Alternative Options for Achieving Food Security: A Focus on Kenya

Introduction: While some countries currently experience an abundance of food, others are experiencing food insecurity, partly due to low productivity from poor agricultural conditions. Industrial and organic agriculture are two popular models of agricultural production with unique advantages and disadvantages. Which model is the most suitable for increasing food security within low-income countries that face adverse environmental conditions? Kenya has experienced an increase in drought intensity over the past thirty years coupled with a loss of soil fertility, resulting in lower agricultural productivity and a decrease in food security. Gender disparities in land ownership and household privileges also increase food security as women statistically spend more of their income on their families than men. In Kenya's case, organic agriculture is the most suitable model for increasing food security because it is easily adopted by smallholders, increases soil quality and protects farmers from crop failure during drought.

Methods: For this study, reports of the environmental, social and economic effects of both industrial and organic agriculture were analyzed. Their ability to reduce food insecurities in Kenya was considered through the following methods:
- A review of Kenya's agricultural history, land use practices and current agricultural policies
- An analysis of climatic reports in Kenya
- An assessment of the factors that contribute to food insecurity within Kenya

Economic, Environmental and Social Advantages and Disadvantages of Industrial and Organic Agriculture

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<tr>
<th>Model</th>
<th>Advantages</th>
<th>Disadvantages</th>
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| Industrial Agriculture | - Produces cheap food, allowing low-income families the luxury of input intensive food products, such as meat and dairy  
- Highly efficient  
- Benefits from large economies of scale | - Reliant on expensive fertilizer and chemical inputs  
- Requires heavy machinery  
- Chemical leaching can poison groundwater and cause eutrophication in rivers and lakes  
- 75 percent of agricultural production comes from smallholder farmers  
- 40 percent unemployment rate  
- Labor intensive  
- Low production efficiency per crop | - Requires heavy investments in agricultural extension services  
- Tea and coffee contribute 13 and 9 percent of total export earnings respectively | - Relies on small economies of scale  
- Relies on large economies of scale  
- Labor-intensive model  
- Machine-intensive model |
| Organic Agriculture | - Increases soil fertility and water retention  
- Less susceptible to crop failure from environmental disasters  
- Low-cost methods  
- Increases crop diversity  
- Decreases susceptibility of crops to pests and disease | - Labor intensive  
- Relatively small economies of scale  
- Knowledge intensive  
- Requires heavy investments in agricultural extension services | - Mixed cropping reduces crop failure  
- Mixed cropping and conservation tilling increases soil fertility  
- Relies on small economies of scale  
- Labor-intensive model  
- Low production efficiency per crop  
- Tea and coffee contribute 13 and 9 percent of total export earnings respectively | - Will be able to use genetically modified drought-tolerant crops  
- Fertilizers boost fertility, but are too expensive for smallholders  
- Relies on large economies of scale  
- Machine-intensive model  
- High production efficiency per crop |

Vegetation and Agricultural Cash Crops in Kenya

Conclusion: As seen in Table 2, organic agriculture will more efficiently reduce food insecurities in Kenya because it provides more benefits to Kenya's smallholder farmers who are the most at-risk of becoming food insecure. While industrial agriculture may be more efficient and produces cheap food, it requires the use of too many expensive inputs that the poorest farmers cannot afford. It also is unable to build soil fertility and water capacity, and protect biodiversity as organic agriculture does. While organic agriculture can efficiently address food insecurities in Kenya, its adoption among farmers may be limited by the knowledge intensive nature of the model. For organic agriculture to be successful in Kenya, the Kenyan government will have to invest heavily in community outreach programs to teach farmers how to implement organic agriculture techniques. These programs could also be used to address Kenya's gender disparities by teaching communities the socio-economic benefits of allowing women to gain title deeds to their land.

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Resources used:

Table 2: Green boxes highlight the ability of each model to address Kenya’s agricultural conditions in ways that will increase food security, while red boxes show the opposite. Organic agriculture is the most suitable model for expanding food security in Kenya because of its low-cost methods, protection from drought and positive effects on soil quality. While industrial agriculture can raise farmer incomes through export earnings, its inputs and machinery are too expensive to be adopted by Kenyan smallholders, making it a poor model for establishing food security.