Globalization of Agriculture and its Effects on Small-Scale Farmers in Haiti and Jamaica

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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Introduction

The current state of agriculture in the Caribbean region can largely be explained by its past as a colonized plantation economy that exported most of its agricultural products to Europe. This resulted in a neglect of domestic agriculture development causing the region to become a net importer of food, posing a risk to the profitability of small-scale agriculture and food security in the Caribbean (Timms, 2008). Commercial agricultural enterprises have been able to capitalize on the government funded research to develop novel techniques and tools for industrial farming operations, allowing them to increase production without having to pay for the research needed to do so. Research subsidies are mainly paid to farmers in northern-hemisphere countries that export a majority of their product. These large-scale farms can export their product around the world at scale for a fraction of the cost leaving small-scale farmers vulnerable in the markets. A decreasing number or complete loss of small-scale farmers in the Caribbean would be detrimental for the food security, culture, and society of the region. For these reasons, the impact of the globalization of agriculture on small-scale farmers in Haiti and Jamaica is analyzed using a neo-colonialism framework with focus on responsible research and innovation. I propose that through the means of influencing agricultural development policy and dominating the field of research, wealthier nations are taking advantage of Haiti, Jamaica, and countries like them. This paper consists of an analysis of agricultural development policy in Haiti and Jamaica as well as a bibliometric analysis of agricultural literature. The two cases analyzed show the spectrum of how the issue of agricultural development in the region can be approached. The first case looks at a Haitian post-disaster development plan in which small-scale farmers are epistemically excluded from policy discussion while internationally funded commercial export farms are prioritized. The second case focuses on the Rural Economic and Development Initiative in Jamaica and the

benefits of empowering rural communities though building capacity and recognizing local knowledge. The cases and bibliometric analysis show the current state of research domination of the northern-hemisphere as well as how this epistemic divide trickles down into policy decisions and greatly influences the prosperity of the region.

The Caribbean Small-Scale Farmer

Agriculture plays a primary role in the economy of the Caribbean. Presently, the agricultural sector of the region is becoming more diverse due to a dramatic decrease in demand for Caribbean export crops by the European Union. This shift in demand allows Caribbean farmers to produce a wider range of crops since they are no longer required to meet export quotas for cash crops. While agriculture is not extremely prevalent in all countries in the region, countries such as Haiti, Dominica, Guyana, and Grenada have large agricultural sectors which contribute to 7% to 17% of total Gross Domestic Product and between 10% to 50% of employment (Food and Agriculture Organization [FAO], 2019). Despite this, the region is currently a net importer of food averaging between 60% to 80% of all consumed food being imported. The remainder of food required for domestic consumption is supplied by small-scale farmers (Graham, 2012). This difference between imports and exports has arisen in the past 40 years due to increasing globalization causing local food sources to become unable to compete with cheaper imported food from larger industrial agricultural operations (Barker, 2001). The Food and Agriculture Organization defines small-scale farmers as those who are in the bottom 40% of land ownership and economic revenues at a national level (FAO, 2018).

Traditional small-scale agriculture in the Caribbean relies on local knowledge that is passed down through generations. This information is passed down by individual farms as well as at a much wider community and even country-wide level. Farmers benefit from this passage of information in many ways including how to determine correct farming techniques for the local land, how to manage soil fertility, and approaches for natural pest control (Beckford & Barker, 2007). In the Caribbean region, most small-scale farms are found in rural areas which generally have lower incomes, which when paired with their reliance on imported food for a majority of their nutrition, leaves these people vulnerable to economic and environmental factors that can eliminate their access to affordable healthy foods (Graham 2012).

State of Agriculture

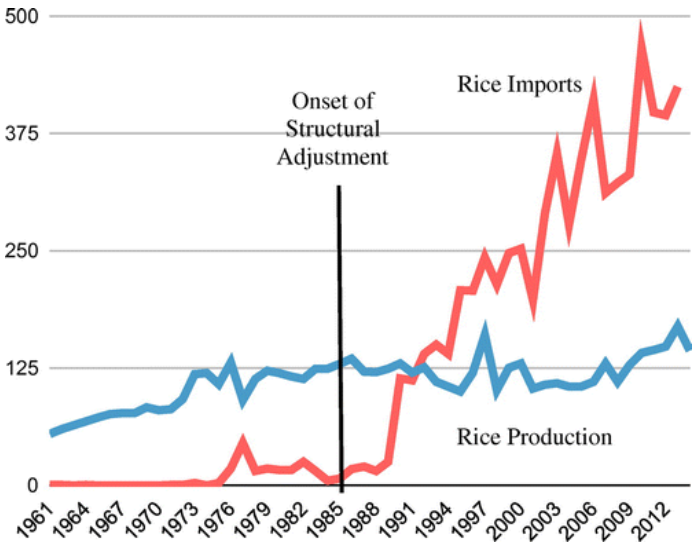
Although Haiti has been seeing a decreasing prevalence of undernourishment, over half of its population still remains undernourished due to population growth outpacing development. Haitian food insecurity is largely related to its high poverty levels and low economic growth. Recent studies have suggested that over 40% of the nation's population lived on under US$1 a day in 2011. These factors are not helped by large recurring natural disasters such as droughts, tropical storms, and earthquakes that damage key infrastructure needed to support the population (FAO, IFAD, & WFP, 2014).

Agriculture provides approximately half of the jobs nationwide and is responsible for about a quarter of the gross domestic product. Small-scale farmers make up less than 10% of the total population and their average farm size is less than 1 hectare. These farmers face issues such as insecure land tenure, urban encroachment, and limited arable and irrigated land. Due to these

issues in domestic food production in combination with the increasing population, Haiti is increasingly dependent on food imports. In 2010, Haitian food imports represented 44% of total food availability while only three decades ago food imports represented only 19% of available food. Food staples such as wheat and rice that the country could once independently produce, are now completely imported. Figure 1 shows the annual rice imports and production in Haiti and the dramatic increase of rice imports from 1990 to 2012. Food imports cost Haiti over 50% more than the country received from total exports (FAO, IFAD, & WFP, 2014).

Figure 1

Haiti's rice production and imports (in 1000s of tonnes), 1961–2014



Note. Source for data: FAOSTAT, Haiti Rice Production. Figure from Steckly & Weis 2015

The Jamaican agricultural sector is riddled with inequality in terms of location, area, and market access. Agriculture does not make up a major component of Jamaica's GDP, but the sector employs approximately 18% of the population and almost half of the population lives in rural areas, making it an important part of the country's economy (Shik, Boyce, & De Salvo,

2017). Small-scale farmers are classified as those holding between 0.15 and 2 hectares of land and make up around 77% of the registered farmers in the country (Ewing-Chow, 2020). However, they are confined to the rugged mountainous interior of the island while large-scale farms occupy the fertile coast line. Additionally, large-scale farms only make up about 1% of the total number of farms but occupy about 39% of farmland in the country. In terms of market access, small-scale farmers produce mainly root crops and vegetables, which are mostly distributed within the domestic market, while large commercial farms produce high value export crops like sugar, bananas, and coffee, which are sold internationally for large profits (Jamaica, 2003). Due to this focus on export crops, the country's farmers are unable to domestically produce enough food for the nation and imports around 26% of all food consumed (Karfakis, Løvendal, & Jakobson, 2011).

Country Selection

Haiti and Jamaica were chosen in this study since they are both small island developing states in the Caribbean that are vulnerable to external economic shocks in food markets due to their reliance on imported food, large rural populations, and similar colonial roots. These similarities, along with their differing foci in agricultural policy, make them an ideal case study to investigate how small-scale farmers are being impacted by globalized agriculture and whether or not they are being socially or epistemically included in policy decisions.

Commercial vs. small scale

Due to their scale and technological advancements, commercial farms are able to produce massive volumes of crops at a low price. However, this comes at a cost to the quality and diversity of what they can produce. In addition, the concentration of production creates more risk

for the supply chain if these regions are impacted by an extreme natural event. Individual small-scale farms face this same risk but since they are independent, the supply of food is not likely to be at risk due to a single event. Small-scale farms are better able to meet shifts in demand and promote biodiversity; however, their smaller scale also leaves them less likely to be able to adopt the newest farming technology (Luzzini, 2019).

Neo-Colonialism and Responsible Research

History of Colonialism in the Region

Both Haiti and Jamaica have troubled pasts dealing with slavery and colonization by European nations. “Discovered” by Columbus in 1492, Haiti was only shortly held by Spain before being passed on to France. Under French occupation the country became the largest exporter of coffee and sugar to Europe. However, this economic success for France came from the work of around 800,000 African slaves. It was not until 1804 that Haiti declared itself independent from France after fighting a long bloody civil war. In order to receive diplomatic recognition from France, the new republic had to pay its former colonizer 150 million francs. To pay off the debt, Haiti had to borrow large sums of money from American, German, and French banks at high interest rates which forced the nation to spend about 80% of its national budget on loan repayment. This debt crippled the economy and was not paid in full until 1947. Through these debts, Haiti became trapped in neo-colonial relationships with only more foreign aid to assist them (Henley, 2010). Jamaica, also “discovered” by Columbus, has a similar colonial history. Passed from Spanish to English control, the island became location for highly profitable sugar and tobacco plantations worked by slaves. Jamaica also had multiple wars for

independence but none were as successful as Haiti's. It was not until 1962 that Jamaica was granted its independence from England ("History of Jamaica", n.d.).

Using a neo-colonial framework, this paper will analyze the impacts of industrial agricultural practices on small-scale farmers in the Caribbean. Neo-colonialism is the use of economic, societal, or other pressures by former colonial masters and powerful nations to control the development and prosperity of another country (Segell, 2019). One aspect of neo-colonialism is the dismissal of local perspectives and traditions in order to promote activity that is beneficial for the neo-colonizer. For instance, this could include the exclusion of local groups in research and policy creation as explained in "Responsible innovation as empowering ways of knowing" by Valkenburg et al. (2019). In this piece, Valkenburg et al. discuss the importance of responsible research and innovation (RRI) in developing regions of the world. The goal of RRI is to make the governance of science, technology, and innovation easier to access for the groups that they represent and to empower people to contribute their own knowledge and ontologies. Within RRI, 'inclusion' and 'responsiveness' are key factors which encourage knowledge inclusion of participants. The authors make a point to differentiate social inclusion from epistemic inclusion. Social inclusion consists of ensuring that people are able to overcome economic, political, and social barriers that prevent participation in governance processes. Epistemic inclusion deals with ensuring a group of actors with different backgrounds and knowledge bases can meaningfully contribute to innovation, governance, and the production of knowledge. The idea of inclusion assumes a core site where decisions about governance of innovation occur and a voiceless periphery (Valkenburg et al., 2019). The authors relate this back to the idea of unmarked categories from Haraway's 1988 "Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective". Unmarked categories

consist of the dominating class who is privileged enough to define the classes of society and determine how they matter while remaining the default themselves (Haraway, 1988). Ideally, local researchers and citizens should be both socially and epistemically included in the advancement of technology and research in the region. This kind of inclusion empowers groups and individuals to contribute their unique perspectives and fully participate in governance and research. Contributions of unique local perspectives, instead of those from foreign parties, ensures that the research being done is what is most beneficial for the local population and stakeholders.

Differing Solutions

In Haiti and Jamaica there are differing strategies to bolster economic and agricultural independence. This section will delve into the contrasting approaches both nations are currently taking to achieve this goal. The Haitian approach aims for urban and economic development which is incompatible with the goals of Haitian small-scale farmers while the Jamaican Rural Economic Development Initiative (REDI) aims to empower small-scale farmers through rural development plans and rural tourism. These two examples include differing amounts of domination from foreign stakeholders and levels of epistemic inclusion.

Haitian Post-Disaster Development

Haiti, as a nation, has been victim to multiple devastating natural disasters in the 21st century. One particular example is the January 12, 2010 earthquake which was an immense human and economic tragedy. This earthquake left the capital of Port-au-Prince devastated, killing about 220,000 people and leaving another 1.5 million homeless (“Haiti Earthquake”,

2022). In order to rebuild the nation, the government established a development agenda with the focus macro-economic stability and poverty reduction through increasing the nation's export capacity. The main export industries emphasized in this plan are textiles and agriculture, both of which receive massive investments from foreign entities (Steckly & Weis, 2016).

The adoption of an agro-export industry is dependent on the country's ability to modernize the agricultural sector. For Haiti, the development plan focused on improving infrastructure, establishing an official land registry, developing large-scale orchards, and pursuing higher value export crops. The Haitian government allocated US$30 million for road building within the first 18-months of the earthquake as well as committing to an additional US$600 million over an extended period. These investments were made with the claim that they would reduce post-harvest losses, which at times, could be up to 35%. However, they focused mainly on improvements to major highways that are most frequently used by government officials, Non-Governmental Organizations, and larger agricultural operations. Rural roads that connect the rural farming population remain in poor condition and contribute to post-harvest losses of small-scale farmers (Steckly & Weis 2016). The buildup of highway road systems without an additional focus on rural infrastructure shows a dismissal of the perspectives of rural land owners. Through their political and economic influence, government organizations and foreign NGOs were able to push projects that increased access to their goal of a modernized commercial agriculture industry while excluding the rural populations from the benefits of the projects.

In order to increase the value of agricultural production, Haiti's development plan seeks to replace small-scale farmers with large consolidated farms and to produce higher value export crops. Haiti has no functional land registry system meaning that there are no records of who

owns most of the private land. This remains a significant barrier for the modernization of agriculture in the region because around 60% of the private land lacks an official title. Establishment of a land registry and clear property rights enables the Haitian government to facilitate capital investment from foreign or domestic entities into large-scale projects like commercial farms by creating and claiming ownership of land parcel titles which can then be given to commercial farms. As commercial agribusiness operations attempt to expand into rural regions, conflict is generated between them and local farm owners (Steckly & Weis 2016). This practice is incompatible with the development goals of traditional small-scale farmers as it dispossesses them of their land rights and collective farming potential.

Haiti's governmental actions in their redevelopment agenda show a clear disconnect from the goals of local farmers and those making policy and handling foreign investments within the country. Many peasant leaders have expressed concerns that the development policies being put into place ignore the peasant perspective and will only accelerate rural displacement. The root of the issue is that all of the post-disaster agenda and investment plans were created without any input from peasants or peasant organizations (Steckly & Weis 2016). The peasant class was both socially and epistemically excluded from the creation of the policy. Relating back to Haraway's 1988 "Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective", in this situation the unmarked group is the government and foreign business interests which are the core site where decisions about governance are made without input from the periphery. Without being able to contribute their own knowledge and ontologies to the discussion, the peasants effectively became what Haraway would consider a marked group and seen as obstacles to a 'modernized' Haitian economy that must be changed, illustrating a core aspect of neo-colonialism. Foreign entities with economic interest in developing Haiti influenced

policy to promote the bolstering of the agro-export economy which is beneficial to them while it is in direct opposition to the traditional subsistance small-scale farming which is beneficial to the people of Haiti.

Jamaica Rural Economic Development Initiative

The Jamaican REDI has similar goals of stabilizing the economy and reducing poverty as the Haitian post-disaster development plan. However, this initiative recognized the importance of keeping rural and urban economic development at the same pace and the importance of local knowledge. The project's development goal was to expand the market access of small-scale agricultural producers as well as rural tourism and service providers and consisted of three main components: increasing rural subprojects and tourism, creating capacity and technical assistance, and creating robust project management. The project was largely successful, generating many benefits for participating rural farmers and tourism providers. Subprojects investing in disseminating modern agricultural technologies and techniques increased yields by up to 400%. Coupled with support from REDI, increased yields enabled 86% of rural enterprises involved to expand into new markets which grew profits by five to ten times pre-REDI incomes (World Bank, 2021).

One main aspect of the Jamaican REDI that sets it apart from the Haitian post-disaster development plan is its goal to create economic stability through empowering rural communities instead of strengthening the export economy. REDI accomplished this in two ways: supporting business development and providing training for small scale farmers on a variety of topics. To support small-scale agricultural producer's businesses, REDI helped them gain access to new markets to sell their products. In some cases, small-scale agricultural producers have been able to secure contracts to supply locally grown food to large tourism facilities that previously relied on

imported food. Witnessing deals such as these have shifted the perspective of many small-scale farmers, encouraging many to look at agriculture as a business and seek out new market opportunities. REDI assists these farmers in building the capacity of production and business knowledge that they need to thrive in these markets such as creating profitable business plans and legally registering farm cooperatives (World Bank, 2021).

REDI has played a large role in building the capacity of small-scale farmers through hands-on training. The initiative offered training on technical farming aspects like installing and maintaining drip irrigation systems, building greenhouses, and agricultural best practices. In the case of building greenhouses, REDI provided training and equipment for 20 communities to construct their own greenhouse structures. After seeing the success of the initial greenhouse projects, an additional 20 communities wanted their own greenhouse clusters. Without further assistance from REDI, the initial set of farmers were able to construct the additional greenhouses and teach the other communities what they had learned (World Bank, 2021). This example illustrates a successful case of RRI in practice. By teaching the initial set of farmers how to build and maintain the greenhouses instead of building them for the farmers, they built a knowledge base that the farmers could then circulate and integrate into their communities, reducing the risk of epistemic exclusion between the marked and unmarked categories.

The underlying factor that made REDI so successful in Jamaica was its inclusion of small-scale farmers during the development of the project. This project connected policy makers to rural leaders and included them in the decision-making processes. Social inclusion ensured that the outcome of the policy was one that benefited all of the stakeholders involved. Epistemic inclusion, through combining the knowledge of the rural farmers, economists, policy makers, and

scientists involved in the project empowered all groups to be able to meaningfully contribute to the development of the policy and to shape the future of the country together.

Bibliometric Analysis

Construction of bibliometric search query

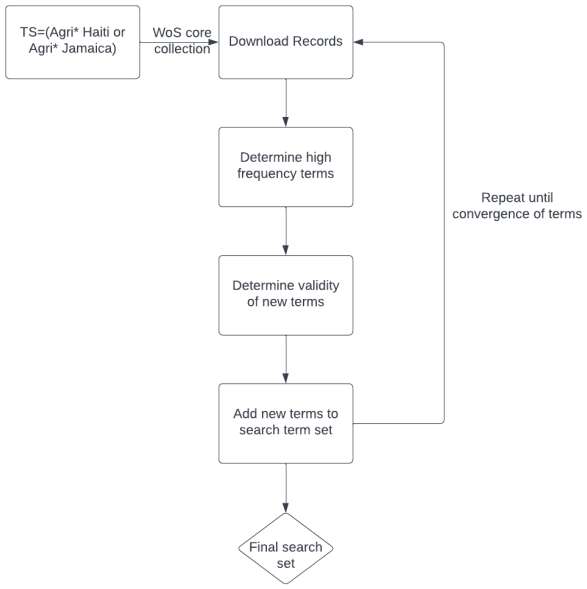
Bibliometric studies are often used to study the trajectory of science and technological development by identifying publications and identifying their interactions within the field. This is often measured by research output metrics such as publication counts, citation counts, and other measurements derived from bibliographic information. Other data that can be analyzed includes authors, publishing institutions, keywords used, and date of publishing ("Bibliometrics", 2021). One commonly used bibliometric search method is lexical keyword-based searches. These searches are not complex; however, they depend on the objectivity and the focus of the search terms. One method to create a more robust search strategy is to create an evolutionary lexical query through iterative searches. Through this process, the original search term set is expanded by adding relevant keywords that occur at a high frequency until there is a convergence to a final search set. Using this evolutionary method allows there to be greater certainty that the search results better encapsulate the state of knowledge (Liu, Shapira, & Yue, 2021).

This study uses the evolutionary lexical keyword-based search strategy that was proposed by Li, Shapira, and Yue. The search was conducted on the core network of the Web of Science (WoS) to search for articles pertaining to agriculture in Haiti and Jamaica. The search was specified as a Topic Search meaning that the WoS searches for the specified terms in the title,

abstract, and keywords of articles. This method allowed for the search to be extended from just the title in order to expand the core search and capture as many related articles as possible while also ensuring that the articles found are relevant to the research question. The initial search used the overarching subject categories of "Agri*, Haiti", and "Agri*, Jamaica". The asterisk is a wildcard advanced search function in the WoS that allows results to include different spellings or forms of the word. From these searches, 286 results were found then reviewed to ensure that they were relevant research papers. Of the initial articles found, the majority were about Jamaica. Once this initial list of papers was generated, the search strategy was expanded using the evolutionary search strategy to include new keywords that occurred at a high frequency in the initial search. This expanded search included two new keywords: 'Food Security' and 'Climate Change'. The addition of these two new keyword phrases expanded the search results to 536 articles. With the addition of these terms, the search set appeared to converge since all of the most frequent relevant keywords in the new search were already included in the search set. This process is diagrammed in Figure 2 below.

Figure 2

Overview of Search Strategy

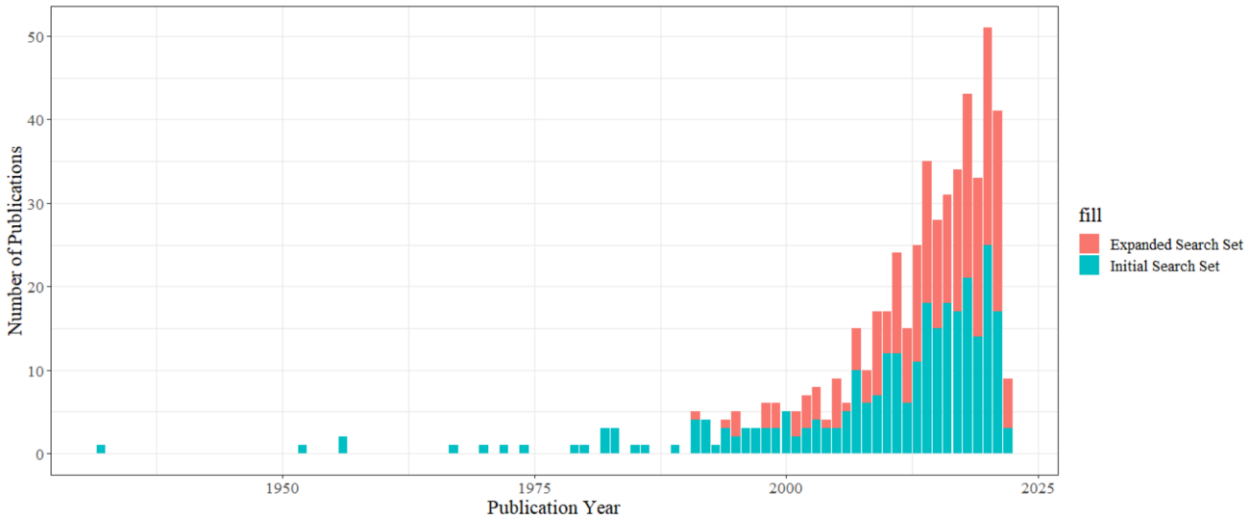


Bibliometric Analysis Results

The final search set of keywords included agriculture, food security, and climate change as these were the most relevant keywords that were included with the highest frequency in the publications identified. Using these keywords resulted in a selection of 536 publications included in the WoS core collection. Looking at the year that the articles were published it is apparent that, of the collection of publications in the WOS core, there was not very much funded scientific interest in Haitian and Jamaican agriculture until the mid-90s. Since then, the number of articles published per year has increased at an almost exponential rate. As seen in Figure 3, this artifact in the data was present in both the initial set of publications as well as in the expanded search which shows that it was not caused only by the added terms but rather is a general trend of the research in the region.

Figure 3

Publications in Initial and Expanded Search Set by Year



Over 64% of the 536 publications found in the search were published in England or the United States with another 12% in the Netherlands while only about 1.5% of the articles were published by a Jamaican institution and none by a Haitian. While this does not mean that Haitian and Jamaican researchers were not involved in research published in other nations, it does show that there is a clear divide in research capacity and knowledge foundation between these Caribbean countries and "northern" countries. The goal of RRI is to make science, technology, and the governance of both easier to access for the groups that they represent which is unable to happen if the science that is supposed to represent them is taking place on a different continent. It is possible that by reaching out to researchers and farmers in Caribbean countries, these "northern" researchers could be able to socially include them though discussion and data collection but that by itself does not lead to epistemic or ontological inclusion needed to ensure RRI.

A similar dominance of “northern” countries can be found when looking at the academic impact of the publications. The academic impact is quantified by the number of times a publication is cited within the WoS core collection. The publications from the United States and England were cited a combined 5,865 times while the Jamaican publications only 21 times. Normalized by the number of publications these countries have shows that the American and English publications are around six times more cited than the Jamaican literature. This difference shows that Jamaican researchers most likely lack influence in large-scale governance and science since they are not able to reach the same breadth of audience. This supports the argument that these researchers face epistemic exclusion in the sense that they do not have the reach and therefore the ability to meaningfully contribute to the advancement of the field.

Conclusions

Expanding global agricultural markets have increased the economic opportunities for large-scale commercial farming operations but small-scale farmers have largely been excluded. In Haiti and Jamaica this exclusion of rural farmers stems from a history of hardship due to neo-colonial relationships with European nations and extreme natural events which create economic instability. In order to determine the extent of how small-scale farms in Haiti and Jamaica are impacted by the global agricultural market, this thesis identified two development plans which occurred in the region. While sharing a vision of economic prosperity, these two plans were dissimilar in how they intended to achieve their goal. The Haitian post-disaster development agenda focused on increasing agricultural and industrial exports, largely ignoring the wants and needs of the rural majority in favor of the commercial farming minority. This development agenda was heavily influenced by international aid contributors and by foreign investments in

industry. These external influential sources became responsible for the development agenda to be created without the consultation of rural communities and organizations. This greatly contrasts the Jamaican REDI which was developed with the input of small-scale farmers and rural community organizations. This initiative delivered significant benefits to participating communities due to its inclusion of local knowledge and empowerment of rural peoples in the creation of the policy. The analysis of these cases offers an insight into how decision makers should create future development plans in the region, by including all affected groups, both socially and epistemically as seen in REDI, once excluded groups can overcome the barriers that prevent participation in the governance process allowing for more inclusive and beneficial policies. In terms of agricultural research in Haiti and Jamaica, it is apparent from the bibliometric study that social and epistemic inclusion is not occurring in the academic sphere. This sector of the analysis found vast disparities between the inclusion levels of northern researchers and local Haitian and Jamaican organizations as evident in the number of native researchers and by the size of citation impact of native researchers. Being a responsible researcher through RRI may include seeking out local partners in these countries to learn from and to pass on knowledge to. Bridging the epistemic gaps in research and policy is essential for connecting groups which would otherwise be divided in order to develop equitable actions and innovations to advance the agricultural development of the region.

References

Barker, D. (2012, July). Caribbean agriculture in a period of global change: Vulnerabilities and opportunities. *Caribbean Studies, 40*(2), 41-61. doi:10.1353/crb.2012.0027

Beckford, C., & Barker, D. (2007, June). The role and value of local knowledge in Jamaican agriculture: Adaptation and change in small-scale farming. *The Geographical Journal, 173*(2), 118-128. doi:10.1111/j.1475-4959.2007.00238.x

Beckford, C. L., & Campbell, D. R. (2013). The small-scale food farming sector in the Caribbean: Food production and the Caribbean peasantry. *Domestic Food Production and Food Security in the Caribbean,* 13-26. doi:10.1057/9781137296993_2

Bibliometrics. (2021, December 22). Retrieved April 18, 2022, from https://datalab.ucdavis.edu/bibliometrics/).

Current status of agriculture in the Caribbean and implications for agriculture policy and strategy (Rep. No. 14). (2019). Retrieved November 1, 2021, from Food and Agriculture Organization website: https://www.fao.org/3/ca5527en/ca5527en.pdf

Ewing-Chow, D. (2020, August 10). Investing in Jamaica's Smallholder Farmers' climate resilience could double agricultural production. Retrieved April 18, 2022, from https://www.forbes.com/sites/daphneewingchow/2020/08/09/investing-in-jamaicas-smallholder-farmers-climate-resilience-could-double-agricultural-production/?sh=757bce7b7a2a

FAO, IFAD and WFP. (2014) *The State of Food Insecurity in the World 2014. Strengthening the enabling environment for food security and nutrition*. Rome, FAO.

Graham, B. (2012). *Profile of the Small-Scale Farming in the Caribbean* (Rep.). Retrieved November 1, 2021, from Food and Agriculture Organization website: https://www.fao.org/3/au343e/au343e.pdf

Haraway, D. (1988). Situated knowledges: The science question in feminism and the privilege of partial perspective. *Women, Science, and Technology, 14*(3), 489-506. doi:10.4324/9780203427415-40

Henley, J. (2010, January 14). Haiti: A long descent to hell. Retrieved April 18, 2022, from https://www.theguardian.com/world/2010/jan/14/haiti-history-earthquake-disaster

The history of Jamaica. (n.d.). Retrieved April 18, 2022, from https://jis.gov.jm/information/jamaican-history/

Jamaica. (2003). Retrieved April 18, 2022, from https://www.fao.org/3/y4632e/y4632e0m.htm

Karfakis, P., Løvendal, C. R., and Jakobson, K. T. (2011) *Biggin' it up – food security and obesity in Jamaica and St Lucia* ESA Working Paper No. 11-15. Available at https://www.fao.org/3/am321e/am321e.pdf

Liu, N., Shapira, P., & Yue, X. (2021). Tracking developments in artificial intelligence research: Constructing and applying a new search strategy. *Scientometrics, 126*(4), 3153-3192. doi:10.1007/s11192-021-03868-4

Luzzini, D. (2019, April 24). *Big versus small agriculture: Is there a viable middle ground?* Retrieved November 23, 2021, from https://www.zlc.edu.es/news/big-versus-small-agriculture-is-there-viable-middle-ground/.

Proposed International Definition of Small-scale Food Producers for Monitoring the Sustainable Development Goal Indicators 2.3.1 and 2.3.2 (Rep.). (2018, February). Retrieved November 1, 2021, from Food and Agriculture Organization website: https://unstats.un.org/unsd/statcom/49th-session/documents/BG-Item3j-small-scale-food-producers-definition-FAO-E.pdf

Segell, G. (2019). Neo-colonialism in Africa and the cases of Turkey and Iran. *Insight on Africa, 11*(2), 184-199. doi:10.1177/0975087819845197

Shik, O., Boyce, R. A., and De Salvo, C. P. (2017) *Analysis of Agricultural Policies in Jamaica* Retrieved from Inter-American Development Bank website: https://publications.iadb.org/publications/english/document/Analysis-of-Agricultural-Policies-in-Jamaica.pdf

Steckley, M., & Weis, T. (2016). Agriculture in and beyond the Haitian catastrophe. *Third World Quarterly, 38*(2), 397-413. doi:10.1080/01436597.2016.1256762

Timms, B. F. (2008). Development theory and domestic agriculture in the Caribbean: Recurring crises and missed opportunities. Retrieved from California Polytechnic State University Social Sciences Department website: https://digitalcommons.calpoly.edu/cgi/viewcontent.cgi?article=1036&context=ssci_fac

UN marks anniversary of devastating 2010 Haiti earthquake | | UN news. (2022, January 12). Retrieved April 18, 2022, from https://news.un.org/en/story/2022/01/1109632

Valkenburg, G., Mamidipudi, A., Pandey, P., & Bijker, W. E. (2019). Responsible innovation as empowering ways of knowing. *Journal of Responsible Innovation, 7*(1), 6-25. doi:10.1080/23299460.2019.1647087

World Bank. (2021) *Jamaica-Rural Economic Development Initiative.* Independent Evaluation Group, Project Performance Report. 155313. Washington, DC: World Bank. Available at https://ieg.worldbankgroup.org/sites/default/files/Data/reports/ppar_jamaicaredi.pdf