GREEN TECHNOLOGY ADOPTION PUZZLE: WHAT CAN WE LEARN FROM THE FIELD

MARIFLOR H. DEVIBAR[1]

[1]Professor, College of Business Accountancy and Public Administration

, Isabela State University-Main Campus, 3309, Echague, Isabela, Philippines

Abstract *:- adopting and embracing green technologies from the agricultural to industrial sectors, communities around the world have been transitioning to a greener economy. Strategies must be used by nations to solve the global issue of climate change. The adoption of green technology methods by farmers and cooperatives, as well as the perplexing delays they experienced, were reviewed and assessed in this paper. The study's findings showed that most of them already employ green technologies like vermicomposting, manure, and silage without receiving the necessary instruction or knowledge. Also, they embraced the 5R's of waste management. On the other hand, they experienced several perplexing delays, such as a shortage of funding, a delayed loan approval process, and a lack of government assistance.Therefore, there is a pressing need for cooperatives to become aware of the use of Green technology. This can be accomplished by holding major informational campaigns, training sessions, and workshops which are led by the ISU as a partner, and strengthening the partnership with the local government to maintain their capacity as green technology adopters.*

Keywords: *Green Technology, Adoption, 5Rs, agricultural, industrial*

1. INTRODUCTION

Cagayan Valley is primarily an agricultural region, with livestock production being a significant contributor to its economy. However, livestock production also contributes to greenhouse gas (GHG) emissions, mainly through enteric fermentation and manure management.

According to a study published in 2018 by the Philippine Council for Agriculture, Aquatic, and Natural Resources Research and Development (PCAARRD), the livestock sector in Region 2 accounted for approximately 1.45 million metric tons of carbon dioxide equivalent (CO2e) in 2014. This is equivalent to 20.7% of the region's total GHG emissions.

Within the livestock sector, the study found that enteric fermentation from cattle, carabao (water buffalo), and goats accounted for 80% of the sector's emissions, while manure management accounted for the remaining 20%.

To address these emissions, the study recommended several strategies, including improving feed quality and digestion efficiency of livestock, reducing herd sizes, adopting sustainable manure management practices, and promoting the use of renewable energy in livestock production.

Threats such as the exhaustion of natural resources, climate change due to overpopulation, and the accelerating economic growth of new industrial countries (South Korea, Singapore, India, Malaysia, Turkey,

Iran, the Philippines, etc.) associated with negative environmental impacts are widely recognized. They necessitate the adaption of new approaches to economic growth and development that would focus more on additional sources of growth to minimize the use of natural resources and improve the living conditions of the population.

This puzzling lag in technology adoption is holding back the role of agriculture for development in extensive regions of the world such as Sub-Saharan Africa and Eastern India, with high aggregate costs in terms of economic growth and human welfare. Field experiments have been particularly useful in addressing this adoption puzzle. Significant lessons have been learned on the roles of farmer behavior and of mediating factors such as credit, insurance, markets, and policies in constraining the adoption.

There may be technologies available that could improve the efficiency of livestock production, reduce the use of fossil fuels in transportation, or increase the use of renewable energy sources. However, the adoption of these technologies may be slow due to various factors such as lack of awareness, limited access to financing, regulatory barriers, or resistance to change from traditional practices.

To address this puzzle lag, it may be necessary to provide education and training on new technologies, establish supportive policies and regulations, offer incentives for green investments, and encourage collaboration among stakeholders. By doing so, the adoption of green technologies could accelerate, helping to reduce GHG emissions and promote sustainable development in Region 2

Thus, this study is to be undertaken to assess and evaluate the “Green technology adopted by the cooperative farmers and the Puzzling lag they encounter using the 5R's of Waste Management.

OBJECTIVES:

Generally, the objective of the study was to assess and evaluate the “Green technology adopted by the cooperative farmers and the Puzzling lag they encounter using the 5R's of Waste Management in Cagayan Valley.

Specifically, it aimed to :

1. Determine the socio-demographic profile of the dairy farmers and cooperatives in Cagayan Valley.
2. Identify the presentpractices in green technology adopted by the dairy farmers and cooperatives.
3. Classify the puzzling lag in green technology encountered by the farmers and cooperatives.
4. Present the problems encountered in the adoption of green technology by the farmers and cooperatives.

METHODS

Research Design

This study used descriptive survey method to assess the demographic profile of the respondents such as age,

sex ,educational attainment and the size of income.

However, thematic approach will be utilize to analyze qualitative data in the study.

Thematic analysis is a method of analyzing qualitative data. It is usually applied to a set of texts, such as interview transcripts. The researcher closely examines the data to identify common themes – topics, ideas and patterns of meaning that come up repeatedly.

A qualitative approach primarily focuses on developing understanding of social phenomenon, seeking to find answers regarding various questions of how people behave, their behaviour and attitudes, and how they are affected by different events in their surroundings (Hancock, et al., 2007).

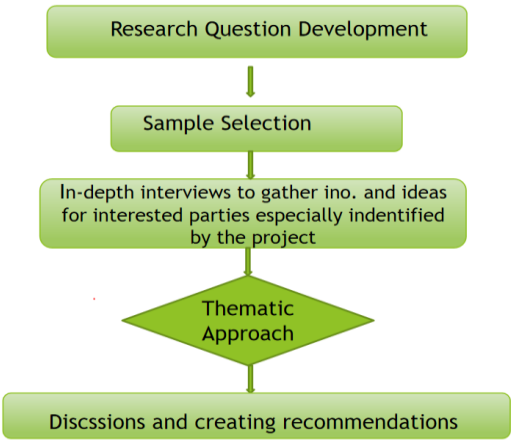
Respondents and Sampling

Purposive sampling wasundertaken to determine the respondents being surveyed. Selected Dairy Cooperatives/industry in Cagayan Valley, Region 02.specifically Mallig, Santiago and Bambang.

Gathering of Data

Primary data wasobtained using in-dept interviews to gather information and ideas interested parties specifically identified by the Project study Gathering of data was done through k ey Informant Interviews.

Theoretical Framework



4. RESULTS AND DISCUSSION

Demographic profile

As stated in the Table, these are the project's target respondents in the Cagayan Valley, mainly from Santiago City, Isabela Mallig, Isabela and Bambang, Nueva Vizcaya. The majority of respondents were between the ages of 45 and 58, and given that they were in that age range, they were likely actively working in agriculture. Also, the majority of them were men.

This is in contrast to the results and discussion of Karim et.al, (2015), she reiterated that 50% of the farmers who involved in dairy farming were between the ages of 15 to 40 years old. Moreover, In Malaysia, people

in this range of age are considered as youth (Bahaman et al., 2010). Most of the respondents which are youth are willing to paricipate in dairy farming.

Most of them are members of cooperatives and been operating for the past 5-15 years. In the same study of Karim et.al (2015) it revealed that on "experience category," 44% were involved in dairy farming for between 10-20 years, 30% with less than 10 years of experience in dairy farming while the smallest percentage was 26% which refer to the respondent's experience be- tween 21-30 years.

Previous research has demonstrated the importance of age and educational achievement in farmers' decisions to use technology. Farmers' adoption of BMPs was predicted to be negatively affected by variable AGE, which accounted for the primary operator's age. Mobile, Alabama, (2003).

PRESENT PRACTICES OF THE COOPERATIVES'

The majority of the respondent used green technology such as vermicomposting, silage, and solar. Furthermore, they practice zero waste management without realizing it is a component of green technology, such as drying manure and reusing it on the farm.

PUZZLING LAG

Even though these cooperatives and their owners confirmed that they had adopted some green technology without their knowledge, there are still some perplexing barriers to technology adoption, including money, sluggish loan processing (credit), a lack of government support, political unrest, weather changes, and manpower.

As Ferdi.fr (2016) stated in its report ,"This puzzling lag in technology adoption is holding back the role of agriculture or development in extensive regions of the world such as Sub-Saharan Africa and Eastern India, with high aggregate costs in terms of economic growth and human welfare. Field experiments have been particularly useful in addressing this adoption puzzle. Significant lessons have been learned on the roles of farmer behavior and of mediating factors such as credit, insurance, markets, and policies in constraining adoption.

Moreover, Inadequate levels of education, access to advice and pressures on financial resources for some farmers slow the adoption of some technologies, especially those that require a larger scale of operations and where the initial investment costs required are high.

Common Problems Encountered

Green adoption has been helpful if properly managed and monitored and would greatly help uplift the standard of living of farmers and generate more production to cooperatives. However, the lack of trainings, seminars, funding, government support and marketing of their produce products were the most pressing problems they usually encountered.

From the empirical results it has been seen that, the socio-economic conditions of the rural small farmers differs from the peri urban farmers connected to the formal corporate dairy chain. Their farm structure, lack of capital, government support, feed management, hygienic standards and traditional marketing practices

leaving them exposed to high uncertainties. (Tariq,Ziad, 2018)

Moreover, This has been observed in the case study that there is no government support for small scale farmers. Government is not playing an effective role to uplift the small farmer from lower yields and low profit to higher yield and more profits.

CONCLUSION

The key findings from the thematic analyses that were undertaken can be summed up as follows:

1. Since most cooperatives lack the required training and seminars to maintain their level of life and even increase revenue and output, the proper implementation of green technology is a dynamic issue on the part of cooperatives. 2. the necessity of encouraging the adoption of green technologies for environmentally friendly farming practices.

3. For some farmers, access to guidance and financial constraints cause them to embrace green technologies more slowly, especially when those technologies need a bigger scale of operations and have substantial initial investment costs.

4. Technically sound knowledge of the 5 R's of waste management, but improper application.

RECOMMENDATION

1. Cooperatives need to become more conscious of the importance of using green technologies. This can be accomplished through a significant communication campaign, as well as workshops and trainings that the ISU will lead as a collaborator.

2. To maintain the ability of the local government to adopt green technology, strengthen the relationship with it.

3. The government is being urged to take a more aggressive approach in enforcing laws and regulations because green technology is a major factor in cooperatives adopting sustainable green practices.

4.. More research must be done on green technologies and the perplexing delay in increasing income and output that cooperatives encounter.

REFERENCES

[1] Blaseg,D.& Koetter , M.(2016). Crowdfunding and Bank Stress, Banking Beyond Banks and Money, 10.1007/978-3-319-42448-4_3, (17-54).

[2] JuditKarsai, Mike Wright, Igor Filatotchev, (2017). Venture Capital in Transition Economies: The Case of Hungary, Entrepreneurship Theory and Practice, 10.1177/104225879702100407, **21**, 4, (93-110).

[3] Janvry, et. Al, 2016,The Agricultural Technology adoption: What Can We Learn from the field Experiments,

[4] Mason,C. & Harrison, R. (2016). Why 'Business Angels' Say No: A Case Study of Opportunities Rejected by an Informal Investor Syndicate, International Small Business Journal: Researching Entrepreneurship, 10.1177/0266242696142003, **14**, 2, (35-51).

[5] Mobile, Alabama, February 1-5, 2003. "Factors Influencing the Implementation of Best Management Practices in the Dairy Industry"

[6] Panda, S. (2015). Factors Affecting Capital Structure of Indian Venture Capital-Backed Growth Firms, Entrepreneurial Ecosystem, 10.1007/978-81-322-2086-2_5, (133-156).

[7] Riquelme, H. & Watson, J. (2016). Do Venture Capitalists' Implicit Theories on New Business Success/Failure have Empirical Validity?, International Small Business Journal: Researching Entrepreneurship, 10.1177/0266242602204002, **20**, 4, (395-420).

[8] Smith, J.&Cordina, R. (2014). The role of accounting in high-technology investments, The British Accounting Review, 10.1016/j.bar.2014.03.002, **46**, 3, (309-322).

[9] Philippine Council for Agriculture, Aquatic, and Natural Resources Research and Development (PCAARRD, 2018

[10]Wageningenworkshop proceedings(2003). Adoption of technologies
For sustainable farming systems

[11](https://www.oecd-ilibrary.org/docserver/5k486rchlnxx-en.pdf?expires=1627370900&id=id&accname=guest&checksum=AD6744B0F869F351A921C04A47A191EF)
(Noro C. RahelizatovoandJeffrey M. Gillespie,2015)Selected Paper prepared for the presentation at the southern Agricultural Economics