultivation.”<sup>72</sup> The ease certifying lemongrass and the benefits in their export market made it worthwhile. For most farmers, including the other products BioBhutan produces, the process is much more difficult, and the benefits do not outweigh the burden. Without a domestic market that pays premiums for Organic goods and the high cost of exporting, certifying does not make financial sense for most products.



While the self sufficiency goal could be met in the future, and certification may get easier with time, the lack of organic alternatives to chemicals may be the most difficult barrier. The herbicide Butachlor is the kingpin. While other chemicals’ usage has leveled out over time, Butachlor continues to increase. Butachlor is a powerful weedicide that replaces hours in the rice paddy fields with a spray that kills all flowering weeds. In the figure shown previously and

included in the appendix, the green bars are the herbicides that have seen a steady increase and make up the majority of pesticide & herbicide usage. The reliance on herbicides, especially Butachlor, is a major reason that organic farming is still a goal far in the future. If an effective and sustainable alternative is found, the burden shouldered by Butachlor could be reduced and chemical pesticide and herbicide usage would fall drastically. Even then, usage may continue. The porous border shared with India is a challenge to manage and the

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<sup>71</sup> Navin. Interview by Author.

<sup>72</sup> Navin. Interview by Author.



chemicals may slip through even if highly regulated by the government.<sup>73</sup> The development of a organic alternatives would help, but it may be impossible to rid the countryside of chemicals forever.

### *Bio-Fertilizer Shortage*

Much like the lack of organic alternatives to pesticides, there is not enough organic fertilizer to satisfy Bhutan's needs. "When people look at organic farming, they often forget about manure. For many farmers, there simply isn't enough manure to meet their needs. For it to be possible, there needs to be enough manure."<sup>74</sup> For those farmers who do raise cattle, they can collect their own livestock manure and use it. For farmers who do not raise their own cattle, manure must be bought and may be expensive. In the past, manure was traded for free, but now it must be purchased.<sup>75</sup> Farms, especially commercial farms, are growing and more and more manure is required and the collection or purchase requires time or money. Compounded by the labor shortage, it is simpler to use chemical fertilizers. In addition to manure, leaf litter is used to insulate crops and retain water in the fields. This is a form of bio-pesticide that is, again, difficult to collect. The shortage of these components or the lack of labor to collect them encourages the use of chemicals and the increased availability of organic alternatives could reduce chemical usage.

### *Organic Seeds*

In the same vein, organic seeds are required to be organic and the lack of them makes the practice difficult. If a seed is treated with chemicals or is genetically modified, that seed can not be used for organic agriculture, even if the process is 100% organic after the plant is in the ground.<sup>76</sup> There is already difficulty in providing enough non-organic seeds, and the production of organic seeds would need to see a drastic increase to become feasible. One of the extension agents that I spoke with suggested that supplying free organic seeds would be one way to motivate farmers to go organic.<sup>77</sup> This is possible, but if a farmer sees a benefit of using fertilizers and pesticides on organic seeds, there is little motivation to stop that from happening.

If all of the aforementioned issues surrounding organic alternatives were alleviated, an unpredictable outbreak of pests could necessitate the use of chemicals to save farmers from devastation. In 2013, the army worm became a problem for farmers. Armyworms are a caterpillar that thrives on the rainfall and sunshine of Bhutan's summers. The worm would "eat anything green"<sup>78</sup> and could be devastating to a small scale farmer. Mahesh Ghimiray attributes the outbreak to climate change and believes it could happen again at any time. "Even in areas that are organic, you have to spray to save the crop and seedlings."<sup>79</sup> The

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<sup>73</sup> Gurung, DB. Interview with Author.

<sup>74</sup> Ura, Karma. Interview with Author.

<sup>75</sup> Dorji, Kinley. Interview with Author.

<sup>76</sup> Chhetri, Mr Durba. Interview with Author.

<sup>77</sup> Tshering. Interview with Author.

<sup>78</sup> Ghimiray, Mahesh. Interview with Author.

<sup>79</sup> Ibid.

unpredictable nature of farming means that even the most organic-conscious farmer could be forced to choose between spraying to save his crop and losing all that he has grown.

## **What is Happening Now:**



Bhutan faces a long trek to 100% organic. Whether 100% organic is a "good plan" in the long term is another question to debate, but the steps to an organic Bhutan will help Bhutan achieve their sustainability goals. Between the government and private organizations there are initiatives, policies, and support for the organic movement.

## Policy

### *National Level Board*

The establishment of a national level board is a step towards organic in Bhutan. The board is under the Department of Agriculture and with the Framework for Organic Farming in Bhutan as a guide, their goal is to establish support systems for the farms under conversion to organic. This is done at many levels. A national board handles the policy making and implementation, budget allocation, and coordination between departments.<sup>80</sup> A non-governmental technical body composed of experts on organic farming from different sectors of society and NGOs will help promote organic farming and operate as an advisory board to the National Level Board.<sup>81</sup> Credit support will be included as well, with the goal offering support for "organic farming activities at reasonable interest rates and with feasible security."<sup>82</sup> The final component would be the introduction of organic farming syllabus in all ages of education in Bhutan.

### *School Agriculture Programs*

The current iteration of agricultural education is School Agriculture Programs (SAP). These programs are a joint effort between the Ministry of Education and the Ministry of Agriculture.<sup>83</sup> The aim is to have these programs in every secondary school nationwide, but currently only two-thirds of schools participate.<sup>84</sup> The Ministry of Agriculture supports the first year financially, with following years a part of the school's budget.<sup>85</sup> Support continues on a smaller scale through a nationwide evaluation and ranking for the best SAP, with a cash prize awarded to the winner.<sup>86</sup> Lobesa Secondary School is located within a few kilometers of the College of Natural Resources (CNR). The College serves to train future agriculture extension agents offer and is home to the academic agricultural experts of the country. For Lobesa Secondary school's SAP, they visit CNR to learn and practice. Once a week on Wednesday afternoons, 30 students make trek down the hill to CNR and learn technical skills from a CNR lecturer.<sup>87</sup> The students come from farms and are "motivated to learn."<sup>88</sup> The students come from the Lobesa or other nearby villages. These villages are situated in a part

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<sup>80</sup> Thimmaiah, Dr. A. Guide to Organic Agriculture. pg 82

<sup>81</sup> Ibid., pg 82

<sup>82</sup> Ibid., pg 83

<sup>83</sup> Dosch, Emma. *Validating the Culture of Agriculture: Farmers Groups and Organic Agriculture Mitigating Rural to Urban Migration in Bhutan*. Kathmandu: SIT Digital Collections, 2011. pg 31

<sup>84</sup> Ibid., pg 31

<sup>85</sup> Ibid., pg 32

<sup>86</sup> Ibid., pg 33

<sup>87</sup> Kinley, Mr. Interview with Author.

<sup>88</sup> Kedarnath, Mr. Interview with Author.

of Bhutan where most farms are commercially oriented. For these kids, organic is a new phenomenon and the advantages and disadvantages are taught. “Whatever we teach, we encourage them to take it home and encourage their parents to use organic.”<sup>89</sup>

## Education

Education is at the heart of the organic process. If farmers are not privy to the advantages and disadvantages of organic agriculture, they can not make an informed decision that benefits both themselves and Bhutan as a whole. “For Bhutan to go organic, people need to become more literate. People see that you should go organic, but don’t have the tools.”<sup>90</sup> The education does not only include the children of farmers, but the farmers themselves. While farmer literacy is not a stated goal, there is a push to educate the farmers on the advantages of organic. In the NOP offices, there are pamphlets that show a step by step guide to organic processes with directions in English and Dzongkha. If farmers can not read them, “when their kids come home they can tell them what it says.”<sup>91</sup> The NOP also educates any group of farmers that expresses an interest in organic agriculture. Through the extension agents, the NOP goes and trains local farmer groups. “By the time a farmer group is formed it is usually three years for them to go organic.”<sup>92</sup> The NOP stays in contact with them and has remained in contact with all of the groups that have been trained in the last 10 years.<sup>93</sup> Most important is that the farmers themselves are interested and motivated. “If we give away free things, everyone will want to be organic, but we don’t do that. We give information and wait for them to back to us.”<sup>94</sup> Still the best teacher is a neighbor or another farmer. When the research center in Bajo meets with farmers, they meet as a group and share their problems collectively.<sup>95</sup> In Bumthang, farmer groups have become “like schools”<sup>96</sup> because farmers visit and get answers to their questions. The farmers that visit will then talk with their extension agent who will work with the NOP to get a training session scheduled.

## Private Organizations

### *BioBhutan*

Another way that farmers are trained is through private organizations. BioBhutan, the company that certified lemongrass organic, teaches their farmers proper techniques. Lemongrass is grown in the wild, and the training is relatively simple, but the process has not been perfect. In 2008, one of their batches of lemongrass oil was found to be contaminated.<sup>97</sup> The distiller in question had an orchard that was sprayed with chemicals. Those chemicals

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<sup>89</sup> Kinley, Mr. Interview with Author.

<sup>90</sup> Navin. Interview with Author.

<sup>91</sup> Tshomo, Kesang. Interview with Author.

<sup>92</sup> Ibid.

<sup>93</sup> Ibid.

<sup>94</sup> Ibid.

<sup>95</sup> Yeshey, Madame. Interview with Author.

<sup>96</sup> Tshomo, Kesang. Interview with Author.

<sup>97</sup> Navin. Interview with Author.

washed into the river and the river water was used to distill the lemongrass.<sup>98</sup> BioBhutan visited and explained how the product becomes more valuable, often four fold, when organic and that that requires a level of care. For their other products that are cultivated in fields, BioBhutan will run a feasibility test and visit the farms who have the opportunity to produce the most and the highest quality produce.<sup>99</sup> It is explained that they will provide a market for the product, but it must be organic. Farmers are trained what can and cannot be used in addition to how to use specific techniques (vermicompost etc.).<sup>100</sup> With the motivation of a guaranteed market, these farmers are able and willing to farm organically.

The lemongrass farmers that work for BioBhutan are certified organic and are required to follow strict international standards. This process is tedious, expensive and complicated. It is not for all farmers in Bhutan, and the NOP recognizes this. With the 11<sup>th</sup> five year plan, NOP has split organic farming into three separate categories. The first category is classified by “naturally organic, remote areas within national parks, high altitude areas” and the focus for development is “a conservation of area/watershed, biodiversity, household nutritional needs and food basket security.”<sup>101</sup> The second group is “Selected areas selected products linked to potential markets in local proximity” and development looks to focus on local markets with a build toward surplus production that could be used in a larger market.<sup>102</sup> The third category is “Any area suitable for production, any products identified as suitable for production for assured market” and development is focused on targeting export markets.<sup>103</sup>

### *Bhutan Organic Logo*

There is a plan to increase the marketability of Bhutanese vegetables that fall under a distinction of Good Agriculture Practices (GAP). These practices, while not under an international certification, would be a domestic standard that could be accepted by some export markets. The face of this movement is the Bhutan Organic logo. This logo is designed by the government to give to farmers and organizations who abide by the standard an identity that could develop into increased profitability. The NOP pushes those who qualify to use the organic logo. The hope is that this logo will be placed alongside other international organic logos and act as a sign of consistency for consumers. The logo was designed to symbolize the components of Bhutanese agriculture that align with organic principles. This logo can be used by farmers who are registered with the NOP and are supervised by an extension agent,



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<sup>98</sup> Ibid.

<sup>99</sup> Ibid.

<sup>100</sup> Ibid.

<sup>101</sup> Tshomo, Kesang. Interview with Author.

<sup>102</sup> Ibid.

<sup>103</sup> Ibid.

involved in Participatory Guarantee System (PGS), certified by the Bhutan Agriculture and Food Regulatory Authority (BAFRA), or internationally certified.

### *Happy Green Cooperative*

Happy Green Cooperative is a private company involved in the marketing and promotion of organic agriculture. The creator, Sangay Rinchen, is a graduate of CNR, and he began the cooperative to mitigate youth unemployment.<sup>104</sup> His solution was an organization that seeks to "Establish a sustainable high quality employment to its owner worker members."<sup>105</sup> The mission connects the youth to the Happy Green Designs that promote eco-friendly products. A notable success are reusable canvas bags that are found around Thimphu. Happy Green Cooperative sells their organic produce near the market. The marketing component is called Happy Green Infotainment and works to campaign for "green" methods by highlighting their products and components of GNH. The infotainment division is a departure from the other product based initiatives and is a form of marketing for social action that is also a step towards Happy Green's goals.

### *SNV Netherlands Development Organization*

To address the water shortage that farmers frequently cite as a barrier, SNV Netherlands Development Organization is prepared to help. SNV is responsible for much of the research on organic agriculture in Bhutan and has coordinated with the Ministry of Agriculture and Forestry (MOAF) and the NOP on books on the topic. SNV recently began a program called "Climate-smart Agriculture" (CSA) in Bhutan as well as Laos, Cambodia and Nepal.<sup>106</sup> Per the SNV website, the program has "expectations towards increasing footprint, and innovation from a global perspective and support rural development connecting partner agencies and provide service to the needy communities- both men and women alike in realizing climate resilience agriculture production system."<sup>107</sup> The project started in the Summer of 2013 and in February of 2014 SNV organized a workshop with 27 participants from "various backgrounds"<sup>108</sup> that was guided by the theme "where do we stand on agriculture adaptation to climate change, and how do we collectively contribute to an improved food security and income level of both women & men farmers under climate change context."<sup>109</sup> SNV is involved in the production of texts for the NOP and though CSA is in the early stages of development, it is another step by SNV to improve sustainable agriculture in Bhutan.

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<sup>104</sup> Dosch. Rural to Urban. pg 33

<sup>105</sup> Ibid.

<sup>106</sup> <http://www.snvworld.org/node/8240/>

<sup>107</sup> Ibid.

<sup>108</sup> Ibid.

<sup>109</sup> Dorji, Cheku. Report on Study Tour

## *Samdrup Jongkhar Initiative*

Samdrup Jongkhar is a dzongkha in the farthest southeast corner of the country and is home to the Samdrup Jongkhar Initiative (SJI). The initiative was started by Dzongsar Khyentse Rinpoche in March 2010<sup>110</sup> and "aims to raise living standards in Samdrup Jongkhar dzongkhag (south-eastern Bhutan) in an ecologically friendly, self-reliant way that strengthens community and culture."<sup>111</sup> One of the focuses of the initiative is organic agriculture. There have been organic training sessions conducted by the Organic Farming Association of India, and in March of 2011 SJI organized a three week tour in India that included farmers, District Agriculture officer, extension agents, and representatives from the National Organic Programme. The tour looked into organic farming in India. Currently, SJI is focused on the education and research of organic agriculture. In research, study is focused on the conversion to organic that farmers in Samdrup Jongkhar are experiencing.<sup>112</sup> This study is still in the first stages and is focused on collection of soil samples along with farmer interviews<sup>113</sup> The education initiative focuses on training sessions, like the study tour in India, are designed to teach the farmers about organic agriculture.<sup>114</sup> The most recent training session was a 10 day training in pest control and soil management that was attended by some 250 people.<sup>115</sup>

## Organic Farms in Operation

With acknowledgement to the many farms that abide by organic principles by nature, there are several farms that are making a conscience choice to “go organic.” Druk Organic Farm in Toktokha, Punakha, an Integrated Agriculture Technology farm in Wang Sisina, and the farmers in Gasa are all using organic methods of farming and are considered examples for other farmers..

### *Druk Organic Farm in Toktokha*

Druk Organic Farm is a half hour from the College of Natural Resources and receives frequent visitors who hope to learn about organic methods. The farm consists of terraced land that hosts an array of vegetables, all organic. When I met with Tshering, the manager of the farm, he was busy with the members of the local cooperative that he manages. The cooperative began three years ago, consists of local farmers, and abides by organic principles as well. The farm is for commercial use and relies on hired help. The farm began in November 2009 as a “hobby”<sup>116</sup> and so that the land would not become fallow. The goal is for

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<sup>110</sup> <http://www.sji.bt/about/frequently-asked-questions/>

<sup>111</sup> "Summary Overview of Samdrup Jongkhar Initiative (SJI) (as of May 2011)." .

<sup>112</sup> <http://www.sji.bt/organic-agriculture/research/>

<sup>113</sup> Ibid.

<sup>114</sup> Ibid.

<sup>115</sup> Ibid.

<sup>116</sup> Denka. Interview with Author.



the organic farm to become “filled with mixed vegetables, sold in bulk.”<sup>117</sup> The biggest issue that Druk Organic faces is a water shortage. The farm is quite new and does not have a water source on site. “We ask the local farmers for water, but they say they do not have enough for themselves, let alone us.”<sup>118</sup> Without water to irrigate the crops, it is difficult to grow anything and at the moment the collective is vital to their success. Each Thursday, they sell their vegetables through Happy Green Cooperative in Thimphu. Druk Organic Farm differs from other farms I visited because it is a purely commercial project that is backed by external funds.

### *Wang Sisina Integrated Farm*

Wang Sisina is on the road between Thimphu and Paro and is home to a farm that is focused on Integrated Agriculture Technology. “The farm includes three components; integrated, ornamental, and food storage.”<sup>119</sup> The venture began in 2012 as a program to employ the unemployed youth and landless farmers, but in March of 2014, was rebranded.<sup>120</sup> Now, the farm is serviced on weekends by 85 different shareholders from the civil service.<sup>121</sup> The shareholders are expected to come twice a week, Saturday and Sunday, and work the land. This farm is in its infancy and some plots are still under construction.<sup>122</sup> The farm changed purposes under the direction of the Prime Minister in order to offer “recreational exercise”<sup>123</sup> to the civil service agents who spend most of their time on the computer. The Prime Minister himself has a plot. In addition, the farm hopes to be a model for other farmers to go organic. Near the entrance, there is a large plot that is surrounded by a solar powered electric fence and has signs that highlight the technologies being used. Just beyond that, you are greeted by Technology Park. To enter, you pass a fountain that doesn’t yet run, and arrive in a newly planted grass lawn with two rows of crops running down the middle. “We hope that this is a place for people to come and relax, bring their children.”<sup>124</sup> Just beyond the park are several greenhouses that are home to seedlings,



Terraced plots at the farm in Wang Sisina

<sup>117</sup> Ibid.

<sup>118</sup> Ibid.

<sup>119</sup> Dhondo. Interview with Author.

<sup>120</sup> Ibid.

<sup>121</sup> Dorji, Kinley. Interview with Author.

<sup>122</sup> Ibid.

<sup>123</sup> Dhondo. Interview with Author.

<sup>124</sup> Dorj, Kinley. Interview with Author.

transplants, and ornamental crops. The seedlings and transplants are given to the farmers to use in plots that are small enough to be managed in limited time. The families are expected to take home a majority of their crop. “We hope they when they take it home, they also share it with their friends and family. With this, it may reduce imports from India.”<sup>125</sup> The reliance on Indian imports is a concern, but the hope is that some of the excess will be available for export as well. With the cold storage component, the vegetables will be stored in a cool environment and preserved for sale at a later date. This storage can be used by any local farms and has potential to address an export market. To address the lack of volunteer labor during the week, thirteen local workers are employed to help, especially during the early stages of the farm’s development. They hope to water each plot twice a week, and workers clear new plots of rocks and roots. It is hoped that the civil service plot owners will take on a bulk of the work.

### *Gasa*

Gasa sits an 86 km drive beyond Punakha. It is difficult to get there because taxi drivers do not feel comfortable on the rough roads; They feel their cars will fall apart. I was quoted a price of nearly \$100 USD. Gasa is organic by choice and works closely with the Research Center in Bajothang (RC Bajo) to increase yields while remaining organic. The research program was initiated in 2012 and intends to increase vegetable production and marketing.<sup>126</sup> The research center provides training and some additives but hopes that the farmers make their own. “We do provide bio-pesticides, but do not provide bio-fertilizers. We encourage them to make their own.”<sup>127</sup> Before the onset of this program, Gasa was unable to be self sufficient and bought vegetables from the lower regions.<sup>128</sup> With the guidance of RC Bajo, Gasa is becoming increasingly self sufficient. “They still buy rice, but vegetable is self sufficient now and livestock product is enough.”<sup>129</sup> The feasibility in Gasa is aided by its location high in the mountains. “Some places at high altitude have less pest and disease problems. In the south, it is needed, but not



Farmers in Gasa are trained by RC Bajo  
credit: Tanka Maya Pulmari

<sup>125</sup> Ibid.

<sup>126</sup> Pulmari, Tanka Maya. Interview with Author.

<sup>127</sup> Ibid.

<sup>128</sup> Tshomo, Kesang. Interview with Author.

<sup>129</sup> Pulmari, Tanka Maya. Interview with Author.

so much in high altitudes.”<sup>130</sup> For RC Bajo, it is hoped that their work in Gasa becomes a blueprint for other farmers that hope to go organic. “I want Gasa to be a bank of knowledge, for both positive and negative things. Not just for publication but for farmers to come here, learn, and take it back to their own farms. We can learn from the successes and failures in Gasa.”<sup>131</sup>

The work done in Gasa is in coordination with the research center in Bajothang. Workers at the research center commute from Punakha and pass CNR on their way to work. CNR and the research centers interact frequently. CNR trains the agricultural extension agents that are the connection that farmers have to the government. This is the connection that allows farmers to acquire pesticide and fertilizers and it is how they learn about new techniques. Though the farmers I visited were referred to me by extension agents, each and every farmer regarded the connection with the extension agent the most important source of technical information. For CNR, this means that what is taught there is what will end up in the fields. This responsibility is understood by the lecturers at CNR. “I think that CNR has the keys to an organic future in Bhutan. What is taught here is what will be used by the farmers in the field.”<sup>132</sup> The research center can offer trials and advice to those extension agents. “We run trials to test whether foreign crops can be introduced into this area effectively. We then show farmers our results and compare them to their own methods and let them choose.”<sup>133</sup> Their reach is limited and they rely on extension agents to disseminate information in areas that are not local. There are research centers for each different altitude level, with altitude specific results catered to the farmers.



The CNR Campus

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<sup>130</sup> Ibid.

<sup>131</sup> Ibid.

<sup>132</sup> Thinley, Dr. Interview with Author.

<sup>133</sup> Pulmari, Tanka Maya. Interview with Author.

## The Future



Organic agriculture has potential in Bhutan. While other countries who rely on chemicals are too far to turn around, Bhutan has the capacity to be 100% organic. The farmers are attuned to organic agriculture. The techniques that they have used for centuries before the introduction to chemicals are organic. For farmers in more remote areas, organic is already reality. The conversion to organic will not be as difficult because of that. Organic also gives an opportunity for small landholding farmers to turn their crop into profit. Shown by the work of Happy Green Cooperative and BioBhutan, there is an export market for organic agriculture. As export markets in Europe and the United States grow, Bhutanese farmers could be a part of a profitable business that begins to export on a larger scale. This economic boon could contribute to poverty alleviation. Poor subsistence farmers would benefit from the increased income.

It will take many steps to unlock that potential. Success mandates a plan and careful execution of that plan. For organic to work, there will need to be support from the farmers and for the farmers, support from the government and for the government. In my own opinions, I will detail what I see as Bhutan's best chance to go organic.

### Farms

At the micro level, it is paramount that organic move slowly. If Bhutan decides to switch to organic agriculture overnight, the movement will fail. Farmers are accustomed to a form of conventional agriculture and fear that a move to organic agriculture would them under. Starting with small organic farms that can teach other local farmers techniques over time will help change conventional agriculture's momentum. The lack of labor needs to be addressed. This could be addressed by increasing the labor availability, but rural-urban migration inhibits that plan's potential. The management of input supply would be more feasible. Farmers should produce as much of their own fertilizer and pesticide as they are able to and should be advised on the appropriate dosage and application of a chemical input. Clear guidance would prevent reckless usage. The final piece of advice is practicality. If a plot of land is not able to make yield when organic, that plot of land should not be organic. If a certain crop can not meet yield goals as organic, that crop should not be organic. Food security is a vital issue and if an integrated method is used with care, the chemical usage will not grow to an unhealthy level.

### Research

One level higher, research is important. With the use of Butachlor in paddy fields not replaceable by any known organic alternative, it is difficult to see Butachlor being phased out. Research must continue to determine a sustainable alternative. Farmers will not choose an organic commitment over the safety of their entire crop and will use chemicals if it assists them. "If we can not sort out an alternative to the chemicals, organic is only a dream."<sup>134</sup> For

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<sup>134</sup> Tshomo, Kesang. Interview with Author.

the chemicals that an alternative exists, that alternative needs to be available. If it more difficult for a farmer to acquire urea than manure, it will be another sacrifice the farmer must make to become organic. Other areas of research could include; soil fertility management, animal husbandry management, marketing, integrated methods, watershed management, biodiversity management, and post harvest supply chain management. The research may be completed by the research centers, but then must be taught to the farmers through training sessions and extension agents. If the agriculture extension agents are unlearned on organic agriculture, there is no hope that the information will be taught to farmers. If extension agents are taught how to farm organically at CNR or through training sessions, it is more likely that organic farming will be taught to farmers, and thus, organic is more feasible. Beyond the extension agents, the creation and cultivation of farmers groups that share information and cooperate in pre and post production will aid the movement. Farmers learn best from each other, and if farmers have an avenue to ask questions and seek input from organic experts it will encourage a smooth conversion to organic. Finally, organic will never be possible if it is not profitable. Private organizations that promote profitable organic farming should be encouraged. Farmers will not be able to front the capital required to start a successful business. If investments are made wisely, they will pay off and will promote organic.

### Government

At the top level, organic requires support from the government. Most important are definitive plans and policies. The creation of the NOP is a step in the proper direction and should be supported both politically and financially. The NOP should be able to operate in collaboration with the Ministry of Agriculture and Forestry (MOAF) for them to have unified initiatives and information for farmers making the conversion to organic. Clear policy will aid these farmers as well. A Pesticide Act with more precision and an equivalent Fertilizer Act would allow farmers and extension agents to apply the appropriate amount of inputs. The advocacy of these policies needs to increase. There are strong resources for farmers available at the MOAF and NOP and they should be publicized and utilized by farmers. The MOAF and NOP can increase organic by increasing availability to organic markets. Organic agriculture begins with a single seed but ends at the market. All the steps in between need to be met with support. If the government can provide a system that relieves farmers of a market burden, it will be easier for farmers to become organic. The final component and part of the organic process is quality regulation and certification. Certifying organic is expensive and tedious and small scale farms are unlikely to attempt the process. For a small scale farm to enter the export market, that farm needs to have some type of quality assurance. If certification is made easier and cheaper while maintaining high standards, it would help small scale farmers join the movement. As it is has been done with BioBhutan and lemongrass, beginning organic with a niche product on a small scale can be profitable. From there, the process can grow.



## Conclusion



Dao, at right, has farmed for as long as he can remember. When he first began farming, the United States was slipping into the Great Depression and Bhutan was still 30 years from letting in the outside world. When the gates opened, Dao began to use chemicals in his crops. The Beatles took America by storm and Dao began to grow more than his families could eat. Today, Dao hears about organic farming and wonders whether he has gone back in time. “I used to have many cattle, you had to have any chance of growing something. Now, I don’t because I can use chemicals instead. I like organic, they tell me I need to go back and do what I did before. It feels like I am going to be young again.”<sup>135</sup> He chuckles hardily. I do not understand his dzongkhag, but I laugh too. His fingernails are stained with 50 years of farming and his laugh carries a lifetime of joy. “Organic is good, but I don’t know how I would meet the yields that are already dropping when I do use fertilizer. Still, I have been here as long as the land and I don’t get too excited about things that are too new.”<sup>136</sup>



Though Bhutan is not new to organic methods, the conversion from conventional to organic will not be simple. There is a startling labor shortage that leaves farmers unable to manage cultivation by hand. The labor shortage is caused by the rural to urban migration that lures the increasingly educated youth population into the cities for office jobs. There is fear that with movement into the cities the traditional knowledge that has been taken for granted for generations will disappear. Organic agriculture is seen as a way to curb this trend. It is supported by the government but there are holes in policy that inhibit progress. The lack of clear pesticide regulation and lack of fertilizer regulation does not help. The process of certifying organic is expensive and arduous. There are not enough bio-fertilizers to support a full conversion, and organic seeds are even less common. The odds are stacked against conversion yet it is possible.

With the creation of a National Level Board that sets to advise the organic movement, progress is being made. School Agriculture Programs are common in schools and are educating future generations on the benefits of organic agriculture. Private organizations like BioBhutan, Happy Green Cooperative, SNV, and Samdrup Jongkhar Initiative seek to educate farmers and the public on organic agriculture while also making it commercially viable. Organic is already happening at Druk Organic Farm in Toktokha, Wang Sisina Integrated Farm and in Gasa. The techniques piloted in these farms can be taught to other farmers who hope to follow in their organic foot steps.

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<sup>135</sup> Dao. Interview with Author.

<sup>136</sup> Dao. Interview with Author.



With these programs in place, organic is possible. Still, the plan for the future will determine whether the initiative makes its goals. At the farm level, change needs to move slow and there needs to be support for the farmers who undergo the burden of conversion. At the research level, research needs to focus on the most successful and sustainable methods and that research needs to be dispersed to the farmers appropriately. At the national level, there needs to be clear legislation and support for initiatives both public and private.

In 2011, the Prime Minister released a statement reaffirming his commitment to organic agriculture. In the statement he says “going organic is living GNH.”<sup>137</sup> That what the organic agriculture movement is about in Bhutan. Bhutan has chose to face modernity by embracing a sustainable approach to governance, the environment and in agriculture. Bhutan may never be 100% organic, and GNH may not make every citizen happy. That may not matter. The process of developing sustainable methods does not have to meet all of its goals for it to make Bhutan a better country.

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<sup>137</sup> Thinley, Jigmi. "Making a Commitment to Organic Agriculture." Lecture,, Thimphu, March 12, 2011.

## Appendix

### Dzongkhag Terms

Acre: ཞཀམ

Agricultural: སོ་ནམ་གྱི།

Agricultural Development Programme: སོ་ནམ་བོད་འཕེལ་ལས་རིམ།

Agricultural Extension: སོ་ནམ་རྒྱ་སྐྱེད།

Agricultural Extension Centre: སོ་ནམ་རྒྱ་སྐྱེད་རྒྱེ་བ།

Agricultural Labourer: སོ་ནམ་ལས་མི།

Agricultural Land: སོ་ནམ་ས་ཆ།

Agricultural Policy: སོ་ནམ་སྲིད་བྱུས།

Agriculture: སོ་ནམ།

Agrobiodiversity: སོ་ནམ་སྐྱེ་ལྗན་རིགས་སྤྱ།

Agrochemicals: སོ་ནམ་ཇས་སྦྱོར།

Alternative Agriculture: སོ་རེ་ཚབ་སོ་ནམ།

Bhutan Agriculture and Food Regulatory Authority: འབྲུག་སོ་ནམ་དང་བ་སྦྱོད་ཁྲིམས་དོན་དབང་འཛིན།

Biodiversity: སྐྱེ་ལྗན་རིགས་སྤྱ།

Bioinsecticide: སྐྱེ་ལྗན་འབྲུལ་སྐྱེ་ལྗན།

Biotechnology: སྐྱེ་ལྗན་ཐབས་རིག་

Buckwheat: ལྷོ་

Cash Crop: དདུལ་ཐོན་

Caterpillar: ཕྱི་ལ་འབྲུལ།

Chemical: སྦྱོར་ཇས།

Chemical Fertiliser: ཇས་ལུད།

Chilli Pepper: ཞཀམ་བཟི་ཁུ་ལྷུག་པ།

Commercial Harvesting: ཚོང་འབྲེལ་བསྐྱུ་གསོལ།

Community: རྗེ།

Composting: ལུང་བཟོ།

Conservation: ཉམས་སྲུང།

Conventional Agriculture: མྱེན་སྒོལ་ཞིང་ལཱ།

Cooperative: མཉམ་ལས་ཚོགས་རྒྱུ།

Crop Rotation: ལོ་ཐོག་སོར་བརྟུང།

Cultivate: ཐོག་བརྟུང།

Demonstration Farm: དཔེ་སྟོན་ཞིང་ཁུ།

Dig བཞོ།

Diversification: ལྷ་ཚོགས་བཟོ་བ།

Drought: ཐན་པ།

Earth: ས། ས་བཞི།

Ecological: རྒྱུ་ལྡན་གནས་སྤངས་ཀྱི།

Ecosystem: རྒྱུ་ལྡན་གནས་སྤངས་རིམ་ལུགས།

Experimental Farm: མོ་བརྟུང་ས་ཞིང།

Fair Market Value: འགྲེམས་ཚོང་གནས་གོང།

Family Farm: ཕ་གཞིས།

Farm: ཞིང་ཁུ། ཞིང། བསོ་སྦྱོང་ཁང།

Farm Inputs: སོ་ནམ་ནང་འདེབས།

Farm Worker: ཞིང་པ། སོ་ནམ་པ།

Farmer: སོ་ནམ་པ། ཞིང་པ།

Farming: ཞིང་ལཱ།

Farming Systems: སོ་ནམ་ལམ་ལུགས།

Fertile Land: འཚོ་ས། ས་བརྩུང་ཅན།

Fertilize: ༡ སོ་ནམ་བརྩུང་བ། ༢ ལུང་སྲུབ།

Fertilizer: ལུང།

Field: ཞིང། ས་ཞིང།

Food Chain: ལྷོ་རིམ།

Fungicide: ཏམ་སྒྲུབ།  
 Garden: ལུམ་ར།  
 Grain: འབྲུ། འབྲུ།  
 Greenhouse: རྩོལ་ཡེལ་ཁྱིམ།  
 Grow: རྒྱ། འཕེལ་ སྐྱོམ།  
 Harvest: ཐོག་བསྟུ།  
 Herbicide: ལྷ་སྒྲུབ།  
 Highland: ལམ། ལམ་ཐོས།  
 High-yielding: ཐོན་ཅན།  
 Hoe: རྐོ་ཉི།  
 Horticulture: ལུམ་རྩེག་པ།  
 Import: བད་འདྲེན།  
 Insecticide: འབྲུ་སྒྲུབ།  
 Irrigate: རྩུ་བྲད།  
 Land Management: ས་གཞི་འཛོལ་སྐྱོད།  
 Livestock: རྐོ་ལོ་སྟེ།  
 Maize: ལོ་ཟ།  
 Manure: རོར་ལུང།  
 Ministry of Agriculture: རོན་མ་ལྷན་ཁག།  
 Mixed Farming: བསྐྱེད་ལེན་ཞིང་ལུ།  
 Multicrop: ལྷ་མང་ལེན་ལ།  
 Natural Ecosystems: རང་བཞིན་སྣོད་བརྒྱུད་ལམ་ལུགས།  
 Natural Resource: རང་བཞིན་ཐོན་སྐྱོད།  
 Nature Conservation: རང་བཞིན་གནས་སྐྱེད་སྐྱོང་སྐྱོད།  
 Normal Farming Practices: ཏུས་རྒྱུན་ཞིང་ལུ།  
 Organic Agriculture: རང་བཞིན་སོན་མ།  
 organic farming རང་བཞིན་ཞིང་ལུ།

organic fertilizer རང་བཞིན་ལུང་།  
 paddy field ལྷ་ཞིང་། ཨ་འིང་།  
 plant རྩོམ་པོ།  
 pollution བཟོལ་གྲིབ། བཟོལ་ལྷང་།  
 power tiller འཕུལ་སྒྲུང་།  
 preservation ཉམས་སྲུང་།  
 produce ཐོན་ལུགས། ཐོན་སྐྱེད།  
 productive agriculture ཐོན་ལུགས་ཅན་གྱི་སོ་ནམ་ལྷ།  
 rain ཆར་པ།  
 renewable natural resources research centre རང་བཞིན་སྐྱར་འབྱུང་ཐོན་སྐྱེད་ཞིབ་འཇོལ་རྩེ་བ།  
 rotation of crops རྫོང་རྒྱབ་ལོ་ཐོབ།  
 rural development སྲོང་གསེབ་སོང་འཕེལ།  
 seed ༡ སོན། ༢ པ་སོན།  
 shovel ཅེ་མ།  
 smallholding ཞིང་རྒྱུང་།  
 soil ས།  
 soil management ས་འཛོལ་སྐྱོང་།  
 sustainable agriculture ཡུན་བརྟན་སོ་ནམ་ཞིང་ལྷ།  
 terrace ཨ་འིང་།  
 traditional agriculture ལུང་སྲོལ་སོ་ནམ།  
 vegetable ཚོད་བསྐལ།  
 vegetable garden ཚོད་བསྐལ་ལྷུ་མ་རྩ།  
 vegetable market ཚོད་བསྐལ་ཁོ་མ།  
 water རྩ།  
 water management རྩ་འཛོལ་སྐྱོང་།  
 weed གཤམ་མ། ཅོན་ལྷུ་མ།  
 world food programme འཛོལ་གླིང་ཟ་སྐྱོད་ལས་འཛིན།

Map of Bhutan



## Questionnaire for Farmers

Site name:

Village:

Geog:

Date of survey:

Time:

Person answering question:

Name:

Age:

Gender: M / F

Position in Household:

Occupation:

### Household information:

1. How many people are in you family? \_\_\_\_\_ People
2. How many children are attending school? \_\_\_\_\_ children
  - 2.1. What grades are they in?  
1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10 - 11 - 12 - college
3. Have you attended school? ( Y / N )
  - 3.1. What grade did you complete?
4. How many in your family have an occupation outside farming? \_\_\_\_ persons
  - 4.1. Where are they, and what are they doing?
5. Did your grandparents farm on the same land? ( Y / N / IDK )
6. How long has your family farmed this land? ( Since \_\_\_\_\_ / \_\_\_\_ years )
7. What is the approximate area of your farmland? \_\_\_\_\_ Acres
8. Has cultivated land increased or decreased since your grandparents time? (Y/ N/ IDK)
  - 8.1. explain why?

### Farming

1. What was your farm like 10 years ago? What has changed?
2. What are your most important crops? List about 3, in order of importance.
3. Do you follow any guidelines on when to plant? ( Y / N / IDK )
  - 3.1. If yes, where are those guidelines from?
4. What do you use to fertilize your fields?

- 4.1. leaf litter from forest
  - 4.2. animal manure from YOUR OWN farm
  - 4.3. animal manure from OTHER farms
  - 4.4. other local materials \_\_\_\_\_ -
  - 4.5. Urea
  - 4.6. Other fertilizers \_\_\_\_\_
5. If fertilizers are used, when did they start being used? Since \_\_\_\_\_/ \_\_\_\_\_ years
6. Are fertilizers becoming more expensive? ( Y / N / IDK )
7. Has total use of chemical fertilizers and pesticides increased or decreased over the years? ( Y / N / IDK )
- 7.1. Why?
8. How do you control pests?
- 8.1. I buy chemicals. They are \_\_\_\_\_
  - 8.2. I make my own pesticides. They are \_\_\_\_\_
  - 8.3. Hand pick insects
  - 8.4. Rarely have pest problems
  - 8.5. Other \_\_\_\_\_
9. Has the quality of your soil changed in recent years? ( Y / N / IDK )
- 9.1. How has it changed?
  - 9.2. Why do you think it has changed?
10. How has your method of farming changed in the past 5 years?
- 10.1. Use of machines
  - 10.2. Different fertilizer and pesticide use
  - 10.3. Started to use chemical pesticides / fertilizers
  - 10.4. Increased area of cultivation
  - 10.5. Decreased area of cultivation



- 10.6. Changed crops
- 10.7. Other
- 11. What reasons did you change your method of farming?
  - 11.1. Local advice
  - 11.2. Changes in policy
  - 11.3. Need for more income
  - 11.4. Climate change
  - 11.5. Wild animal problems
  - 11.6. Changes in market demand
  - 11.7. Labor shortage
  - 11.8. Other
- 12. Do your methods differ for what you grow for yourself and what you grow to sell? Y/N
  - 12.1. How?
- 13. Are you familiar with the term Organic? ( Y / N / IDK )
  - 13.1. If you are familiar, what is your understanding of “organic”?
- 14. Do you practice organic farming?
  - 14.1. Yes, everything I grow
  - 14.2. Yes, what my family eats
  - 14.3. Yes, for part of what I sell
  - 14.4. No
  - 14.5. Don't Know/ Not sure
  - 14.6. When did you begin to practice organic farming? (since \_\_\_\_\_ / \_\_\_\_ years)
- 15. Do you think organic farming will increase income? ( Y / N / IDK )
  - 15.1. Why?
- 16. Do you think organic farming will increase yield? ( Y / N / IDK )
  - 16.1. Why?
- 17. Do you think Organic farming will change the quality of the soil? ( Y / N / IDK )

17.1. How?

18. If you have trouble with crops, who do you get advice from?

18.1. Neighbors/relatives

18.2. Extension agent

18.3. I do not go for help or advice

18.4. Other

19. Are you in contact with an extension agent? ( Y / N / IDK )

20. Are you a part of a local farmers group? ( Y / N / IDK )

20.1. How, in what capacity?

### Market

1. Where do you sell your produce?

1.1. Local market

1.2. Market in different village

1.3. From home

1.4. Other

2. When did you start selling your produce? ( Since \_\_\_\_\_ / \_\_\_\_ years)

3. Have your sales increased over the years? ( Y / N / IDK )

4. How many hours do you travel? \_\_\_\_\_ Hours

5. Has access to the market improved? ( Y / N / IDK )

5.1. How?

6. Is your household self sufficient? ( Y / N / IDK )

## **List of Interviews:**

Bhattarai, BN

Climate Smart Agriculture Advisor at SNV, Thimphu. Interview with Author. April 22, 2014.

Bida, Padang

Farmer, Tong Cheka, Limbu. Interview with Author. April 13, 2014.

Chhetri, Mr Durba

Director of Druk Seeds, Bajothang. Interview with Author. April 16, 2014.

Chhetri, Rehkha

Lecturer at College of Natural Resources, Lobesa, Punakha. Interview with Author. April 18, 2014.

Choden, Ani Kuzang

Writer, Bumthang. Interview with Author. March 7, 2014.

Choden

Farmer, Thangu, Wangdi. Interview with Author. April 13, 2014.

Coo Chu

Farmer, Om Techa, Limbu. Interview with Author. April 13, 2014.

Dao

Farmer, Thangu, Wangdi. Interview with Author. April 13, 2014.

Dhodo

District Agriculture Officer, Thimphu. Interview with Author. April 21, 2014.

Dorji, Kinley

Town Leader, Om Techa, Limbu. Interview with Author. April 13, 2014.

Dorje, Kinley

Extension Agent, Wang Sisina. Interview with Author. April 22, 2014.

Lhamo, Dawa

Lecturer at Institute for Language and Culture Studies, Taktse. Interview with Author. March 11, 2014.

Ghimiray, Mahesh

Principal Researcher at RC Bajo, Bajo. Interview with Author. April 16, 2014.

Gurung, DB

Lecturer at College of Natural Resources, Lobesa Punakha. Interview with Author.  
March 14, 2014

Gurung, Tulsi

Lecturer at College of Natural Resources, Lobesa, Punakha. Interview with Author.  
March 17, 2014

Gurung, Tulsi

Lecturer at College of Natural Resources, Lobesa, Punakha. Interview with Author.  
April 14, 2014.

Mr. Kedarnath

Teacher at Lobesa Secondary School, Lobesa, Punakha. Interview with Author.  
April 15, 2014

Kesang

Farmer, Samtenling, Punakha. Interview with Author. April 13, 2014.

Kinley

Teacher at Lobesa Secondary School, Lobesa, Punakha. Interview with Author.  
April 15, 2014.

Navin

Manager at BioBhutan, Thimphu. Interview with Author. April 24, 2014.

Phubtim

Farmer, Samtenling, Punakha. Interview with Author. April 13, 2014.

Phuntso, Karma

Director of Loden Foundation, Thimphu. Interview with Author. March 19, 2014.

Pulmari, Tanka Maya

Organic in Gasa expert at RC Bajo, Bajo. Interview with Author. April 16, 2014.

Tashi, Sonam

Lecturer at College of Natural Resources, Lobesa, Punakha. Interview With Author.  
March 17, 2014.

Dr. Thinley

Lecturer at College of Natural Resources, Lobesa, Punakha. Interview with Author.  
April 18, 2014.

Tshering, Kinlay

Chief Horticulture Office, Thimphu. Interview with Author. April 21, 2014.

Tshering

Extension Agent, Tong Cheka, Limbu. Interview with Author. April 13, 2014.

Ura, Karma

Director at Center for Bhutan Studies, Thimphu. Interview with Author. March 20,  
2014.

Wangchuk, Dorje

Director at College of Natural Resources, Lobesa, Punakha. Interview with Author.  
March 14, 2014

Wangchuk, Dorje

Director at College of Natural Resources, Lobesa, Punakha. Interview with Author.  
April 18, 2014.

Yangchen, Ugyen

Lecturer at College of Natural Resources, Lobesa, Punakha. Interview with Author.  
March 17, 2014

Yeshey

Soil Specialist at RC Bajo, Bajo. Interview with Author. April 16, 2014.

Zangpo, Sonam

District Agriculture Officer, Bajo. Interview with Author. April 16, 2014.

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## **Future Research**

I wish that I would have had time to be more specific. While I learned a good deal, I hope that others can take the basic information that I have and apply it to a more specific topic. Looking into the specific methods that farmers use, look into a niche product like lemongrass or buckwheat, looking at the gender shifting gender roles, visiting remote farms like Gasa, and visiting other commercial areas of Bhutan would have been delightful had I been had more time. This study could also be replicated in Nepal or India. For India, the farmer suicides is an alarmingly and important issue that may already have significant research, but if it doesn't- it should. I also think that doing this study over again, just better, would be worthwhile. If future research is pursued, I would like to be helpful in anyway I can.

The face of research:

