Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

USYS TdLab
Department of Environmental Systems Science
Transdisciplinarity Lab | Science-Society Interface

The Role of Knowledge in the Acceptance of Organic and Human Waste Recycling: The Case of Rwanda's Food System

MASTER THESIS

Stephanie Vogel

Supervisors

Dr. Pius Krütli

Dr. Leonhard Späth

Dr. Haruna Sekabira

Department of

Environmental Systems Science

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Summary

By 2050, the world's population is expected to increase to 9 billion people. The growing population intensifies urbanization, which puts pressure on the current challenges of food insecurity and environmental pollution. In Rwanda, rural migration and the lack of financial capital to apply sufficient fertilizer result in nutrient-deficient agricultural soils which lead to a decrease in food production. Moreover, the rapid urban expansion leads to environmental pollution and human health risks from inadequate sanitation and waste management. The loss of nutrients in the agricultural fields is a consequence of the rapid urban expansion since the food is mainly consumed in the cities. The waste produced from food consumption (organic and human waste) is not managed properly and leads to nutrient accumulation in the urban environment. A circular economy (CE) in Rwanda's food system approaches to counteract the nutrient imbalance in the rural-urban interface. The project *RUNRES – Rural-Urban-Nexus: Establishing a nutrient loop to improve city region food system resilience*, aims to capture the waste streams in the food value chain (FVC) to keep the nutrients in the system and reuse it in agriculture. Strategies thereof are organic waste recycling (OWR) and human waste recycling (HWR) into fertilizer that returns the nutrients back to the soil. However, these strategies first need to be socially accepted for their successful implementation.

Knowledge is considered a crucial factor that influences acceptance of CE strategies. This master thesis investigates the role of knowledge in the acceptance of OWR and HWR in Rwanda's food system. For this purpose, expert interviews are conducted to qualitatively assess the local circumstances. Furthermore, a survey is performed with 185 respondents including farmers, people from the waste sector as well as public sector to quantitatively measure their knowledge and acceptance regarding OWR and HWR. The results show that these stakeholders are knowledgeable and already accept OWR and HWR in Rwanda's food system. The statistical analyses further show a relationship between knowledge and acceptance of OWR and HWR. Knowledge significantly positively correlates with acceptance, and furthermore, this acceptance is significantly predicted by knowledge.

This research contributes to understand the implementation of OWR and HWR in order to achieve a CE in Rwanda's food system. The findings illustrate that knowledge is essential for acceptance of OWR and HWR in order to implement a CE nutrient cycle in the food system. Thus, practitioners should consider increasing knowledge where acceptance is lacking. This research raises the importance to further identify the role of knowledge in the acceptance of CE strategies among all stakeholders involved in the rural-urban food system. Finally, a step toward a CE in Rwanda's food system is achieved, which reduces waste and pollution by reusing the resources in agriculture in order to improve food security.

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Murakoze cyane, Thank you.

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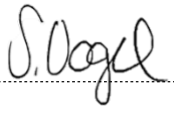
Zurich, 15.05.2020	

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Abbreviations

AA	Active Acceptance
AoT	Amount of Trainings in Work Field
CE	Circular Economy
FAO	Food and Agriculture Organization of the United Nations
FVC	Food Value Chain
HW	Human Waste
HWR	Human Waste Recycling
MEA	Millennium Ecosystem Assessment
MINAGRI	Ministry of Agriculture and Animal Resources
OK	Objective Knowledge
OW	Organic Waste
OWR	Organic Waste Recycling
PA	Passive Acceptance
PCA	Principal Component Analysis
RUNRES	Rural-Urban-Nexus: Establishing a nutrient loop to improve city region food system resilience
RWF	Rwandan Francs
SK	Subjective Knowledge
UN	United Nations
WHO	World Health Organization