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Community Development in Mozambique: Evaluating Impact Assessment Methodologies

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Methodology
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Abstract

This paper is an analysis of an impact assessment conducted by University of Arkansas students and finalized by Abby Davidson during the 2014 Community Development in Mozambique study abroad program. The assessment was based on a developmental poultry organization in the Nampula region. In order to evaluation the assessment several theories of impact assessment were utilized. Construction of a proper counterfactual, the mitigation of selection bias, appropriateness of impact indicators, and validity were all used to consider the methodologies employed in the aforementioned assessment. Based on these criteria it was found that *The Impact of poultry in Northern Mozambique* failed to adhere to several base principles. A true counterfactual was not created to provide a base comparison of the effects of poultry. Also no method as employed to minimize selection bias, and validity could have been improved. The one element that the assessment did adhere to was the selection of two proper impact indicators, employment and income. Due to these shortcomings, three recommendations were rendered. The first recommendation is for a control group to be constructed that includes comparable individuals representing what life would have been like if participants had not entered program intervention. The second recommendation is to employ a simple random sample when administering surveys in order to reduce selection bias by region. Finally, triangulation is recommended to improve validity and give the assessment more robust results. With these three recommendations future assessments of the New Horizons poultry organization will have increased accuracy and will give the business a better understanding of the effects it is having on the region.

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I. Introduction

Per design, project and business ventures are meant to have meaningful effects on the areas and people involved, but one question that often endures is to what extent are they effective. Throughout history, various assessments have been the foundation to which projects and development's success has been measured. One such assessment is the economic impact assessment of the economic effects a given project has on a specified area. Blankenberg (1995), described impact based off "long-term and sustainable changes introduced by a given intervention in the lives of beneficiaries," and further explained that certain elements of impact can be unexpected, unpredicted, and even negative for anyone within the project's area, participant or not.

It is from the definition of impact that the impact assessment is derived. Economic impacts can be measured based off of five major constructs; increased output a business creates, an increase in the GRP of the selected region, overall prosperity of the area in terms of wealth, personal income and wages, and finally employment or job creation (Weisbrod &Weisbrod, 1997). When assessing these measures, it is important to ensure that the difference between impact, outcomes, and outputs is known. Outcomes and outputs measure elements such as effort and effectiveness. Where as impact is focused on the change an event brought upon certain factors than make them different from the original situation (Fowler, 1997)

One of the most difficult portions of developing an impact assessment is the establishing an adequate methodology to properly capture the intended information and ensure that error is mitigated. Difficulties commonly include lack of clarity between the intended goals of a project that the actual impacts it produced, as well limitations in capturing qualitative information. It is due to these difficulties that impact assessments are often weakened, and the true capability of a

project is not displayed (Adams, 2001).

The purpose of this paper is to evaluate the methodologies used in an assessment entitled *The Impact of Poultry in Northern Mozambique* (Davidson, 2014). Upon the conclusion of this evaluation, suggestions will be rendered in order to improve the methodologies of future impact assessments, and ensure that the appropriate effects are captured. In order to accomplish this, an overview of the project is below with the purpose to provide the reader with clarity concerning the nature of the assessment.

1.1 Project Overview

The Impact of Poultry in Northern Mozambique was a project undertaken by students participating in the 2014 Community Development in Mozambique Study Abroad program with the final report and analysis conducted by Economics Graduate student Abby Davidson. The goal of the assessment was to measure the effects poultry has had in the Northern Region of the country, namely the Nampula state. The poultry impact assessment was based off of three businesses in the Nampula region, New Horizons, Mozambique Fresh Eggs, and Eggs for Africa. It should be noted that goal of the three businesses is to serve as a model for developmental poultry that could be translated to other regions of Sub-Saharan Africa (Davidson, 2014)

When analyzing the three aforementioned businesses, the context to which they operate was deemed important. The CIA World Factbook ranks Mozambique as 117th in the world based on yearly GDP and is considered by many to be one of the poorest countries in Africa (2013). Over half of the country lives below the poverty line, and the average life expectancy is 50 years. (The World Bank, 2012)

New Horizons operates on an outgrower model. The business provides chicks and feed, while individuals are responsible for raising the chickens. When the chickens have reached

maturity they are returned to New Horizons and processed for sale. Each outgrower is responsible for building their own poultry house and having the proper infrastructure to raise chicks (Davidson, 2014).

Mozambique Fresh Eggs operates on an outlayer model, similar to the outgrower model. Outlayers are again responsible for the physical structure for the layers, while the layers themselves and feed are provided. The produced eggs are collected, combined with eggs produced on site, and then marketed by Eggs for Africa (Davidson, 2014).

Methodology.

The impact assessment metrics were gathered through a set of surveys aimed at measuring different aspects of the effects of poultry. The first survey was for contracted outgrowers associated with New Horizons, while the second survey was for individuals employed by one of the three organizations. Data collection was administered starting May 20, 2014 and concluded June 12, 2014. The surveys were administered to 41 outgrowers and 26 employees during a period when the total outgrower population was 190 and the total employee population was 450. Out of the 190 outgrowers, only individuals completing 15 or more cycles were interviewed. A cycle is typically 6 weeks and concludes the chick-growing period. This decision was reached due to the considerable amount of time required for effects to be evident through the selected measures (Davidson, 2014).

The survey focused on measuring four indicators of economic status. These included health, transportation, education, and housing. Questions about basic demographics, previous employment, and living conditions were also asked. An interpreter was utilized to translate verbal questions given in English to Portuguese. Surveys were administered to individuals as

well as couples who had jointly invested in the poultry venture based on availability and willingness (Davidson, 2014).

Results.

Outgrowers. Of the outgrowers surveyed, most had over seven people living in one home, and, on average, supported 12 other individuals. Most had been able to increase their poultry production per cycle, up to 2,398 from 1,512 on average. 85% were able to make improvements to their poultry house that helped the process. The average annual income of the individuals surveyed before they began raising poultry was reported as 4,385 MZN ($132 US). After partnering with New Horizons, the average cycle income was 7,950 MZN ($240 US).

When considering housing, 77% had been able to make improvements to their homes such as add a metal roof or concrete walls. Many outgrowers, 70%, had made the choice to build a new home instead of make improvements to the existing one. Of the out growers surveyed, 38% were able to purchase a motorbike for transportation with the increased income they were earning, and 92% reported having increased health and wellness. Over 60% of those surveyed indicated that it was easier to send their children to school, and 75% reported that their children performed better while at school due to increased nutritional value of their food intake (Davidson, 2014).

Employees. The second survey, which was administered to employees, was slightly different than the survey administered to outgrowers due to the differing socioeconomic status many employees occupied before employment. Of the 26 employees surveyed, the demographics slightly differed from the outgrowers surveyed. The average age 33.3 and the average number of dependents was considerably lower at 6.1. In the areas of housing, transportation, and health, the employees indicated similar results to outgrowers. Eighty four percent reported making

improvements to their homes. Over 70% were able to acquire a new form of transportation and 88% indicated that their health had improved after starting work with one of the three companies. When asked about knowledge acquired during employment, 88% reported improved technical abilities and 34% indicated that their professional attributes had also improved. Over half of the employees surveyed also indicated that they plan to improve their homes in the future and 46% are looking to make career advancements in the future (Davidson, 2014).

II. Literature Review

In the instance of impact assessments, one of the main problems encountered is designing and executing appropriate methodology. There are several frameworks in existence for the methodology of impact assessment, each having a slightly different take on the process.

In the World Bank's *Handbook on Impact Evaluation,* impact assessments are first to be classified as either having quantitative or qualitative goals. Once the decision is made regarding which method is most appropriate, the next evaluation is whether or not the assessment will be Ex Post or Ex ante. Ex post assessment's goal is to measure the effect of a project that is already in effect while ex ante assessments center on predicting the impacts of a project or intervention that has not yet been implicated. The subsequent step of the framework for evaluation is the development of a counterfactual that appropriately captures the right control group. The final goal that is set for impact assessment is to minimize selection bias through one of the following ways: "randomized evaluations, matching methods, double-difference methods, instrumental variable, regression discontinuity design and pipeline methods, distributional impacts, and structural or other modeling approaches" (Khandker et al., 2010). If selection bias is minimized and the proper counterfactual is constructed, then the true treatment impacts can be better observed (Khandker et al., 2010).

The International NGO Training and Research Centre (INTRAC) complied its own framework for the methodology of impact assessments, *NGOs and Impact Assessment*. Foremost, adequate planning is a key element in the assessment process. In a perfect situation, the assessment process should be part of regular business for any program; however, this may not be a widespread practice when evaluating programs. Furthermore, the importance of participation from stakeholders is key in ensuring that the impact assessment ultimately has an effect on the business or program. According to Adams, the next issue that arises is the nature of

the information desired, qualitative vs. quantitative, and determining the suitability. Both forms

of data are meaningful by answering different questions. Often a conjunct of moth methods can

give conclusive results. Once a direction has been chosen, triangulation is recommended in

order to provide the given assessment with objectivity and to reduce bias. Triangulation does this

by verifying data and results numerous sources. The next step in the process is the construction

of an impact assessment team rather than pursuing completion individually. This brings different

views to the assessment while also having multiple sources to check for validity. After a team is

assembled the appropriate indicators need to be selected. Indicators should be kept to a minimum

in order to allow for completeness. Attempting to analyze too many factors can dilute the final

report. The final aspect of methodology presented by Adams is to have a data scoring system in

place. With a scoring system for data, comparison between reports becomes easier and allows the

assessment to stand through time (Adams, 2001).

      The Institute for the Study of Labor (IZA) developed a framework for evaluation based

on what they term a "Causal Chain Analysis;" (2010) a process consisting of three main phases.

The foremost step being determining if there is a basic causal relationship between the treatment

and the predicted results and if that relationship is predicted to be significant. The second step is

determining if impacts can actually be observed and whether or not sufficient data is present. If

data is not present there are other methods of collection that can be utilized. Tapping sources

such as focus groups and interviews can employ the collection of qualitative information.

Surveys are also a method and are commonly used based on the virtue of adaptability to

appropriate subject matter. The last option for data collection is to design an experiment to test

the effect of a project/intervention of a specified amount of time. After data has been observed or

collected, the final step in the process is the quantitative analysis of the data (Maarten de Vet et al, 2008).

In *Sustainability Impact Assessment: Methodology for assessing the impact of development projects and programmes,* Kirkpatrick, brings an interesting light to the methodology used across numerous types of assessments. Scoping is recognized as an important part of methodology in that it highlights the possible cause and effects routes that the assessment portion of the report should verify or disprove. Furthermore, in the assessment itself, the negative impacts that are found should be discussed in order to provide the opportunity for improvement. These aspects are important due to the purpose of an impact assessment being to help realize the effects of a program or treatment, not just the improvement in participants' lives (Kirkpatrick, 2002).

The last impact assessment methodology framework to be discussed is present by the World Business Council for Sustainable Development (WBCSD). *Measuring Impact: Framework Methodology*, gives broad guidelines for assessment based on four key elements. The first element of an assessment should be an appropriate explanation of the business being analyzed and objectives based on what needs to be accomplished. The second element presented is measuring direct and indirect impacts that have resulted from the business/project being observed. This process entails selecting adequate indicators that have the ability to be observed over time and selecting quantitative and qualitative ways to measure those indicators. The third element to the framework is analyzing the business's contribution to the development process based on the measurements gathered in the second step. The fourth and final element in this process is to encourage the assessed business to utilize the impact assessment findings in improving and continuing their business (WBCSD, 2008).

Ultimately, several mutual themes are etched across the literature discussed. The first theme is the importance of information. Knowledge about the business and the conditions before the intervention or project was introduced is key to asking the right questions. Without the right questions an adequate control group or counterfactual cannot be constructed. The second theme present in multiple sources is the importance of selecting sufficient indicators to measure the impact. Without the proper indicators the magnitude may not be properly represented.

III. Methodology

Based on applicability, appropriate aspects of current frameworks for impact assessment methodology will be reviewed and then used to evaluate the assessment, *The Impact of Poultry in Northern Mozambique.* This evaluation will be focused on the theory of impact and criteria compiled by The World Bank in compilation with data strength indicators. According to Khandker, Koolwal, and Samad (2010), the basic theory of Impact evaluation is how to properly cope with the inability to collect all the needed data. To combat missing information, a successful assessment will accomplish two things. The first is establishing an adequate counterfactual, or control group, and the second being the avoidance or minimization of selection bias (Khandker et al., 2010).

Designing a proper counterfactual can be difficult due to the fact that it is hard to quantify what would have happened to program participants without the intervention of the program. One approach is to construct a comparison group of untreated individuals that have similar living conditions and practices as those participating in the program. The second approach to creating a counterfactual would be before-and-after comparison, or a reflexive comparison, to determine the differences for each observed individual and use those differences to make inferences about the who program. This is not regarded as the most precise or accurate method due to the time series nature of the data and possible uncontrolled factors (Khandker et al., 2010).

Selection bias has the opportunity to alter the measurement of impact and one of the fundamental goals of an assessment is to minimalize this. Selection bias often occurs due to individuals opting to put themselves in the program, or specific individuals being chosen to participate in the program. The first approach to combating selection bias is randomization. Random assignment eliminates selection bias by randomly selecting individuals to be in the treatment program and then the impact of said program will be evaluated through the

measurement of the treatment effects. Random assignment is an option only if an experiment is to be implemented and the impact assessment will not be based off of observational data. In the absence of an experiment, other methods, such as matching, can be utilized to evaluate effects. Matching methods focus on pairing program participants with non-participants based on specified characteristics. The most common matching method is Propensity Score Matching, which forms pairs based on the probability of being selected to participate in the program (Khandker et al., 2010).

Once groups have been allocated and assigned, the issue of what appropriate measures to utilize comes into play. The aforementioned five economic measures of impact: increased output a business creates, an increase in the GRP of the selected region, overall prosperity of the area in terms of wealth, personal income and wages, and finally employment or job creation, need to be considered in congruence with the ultimate purpose of the assessment. When information is going to be presented to the public to indicate the impacts of an already existing project or intervention, metrics such as jobs created, cumulative sales, and increased income are common measures. These measures tend to be understood by most people and can give the results context (Weisbrod & Weisbrod, 1997).

Finally, once the appropriate measures have been chosen, the last hurdle to overcome is validity. Cohen and Manion (1989) discuss five types of validity that can judge the strength of impact assessment methodologies. The first is face validity, which is the extent to which the methods of collecting data are capturing the intended information. The second is bias in data collection, which would lead to data being skewed in a certain area. The third is convergent validity. Convergent validity is present when a relationship exists between two indicators that should have a relationship such as income and housing. The fourth is internal validity and this

type is the extent to which the results truly reflect the individuals who participated. The fifth and final type of validity is external validity and it focused on the potential for replication of an assessment (Cohen & Manion, 1989). Triangulation is a technique that can be used to improve validity through the validation of results by employing multiple sources, therefore, most considered it a good practice to have multiple methods of data collection (INTRAC, 2001).

IV. Evaluation

The Impact of Poultry in Northern Mozambique assessment reached many of its intended goals, but also had shortcomings in several areas. Many of the issues that presented themselves during the project or after data collection were due in part to limitations for resources and time and these limitations should be considered when analyzing the methodology of the assessment.

Foremost, a true counterfactual was not constructed. There were some aspects of reflexive comparison due the nature of many of the questions, which prompted the respondent to indicate differences in previous measures to current measures. However, the assessment methodology did not include the aggregation and survey of a group of individuals who were not participants in the poultry organization. This could lead to interesting comparisons with the selected measures due to the fact that individuals driven to participate in the poultry program could be individuals that previously had relatively high incomes compared to other non-participants. If this were true, then the real impact of the poultry business is smaller than the estimated impact due to the fact that people who chose to participate in this program are very driven to success and would have improved their productivity somewhat just by being more experienced.

Moreover, there was not a technique employed to avoid selection bias. Due to the fact that this was a retrospective assessment, randomization of the treatment of the poultry intervention was not an option. However, a matching technique could have also been applied. To do this outgrowers survey could have been paired with individuals not participating in the program that are in similar living conditions. This would allow for the comparison between the groups in order to measure the effect of the poultry intervention instead of inferring about the difference as done in the previous assessment. Furthermore, of the possible outgrowers to collect data from there was not even a simple random sampling technique employed. Outgrowers were

interviewed based on convenience of location and time with many of the individuals being in concentrated areas. This definitely had the potential to shape the results to the relationships between the outgrowers and the possibility of selecting people in very similar situations.

In the instance of the measures that data was collected on, the assessment did in fact cover several major indicators of economic impact previously mentioned. Changes personal income and wages were measured through the survey, and jobs and employment created through the poultry operation were figures included in the impact assessment. Two indicators, the increase in the GRP of the selected area and the overall prosperity of the region, were not included in the assessment. The lack of this information can mainly be attributed to the limited time frame allocated for the assessment to be completed as well as the difficulty of data collection in the region.

Finally the validity of the assessment and the data collected need to be discussed. In the instance of face validity there are some points that need to be brought to light. Due to the fact that a translator was used to administer the survey, there are potential issues with the information being misinterpreted or the incorrect questions being asked. There are large cultural differences in Mozambique compared to the United States and even if a westerner understands the question a certain way, some one from a different background may interpret it with a different perspective. To mitigate this as much as possible the impact team did have a lengthy discussion with the translators to ensure that they both understood the purpose of the questions, however, some errors could still exist.

Bias in data collection was previously discussed above and could exist due to the lack of a sampling technique. Convergent validity can be said to exist in the assessment, however, because many indicators such as income, health, and education showed a relationship as

expected. With an increased income, individuals were able to improve their homes and send their children to school. In term of internal validity there were strong claims made based on the data, and these could be made stronger by the presents of a sampling technique. Ultimately, based on the interactions that took place in country with numerous individuals who were not survey but part of the poultry organization, the assumption can be made that the results are mostly representative. The impact assessment that was administered in Mozambique was on a small scale and catered towards poultry; therefore, if those conditions were present in another location, then external validity exists. However, this methodology might not translate well to assess the impact of a business or organization in another industry or in vastly different economic conditions.

4.1 Recommendations

Based on the above analysis, there are three main feasible recommendations to improve the data collection process and the strength of the assessment.

The first recommendation is to construct a control group. This task may not be as difficult as originally thought due to the fact that the impact team visited small communities where only a few outgrowers were present. Other families or individuals were present that were not participating in the poultry business. A survey could easily be administered to these people, allowing for comparison between the treatment survey and the control group survey. The individuals may or may not be experiencing the impacts of the poultry program; however, having some data for comparison is a slightly better alternative to having no data.

The second recommendation for the methodology is to utilize a simple random sample when selecting outgrowers to collect data from. As noticed in country, the location of the outgrower could have effects on the success of the poultry; therefore having groups of surveyed

individuals within very similar conditions could have affected the data. The random sample would still allow the team to move and administer the survey by regions, but the team would be seeking out specific individuals rather than completing as many surveys as possible with the people available.

The third and final recommendation is to utilize triangulation to increase validity. Questions about the reception of the survey through a translator could be minimized if other sources were utilized such as focus groups. Employees and outgrowers could be gathered to participate in a facilitated discussion about their experience and changes in living conditions with the poultry organization. This would provide a validation source for many of the questions asked in the general surveys administered. Many of the quantitative figures could have also been verified by company data, as well as information from other projects being conducted in congruence with the impact assessment. New Horizons does collect data on the outgrowers and employees such as cycle revenue, chick mortality, and feed consumption. These figures in compellation with the data collected through the assessment can provide more robust indicators of the impact of the business.

V. Conclusion

In conclusion, the conditions and environment where this impact assessment took place need to be considered before suggestions are rendered just as they were considered during the analysis. There is a difference between statistical and practical significance. Although errors may have occurred and certain protocols neglected to be adhered to, the information collect does have value. This assessment was conducted with limited resources and a data collection time frame of only three weeks. Furthermore, although the measuring the impact of New Horizons was a goal, the final report was also geared towards presenting information that would be suitable for future investor relation's documentation. Under similar conditions, the main elements that have the potential and practicality to be improved upon were covered under the three recommendations.

In the future if an assessment of this nature is conducted in the same or similar location, a simple random sample of the outgrowers and employees could easily be done to ensure that bias is minimized. This has the potential to make the assessment more robust and ensure that progress had indeed been made in the time intermittent the two assessments. Moreover, developing a survey or interview process for people who are not involved with the poultry business could give the perspective of what life is like in the region outside of the this type of employment/organization. Qualitative measures as well as quantitative measure could be useful in order to give the assessment a different perspective on life out side of the New Horizons organization.

Conclusively, *The Impact of Poultry in Northern Mozambique* report has significance for the New Horizons business and individuals interesting in learning about the organization. In the event that a few alterations are made, a small-scale impact assessment could be conducted again in the future and have improved statistical significance due to adherence to proper techniques.

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