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Factors promoting or inhibiting the integration of ecologically modern principles into the Ugandan agriculture industry

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Abstract

Uganda's Plan for the Modernization of Agriculture (PMA) is comprised of strategies and programs to enhance production, processing and marketing of Ugandan agricultural produce and products. In order for the transition of the Uganda agriculture industry to be sustainable, it is important to ensure such things as the maintenance of good soil quality, minimization of the leakage of chemical inputs into the environment, and protection of water and irrigation systems. This research focused on identifying those factors that may be promoting or inhibiting the adoption of such ecologically modern principles into the agriculture industry. These factors influence the industry's political ecology— those political and strategic actions taken by individuals and organizations, which in turn dictate to what extent ecological modernization can occur. The eco-factors, are in the categories of 1) organizational commitments, competencies, and constraints, 2) environmental policies and programmes, 3) industrial ecology conditions, 4) positioning of related businesses, 5) interest groups and organizations, 6) market demand and patterns of utilization, and 7) competitive forces and collaboration. The research identifies several points of intervention that may further encourage the integration of environmental approaches within the Ugandan agriculture industry: improved access to financial capital, access to markets, and capacity building.

Key words: Potential and strategic actions, market creation

Introduction

One of the objectives of Uganda's Plan for the Modernization of Agriculture (PMA) (2000) is to "promote sustainable use and management of natural resources by developing a land use and management policy and promotion of environmentally friendly technologies." According to the PMA (2002) some of the current productivity related constraints are lack of land, soil infertility, unavailability of inputs, and lack of ability to deal with pests and disease. Addressing these issues by opening up more land, using pesticides, and applying synthetic fertilizers, could lead to increased production, but might also go against the environmental objectives stated above, and damage long term sustainability of improved agriculture capacity. To the extent possible, it is important for the Uganda agriculture industry to maintain good soil quality, minimize erosion, prevent the leakage of fertilizers and pesticides into the environment, and protect water and irrigation systems.

The question arises, how can the agriculture industry in a developing country modernize *ecologically*, realizing that the success of the industry relies on available and healthy natural resources? The political ecology of an industry, those political and strategic actions where environmental strategies are entrenched, dictates to what extent ecological modernization can occur. (Archambault, 2004) Orssatto (2001) uses the term *ecological modernization* to describe the movement of an industry towards less environmentally destructive activities, or the movement towards being in line with natural ecological processes. It is unrealistic to expect an entire industry to become ecologically modern suddenly, if ever, but it is possible for different parts of an industry, or decision making within an industry, to begin to adopt ecologically modern themes. The actions of different individuals or organizations are often able to influence or purposely adjust the structure that promotes or inhibits the adoption and integration of ecologically modern techniques into the function of an industry. Understanding the political ecology of an industry sheds light on the motivations and consequences these motivations have on the actions and decision making of an industry. (Archambault, 2004) There are various factors such as (but not limited to) competency of stakeholders, market demands, and public policies influencing this political ecology. Ultimately, these environmental contingent factors promote or inhibit the integration of ecologically modern techniques into an industry.

The objective of this research is to identify the various factors that promote or inhibit the adoption of techniques that integrate themes of ecological modernization into the Ugandan agriculture industry. The goal is not to discover how the entire industry can become ecologically modern, as

this is unrealistic. However, it is possible to understand how ecologically modern principles can be integrated at strategically key intervention points within the industry, improving its overall sustainability. This is particularly relevant as the industry changes in accordance with the PMA.

Methodology

Observations of the Ugandan agriculture industry were made during ten months of 2003 and 2004, while the author was working with development and marketing support activities within the Uganda agriculture industry. In order to analyze the data collected, a tool called *ecological modernization framework* was utilized. The framework has been used to describe many different industries in both developed and developing countries, including a study of the Swedish agriculture industry (Archambault, 2003). The framework identifies seven environmental-contingent factors (eco-factors) that have the potential to change the decisions and behavior of people in and between organizations, which in turn foster or inhibit the ecological modernization of an industry. these include the following:

1. Commitments, competencies and constraints- the ethical and moral commitment and ability, including organizational limitations, of the main stakeholders to implement environmental measures.
2. Environmental policies and programs- the governmental policy structure within which the industry functions.
3. Industrial ecology conditions- the opportunity to use resources to their maximum, while minimizing the disruption to the environment.
4. Positioning of related businesses- the influence of other businesses that directly or indirectly influence the industry being studied.
5. Interest groups and organizations- the influence of organizations that are not directly associated with government or related businesses.
6. Market demands and patterns of utilization- the demands of the market, which can be divided into large commercial buyers, and final consumers.
7. Competitive forces and collaboration-the influence of competition existing between stakeholders within the industry being studied.

In the analysis that follows, each eco-factor, and its role in promoting or inhibiting ecological modernization concepts within the agriculture industry is considered. This analysis considers farmers as the primary stakeholders in the study. It is not a discussion of all the factors that influence the Ugandan agriculture industry; it gives a general understanding of the categories of eco-factors, using specific and general examples. From the analysis, several points of intervention are identified where steps can be taken to further integrate ecological modernization concepts into the Ugandan agriculture industry.

Analysis using the ecological modernization framework

Commitments, competencies and constraints

The motivation and knowledge Ugandan farmers have concerning the protection of the environment from agriculture related impacts are important here. This does not necessarily need to be purely knowledge gained in an academic setting, but it does include traditional knowledge and practices concerning the land, natural resource protection, etc. Commitment may be as basic as the desire to maintain soil fertility. Commitments can be driven by various factors—desire to continue feeding the family, interest in profiting from agriculture output, or something more abstract, such as a religious belief.

If farmers have determined that they are committed to an environmentally oriented idea, like maintaining soil fertility, but do not have the knowledge of how to maintain soil fertility, the soil may be degraded due to lack of competency. If the expertise for maintaining soil fertility does exist in Uganda, say in the development organizations or government agencies, how accessible is this knowledge to the key stakeholders who are carrying out agriculture related activities? If the commitment and knowledge for protecting soil does exist, but the modes of transferring that information to key stakeholders are limited and inadequately organized, then soil quality may not be maintained. Another organizational constraint may be minimal access to the financial resources necessary to adopt new technologies that would help maintain environmental quality.

Environmental policies and programs

Environmental policies and programs may be regulatory, incentive, or other measures administered by various levels of government—central government in Kampala, district government, or local level governments. Additionally, this factor looks at which government-sponsored programs are available to address specific environmental objectives. It also includes policies or programs that have a negative impact on environmental quality.

Likely the most notable program influencing agriculture practices in Uganda is the Plan for the Modernization of Agriculture (PMA). It is necessary to determine how various aspects of the PMA influence or encourage environmental improvements, or alternatively, how aspects lead to decreased environmental quality. As stated earlier, the PMA has mentioned themes of environmental protection in its mission statement.

Government can be influencing the environmental performance of the agriculture sector in as simple a way as passing a law that limits or allows the use of certain chemicals, say DDT. Whether or not DDT is allowed would impact the environment. If a policy to protect the environment is put in place but is not enforceable, a common difficulty in developing countries, the government does not have much influence in terms of impacting environmental

protection through policy making. The need then, is to establish a program for making environmental laws more enforceable.

This factor also considers governmental funding that positively or negatively impacts environmental quality related to the agriculture industry. To look fully into this factor requires an analysis of the government budget. Questions to ask should include, to what extent is the government training local level agriculture development officers on issues such as watershed protection? The presence of local level programs to address agriculture related environmental issues through a sub-county office may encourage the prevention of environmental damage. If the government is investing in the organic agriculture sector, it could be encouraging farmers to use less chemical fertilizers and pesticides. The amount of funding the government puts towards agriculture related activities in the National Environmental Management Authority (NEMA) is likely to have a positive impact on environmental quality. If funding is limited in this area, then it may be an indicator that the government is hindering environmental protection, or doing less than promoting its protection.

This factor also includes the various environmental treaties that the government has signed, and whether or not they are being enforced in a way that influences the environment.

Industrial ecology conditions

Industrial ecology is often considered a win-win situation, allowing for an increase in economic activity while simultaneously contributing to the protection of the environment. However, there can be some barriers to taking advantage of industrial ecology possibilities. This eco-factor considers both the possibilities for and the barriers that hinder the implementation of industrial ecology opportunities. Whether or not industrial ecology can occur, has either a positive or negative impact on the environment.

An example of industrial ecology in the Uganda agriculture industry is the use of animal manure as a source of energy or fertilizer. Manure from livestock can have a negative impact on water environments and air, as it is often carelessly disposed of. However, this damage can be mitigated if manure is processed in a bio-digester, providing a source of methane gas. Methane can then be harnessed as a source of energy for cooking, decreasing the reliance on fuel wood in rural areas, another environmental benefit. The effluent coming from the bio-digester has the potential to be put onto the fields as a fertilizer. (Thy, 2003) This industrial ecology opportunity processes waste in a way that has a lesser environmental impact, while the energy and fertilizer can provide increased economic output.

The ability to access the win-win benefits from this industrial ecology opportunity is not necessarily difficult, but requires the right set of circumstances. There must be knowledge of how such a system works; there must be the capital to construct or acquire the bio-digester and equipment for harnessing the methane; and there must be manpower to make the system work. This eco-factor looks at various industrial ecology conditions, like the one described here. If a particular industrial ecological opportunity is practical and accessible, it can have a positive influence on farmers to improve or maintain high levels of environmental quality.

Positioning of related businesses

Related businesses can be supply companies, buyers, retail firms, etc. that influence the Uganda agriculture industry. The drive of these businesses to be economically stable might give them the interest to control what happens in the industry. If a related business has strong political or economic influence, it can drive an industry to change, or to maintain business as usual. This control could impede or encourage the adoption of environmental techniques within Uganda's agriculture industry. (Archambault, 2003)

Feed supply companies in Uganda are an example of such related businesses. Feed supply companies are interested in selling feed grains to farmers. They would therefore have an interest in the promotion of zero grazing systems. If they have enough power, they might be able to push the government or other organizations to implement policies promoting zero grazing. The same might be the case with fertilizer or pesticide companies. These companies might even be influencing the industry from abroad. They have an interest in expanding their markets, so it is plausible that they are currently influencing decisions or development work being undertaken in Uganda. More in-depth research is necessary to fully understand what influence related businesses have on the Ugandan agriculture industry.

Interest groups and organizations

This eco-factor includes the development oriented NGOs, capacity building organizations, relief agencies, academic institutions, and even financial institutions. (Archambault, 2003) Their actions and interests can have strong influence on the way activities are carried out, particularly in a developing country setting.

The high number of development agencies and other NGOs in Uganda makes this a very influential eco-factor for the Uganda agriculture industry. National Agriculture Advisory Services (NAADS), International Institute of Tropical Agriculture (IITA), Sesakawa Global 2000, Investment in Developing Export Agriculture (IDEA) Project, Agriculture Productivity Enhancement Project (APEP), ACDI-VOCA, National Organic Agriculture Movement of Uganda (NOGAMU), and Uganda National Farmers Federation (UNFFE) are all agencies that have a direct impact on the activities of farmers. If an organization promotes the use of chemical fertilizers, they may or may not encourage sustainable use practices. Other organizations might not promote the use of fertilizers at all, like NOGAMU. What these organizations promote influences the farmers, especially if there is financial assistance involved.

Similarly, some of the most influential actors in Uganda may be donors. Donors have very big leverage in the type of activities that take place in the agriculture industry. If a donor

requires that pesticide use must be accompanied with environmental training that teaches the user proper use methods, it is likely that the training will occur. If a donor says that it will fund organic agriculture projects, it is likely that many farmers will concentrate on organic production, even if they had planned to do something else. Additionally, donors influence the government policies that are put into place. Uganda's PMA is strongly influenced by donor demands.

Market demands and patterns of utilization

Market demands and patterns of utilization consider the assumption that actors within an industry will act as a result of market forces. This eco-factor also considers consumer expectations about certain products—price of products, appearance of products, etc. Also included are characteristics that distort market demands. (Archambault, 2003)

An example illustrating this is the purchasing activity of large buyers of grains in Uganda. It has been said by some that previous quality requirements for WFP were a bit lenient (concerning diseased, discolored grains[1]). (Magnay, 2004) Such leniency may have discouraged farmers in any attempt to improve their capacity to market higher quality produce. Because of what the buyer wants, the farmer will produce in a certain way. For example, there is a large international market for organic produce. Ugandan farmers trying to fill this market niche will grow organic agriculture products, and will likely resist the use of chemical fertilizers and pesticides. If a farmer's primary market is in one of the big open air markets in Kampala, the average consumer wants inexpensive food. So, farmers must keep their costs low, in order to maximize their profits while selling to the masses. Keeping costs low likely means minimizing the application of pesticides and fertilizers.

Competitive forces and collaboration

This eco-factor considers the various competitive positioning of organizations based on the approach of traditional low-cost and differentiation of products. The eco-factor goes a step further, saying firms will also look at the low costs and differentiation processes. The search for competitive positioning might bring about the implementation of environmentally positive, or negative, measures by certain farmers. This factor also includes the collaboration within an industry which occurs in order to improve competitive positioning. (Archambault, 2003)

Fertiliser use is illustrates how this works. Farmers who use fertilizers must make a higher initial investment. However, they are likely to have a larger harvest than those who do not use fertilizer. If the costs are outweighed by the benefits, then it is likely that a farmer will use fertilizers. These farmers produce high-cost—high-value products. Other farmers might concentrate on reaching the foreign organic market, and therefore would grow those products, being demanded overseas, without adding chemical fertilizers. These farmers are considered to have low-cost—high-value products (costs might rise due to transportation and purchasing of seeds). Subsistence farmers who do not set out to target a specific market, but occasionally sell small amounts of excess foods in order to pay medical and school fees, are considered to have low-cost—low-value products. The use of organic fertilizers, from an industrial ecology opportunity, will increase the output of farmers, but keep prices down, providing low-cost—high-value products. See Figure 1 for a graphical representation of competitive positioning for different types of producers.

This eco-factor of competition and collaboration can explain how various parts of the sector could work together to reach a certain market niche. The niche might be the organic agriculture industry in Europe. Ugandan farmers, with the help of the government and NGOs, could encourage

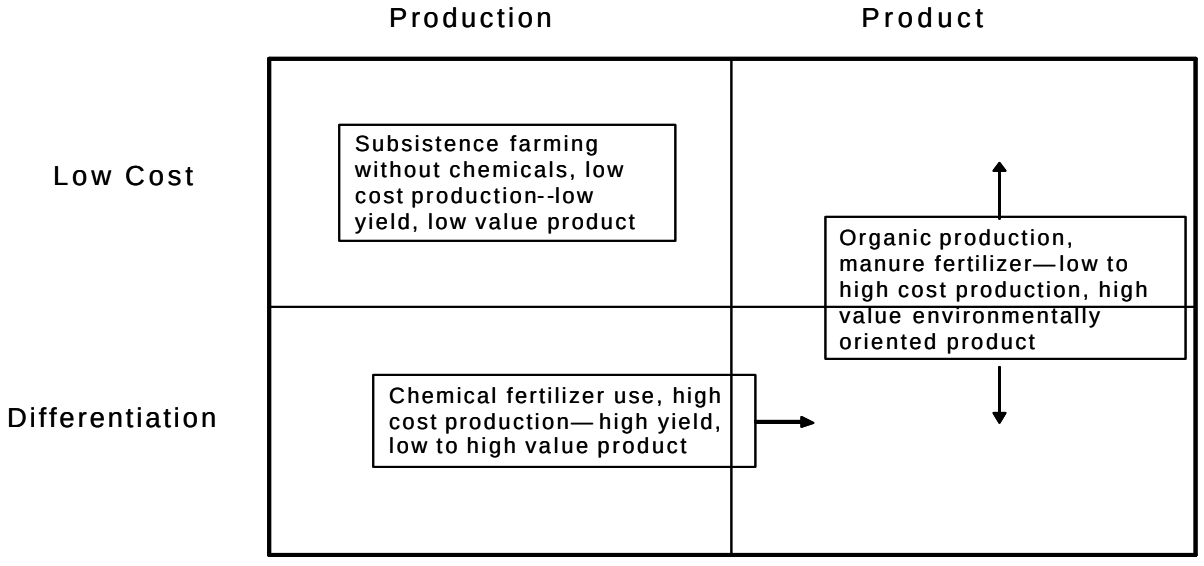

Figure 1. competetive positioning for different types of producers

the maintenance of low chemical input levels in order to brand the Ugandan industry as an entity which specifically targets the organic market.

Discussion

All the eco-factors discussed here contain aspects that influence the Ugandan agriculture industry. Based on the analysis, several themes common to all the factors are observed—access to financial capital, access to markets, and improvements in capacity. The themes give light to those areas where interventions could further promote ecological modernization within the agriculture industry through influencing the political ecology landscape.

Financial capital

As the Ugandan agriculture industry modernizes, access to financial capital, through donors, financial institutions, etc., is important for farmers and farmer groups. Financial capital can assist in building of capacity for farmer groups—proper storage facilities and improved knowledge of techniques to balance increased production with environmental protection. Likewise, of major importance is acquiring resources to purchase chemical inputs, and to ensure their proper application. Financial resources can provide application equipment to minimize health impacts (fumigation masks, etc.), and equipment for reduction in environmental leakages. Proper financing may give farmers the opportunity to begin to establish the infrastructure needed to implement industrial ecology techniques, which would improve their overall income.

Financial institutions, donors, and development agencies have a large amount of influence over the activities of Ugandan farmers, as farmers need cash to improve their capacity and overall economic output. If banks and donors include environmental expectations or demands as a stipulation for receiving assistance, it is likely that farmers, farmer groups, and agriculture institutions will increase their willingness to consider more environmentally favorable techniques.

It is necessary for farmers and farmer groups to have access to capital at lower interests. Many of the current interest rates are so high that there is less incentive for smaller scale farmers to apply for loans, for fear of a long payback period. There have been several discussions among various actors that significant funds exist within the banking sector that are earmarked for agriculture development. It has been said that the government has put some stipulations on these funds, restricting their use to low interest loans exclusively. The funds are supposed to be administered by existing financial institutions, but it is said that these institutions prefer not to use the funds because they would prefer to deal with loans that draw a higher interest. Further investigation should be undertaken to better understand the details of these funds. Regardless of the availability of these funds, providing low interest loans to the agriculture sector could be a worthwhile investment, for banks and farmers alike. One option is that the government sponsor or encourage such low interest loans.

Market access

Market access is a powerful factor that drives decision making and brings in resources to the agriculture industry. It is likely that if there is a market for organic products, the industry will target this market and use fewer chemical inputs. It is necessary for the government and development agencies to continue pursuing programs that allow access to these specialty markets. Also, it is likely that additional markets for high quality export grains will continue to expand. In these cases, it might be most beneficial, particularly in the long run, for farmers to increase the use of chemical inputs. In anticipation of the ever-increasing use of these chemicals, it is necessary for policy makers and development organizations to ensure that measures and policies are put in place to abate the negative impact, and to encourage safe application.

Building capacity

There are many sustainable agriculture methods, including no-till agriculture, which decrease the need to till, maintain better soil conditions, and lessen the need for chemical inputs, while still producing an acceptable level of output. However, these ideas may not be mainstreamed throughout the industry due to lack of knowledge of how they work, and perhaps lack of interest in promoting them by various stakeholders. This is not to say that there are not bodies in Uganda dealing with the implementation of these new ideas. It is necessary for these new methods to be adopted on a wider scale. As a study of political ecology demonstrates, it is necessary to have several factors in place before such techniques will be more widely accepted. The knowledge may be there, but if the academic institutions, training extension workers, for example, do not teach their students these new methods, then it will be difficult for the technique to gain wider acceptance. Instead of teaching farmers the new methods, extension workers may continue to pass along older and less effective knowledge.

It is important too, for the various development agencies at work in Uganda to harmonize their efforts. This is happening to an extent with the PMA and other smaller initiatives. But, it is likely there are many other synergies that could be formed to avoid duplication of efforts, and to make development work more effectively. As an example, one may look at the efforts of the World Food Program's agriculture and marketing support project. In order for effective food-for-assets projects, marketing trainings, and post-harvest handling trainings to materialize, it is necessary for WFP to work together with implementing partners. This idea of harmonizing is not always simple, as issues of time for coordination meetings, and the synchronization of various organizations' activity plans can be a major challenge. Creative ways of coordinating capacity building efforts are necessary.

This research presents evidence as to how a study of the political ecology of an industry can be useful for understanding the interconnectedness and complexity of various aspects of the industry. The eco-factors influencing these aspects, to different levels of significance, promote or hinder the adoption of environmentally-oriented agriculture techniques. A full investigation of the eco-factors will help to identify further those aspects that have the most impact on maintaining environmental quality throughout the agriculture industry. Identifying these most important factors could help uncover points where intervention would help improve the sustainability of the Ugandan agriculture industry as it continues to change form and to expand. Such intervention measures may include the creation of policies, implementation of training programs, determination of which projects should be funded, creation of an NGO work plan, etc. It is also important to point out that certain factors of the ecological modernization framework may vary in different parts of Uganda due to regional differences.

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References

Archambault, S., 2003. Ecological modernization of the Swedish agriculture industry: Factors promoting and hindering the reduction of emissions to the Baltic Sea. IIIEE Reports 2003 1.

Archambault, S., 2004. Ecological modernization of the agriculture industry in southern Sweden: reducing emissions to the Baltic Sea. Journal of Cleaner Production 2004 12, 491-503.

Magnay, J. 2004. Uganda Grain Traders marketing vision. WFP Training Seminar. UGTL, Nakawa, Kampala, Uganda.

Ministry of Agriculture, Animal Industry and Fisheries and Ministry of Finance, Planning and Economic Development., 2000. Plan for modernisation of agriculture: Eradicating poverty in Uganda, Government strategy and operational framework. Kampala, Uganda.

Orssatto, R., 2001. The ecological modernisation of industry: A study of the European automobile field. Doctoral Thesis, Sydney, Australia; University of Technology.

Thy, S., 2003. Management and utilization of biodigesters in integrated farming systems. Masters Thesis, Phnom Penh, Cambodia. Available online: http://www.mekarn.org/msc2001-03/theses03/santhlitrevapr27.htm