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Junior Scientists Tandems
Final Report

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Start and end date of career exploration stay: 24th Oct 2024 – 1st April, 2025
Title: Assessment of extension approaches in vegetable production: Insights from the Vegetable Business Network model in Benin, West Africa.

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Report on the Completion of Six-Months of Internship at the World Vegetable Centre at Abomey Calavi, Republic of Benin, West Africa.

WorldVeg

UNIVERSITY OF HOHENHEIM

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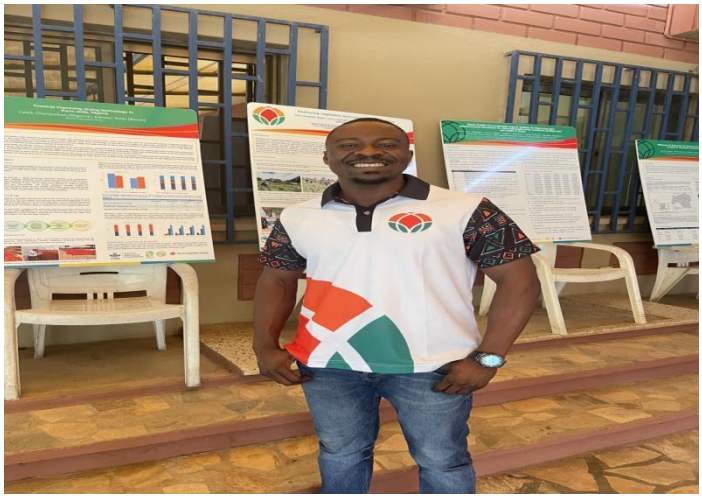
Background: Student Profile

My name is Salifu Yaro Bance, a Ghanaian and a Master's student at the Universität Hohenheim in Germany, pursuing Msc. Agricultural Economics. I count myself privileged to have been awarded the Atsaf Junior Scientist Tandem Scholarship, especially considering the challenges I faced during the application process. It was particularly demanding and somewhat lobbying in nature, as I had to coordinate correspondence with professors and scientists who are generally very busy, making the process both daunting and, at times, frustrating. Nonetheless, I made it, stayed and worked with Worldveg from October, 2024 – April 2025. Primarily, I worked on the Vegetable Business Network (VBN) model to assess its effectiveness in generating and disseminating innovations. This I did with the invaluable guidance from my supervisors, Prof. Dr. Andrea Knierim & Dr. Edmond Totin from the Universität Hohenheim and Lead scientist on the Safeveg[1]initiative respectively.



A JST Scholar at the Premises of Worldveg regional Centre at Abomey Calavi, Benin.

Project Description

My research topic was: "*Assessment of extension approaches in vegetable production: insights from the vegetable business networks model in Benin, West Africa."* based on a case study approach. The Worldveg through the Safeveg initiative has implemented an agro-based cluster (ABC) named Vegetable Business Network (VBN) as a form of an agricultural innovation system model among rural farmers in Benin, Mali, and Burkina Faso to boost vegetable consumption in their respective countries. The VBN model employs an iterative learning process that coordinates direct and indirect value chain actors through a facilitation process called "coaching" to improve the sustainability of farm productivity and profitability. Likewise, beneficiaries of VBN are expected to enhance their farm management skills, collective adoption of new technologies/innovation, increase farm-level income, and smallholder farmers' access to markets. However, owing to beneficiaries' exposures with other extension experiences, the research sort to assess the effectiveness of the VBN model, and compare the coaching approach with their experiences with other extension approaches.

[1] Safeveg: Safe Locally-Produced Vegetables for West Africa's Consumers

Conceptual Framework

My study adapted Davies et al. (2018) conceptual framework used in determining innovation platform effectiveness in the West and Central Africa. However, since the research bordered on agro-based cluster/network, it was significant to incorporate the geographical proximity of actors as asserted by Coman et al. (2024), into the context factor of the framework.

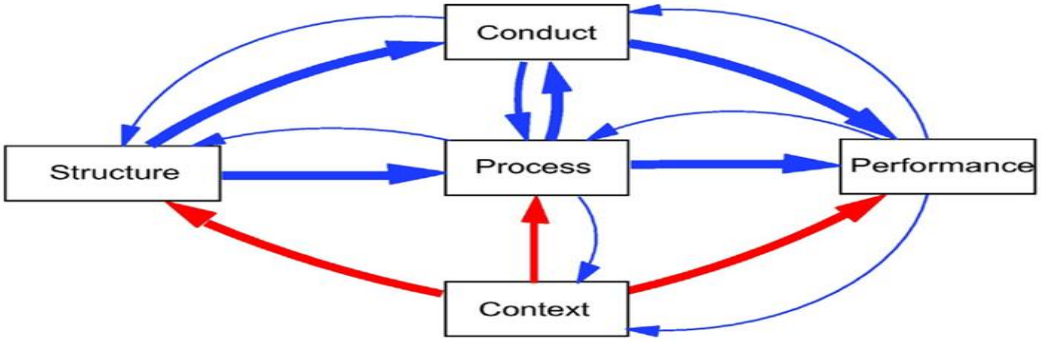


Fig 1: Conceptual framework for VBN effectiveness showing the interacting range of variables ie. structure, conduct, process and context

Source: Adapted Davies et al. (2018)

Method

My research deployed qualitative methods building on two empirical case studies to address the research questions.

- Case studies

My study was carried out from November 2024 to April 2025 within the municipalities of Zè and Tori Bossito in the Atlantique department of Southern Benin. The two study locations share a border to the south from Zè to the Tori Bossito. The rainfall pattern in the department of Atlantique is bimodal, with two rainy seasons starting from (April-July) as the major rains and from (September-November) the minor rains (Soglo et al., 2018). Guedegbe et al. (2022) noted that the primary economic activity in the study area is staple and cash crop production with pockets of vegetable gardening found around lowlands and some irrigated upland areas . The main crops grown in the study area include maize, cassava, oil palm, pineapple, tomatoes, peppers and leguminous crops (Soglo et al., 2018).

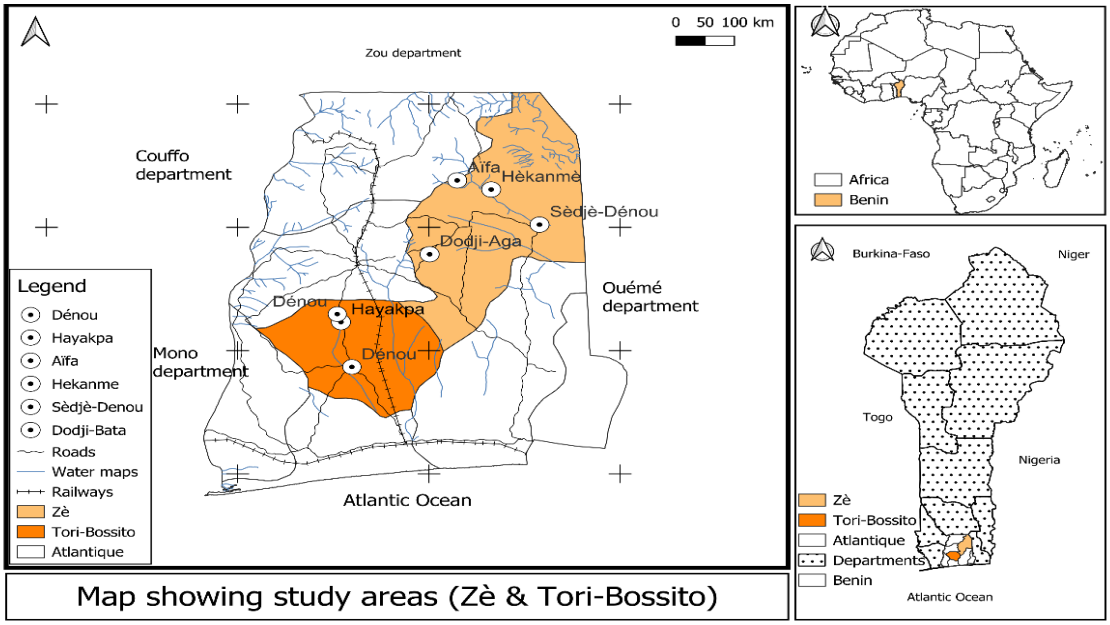


Fig 2: Shows the map of the study areas for the empirical studies.

The two rural areas were considered for this study because they were pilot sites for an initiative that promotes the agro-based cluster (ABC) approach to stimulate vegetable production. The cases offer an opportunity to compare the advantages of the ABC and other conventional extension approaches in enabling the uptake of innovations.

Data collection and Analysis

Empirical data collection was conducted through in-depth individual interviews with a semi-structured interview guide from 24 VBN beneficiaries from both UCCM of Ze and FAKO of Tori Bossito. Data collection was stopped when no new information and repetitive information began to emerge (Bilgic & Tuzun, 2019; Hennink & Kaiser, 2022). Interviews were recorded to facilitate transcribing and ultimately to avoid information loss. Field note was also used to jot down field observations and salient information during the interviews. All the transcripts were translated into English using a computer-assisted software (deepl.com/en/translator). Thematic analysis was performed with ATLAS.ti 9 software to assess the effectiveness of the VBN model in generating and disseminating innovations.

Preliminary findings

❖ **Effective performance of the VBN model**

The thematic data analysis revealed several outcomes perceived by the VBN beneficiaries as effectiveness in both UCCM and FAKO cases. This perceived effectiveness was classified into five categories: changes in livelihoods, changes in the capacity of beneficiaries, changes in market system, efficient use of resources, and recognition by others. Indeed, the VBN beneficiaries highlighted a significant improvement in their livelihoods, largely due to the acquisition of farm assets and improved agricultural infrastructure, thanks to the credit they were able to access through the network. For example, the drilling of boreholes at the Aifa cooperative production site and the installation of modern irrigation systems at “Mahoulome” and “Hekanme” production sites were a testament to capacity building. Through their constant interactions with the VBN beneficiaries, a social institution was established. This enabled them to benefit from reduced transaction cost, risk minimisation and enhanced efficiency. It also appeared that the VBN model incorporates beneficiaries' past experience in diffusing

innovation owning it to the coach's constant interaction and free exchanges with beneficiaries. One of the vegetable farmer of UCCM VBN noted that:

> *"It's not that she comes to impose her way of doing things on us and that we don't have a choice. She also takes into account what we were doing before her arrival and gives us suggestions so that everyone wins." (UAM02, 29/01/25)*

Additionally, the feeling of their effectiveness stemmed from the fact that beneficiaries felt their efforts were being recognized by the constant visitation of top government officials and ambassadors. A processor within the VBN at FAKO remarked that:

> *"...the simple fact of receiving delegations from major organizations is already a success for me. Because if you weren't doing anything right, no one would come and see you... Last time, the SafeVeg project brought a representative of the Japanese embassy to my home." (FHF14, 06/02/2025)*

❖ **Conditions Influencing the effectiveness of the VBN model**

This perceived effectiveness did not occur on its own. The participants noted that several conditions contributed to the effectiveness of both VBNs. The perceived conditions that facilitated the realisation of such effectiveness are summarised in the word cloud (Fig 3). These conditions were further classified under structure, conduct, process or context conditions based on the conceptual framework.

fig 3: Word clouds of perceived conditions influencing effectiveness of VBN

Structure condition

FAKO VBN beneficiaries stated that the formalized arrangements established and accepted by all, attributed to their effectiveness. The adherence to contractual terms signed among beneficiaries within the VBN afforded beneficiaries vegetable price stability and security in the marketing of their organic vegetables. This was largely possible due to the operationalization of the processing unit, which required a constant supply of raw vegetables for processing. Over time, a sense of social cohesion developed among the VBN beneficiaries, visible in their active engagement, shared decision making and open communication under the leadership of the aggregator.

Conduct condition

Moreover, in both case studies, the conduct conditions were articulated by the VBNs beneficiaries as enablers of their effectiveness. They emphasized the importance of cooperation within the network, which has been a key element in helping them access credit to finance their activities. Likewise, mutual trust, constant exchange with the coach, and transparency within the VBN resulted in their effectiveness. They also highlighted the coach's continuous support, motivation and encouragement as factors. This was made possible due to the coach's constant visitation and effort in bringing VBN beneficiaries together for training, field observation, and experience sharing. The consistency of such meetings motivated beneficiaries and enhanced trust in a cooperative atmosphere of understanding and mutual respect.

Process condition

Considering the process conditions, the network beneficiaries emphasized the importance of the coach's work on their capacity building to maximise productivity and marketability of vegetables at the best price. Their continuous collaboration with the coach enhanced their ability to identify common challenges and a shared vision. Legitimate dialogue and attentive listening of one another, the internal conflict resolution mechanisms, and the experience sharing were also mentioned as conditions that solidified their effectiveness. One of the UCCM vegetable farmers remarked that;

> *"For example, we can go to the cooperative of "HEKANME" to discuss with them to see how they manage their production and ask them questions on what they do to prosper in their activities and other times, they also come to our production site here to do the same thing so that we learn from each other experiences. When a disease attacks your production, this kind of exchange and discussion allows us to easily find solutions to our problems." (UAF03, 29/01/25)*

Context condition

Regarding the context condition, the UCCM members noted that their proximity to each other contributed significantly to the outcome of their success. This fostered a close relationship and eased their collaborative efforts. They relied on peer-to-peer learning, as they were reminded by one another in the application of extension advice. One of the vegetable farmers highlighted that:

> "*We're all in the same locality and what's more important is that we've grouped together in a cooperative, …. Even when one of us forgets what the coach said, the others remind him." (UGF06, 28/01/25)*

Additionally, the biophysical characteristics in the Zè municipality allowed the VBN beneficiaries access to water and suitable soil, which contributed immensely to their market gardening activities. One of the vegetable farmers in Zè municipality echoed that:

> "*You see the wetland in front of you there. This is a gift that God has given us, other people are looking for this kind of thing in their commune and they don't have it. The quality of soil here too, is suitable for vegetable production, …"(UMM11, 01/02/25)*

Table 1: Perceived conditions that facilitate the VBNs performances/effectiveness classified according to the conceptual framework

VBN Name	Structure	Conduct	Context	Process	Performance
UCCM	n/a	1. Cooperation and interactions with direct and indirect actors. 2. Encouraged and motivated by the coach 3. An atmosphere of understanding exists among them	1.Proximity of cooperatives 2.Availability of natural resources	1. Regular meetings 2. Ability to access funds 3. Capacity building 4. Internal mechanisms for conflict resolutions 5. Knowledge sharing experience 6. Workshops 7. Mutual exchanges and dialogue among actors	1. Acquisition of asset 2. Facilitation for the establishment of a market garden. 3. Behavioural change 4. Access to commercial trade partners.
FAKO	1. Non-existence of barriers among actors. 2. Strict adherence to contract terms.	1. Existence of trust among members. 2. Give-and-take relationship 3. Transparency in what actors do 4. Understanding & Trust 5. Commitment of collaborators	n/a	1. Honest dialogue and experience sharing.	1. Hosting delegations from major institutions/organizations. 2. feasibility in marketing produce. 3. Professionalism in the agribusiness. 4. Efficient use of resources.

In conclusion / acknowledgement.

Now that you have sunk yourself into the perceived effectiveness of the VBN model in generating innovation and knowledge diffusion, kindly get in touch with me through bsalifu@gmail.com to read the second dimension of the comparison with other extension approaches in a research paper or an academic thesis. I look forward to getting in touch with you. I want to take this opportunity to thank Atsaf e.v, Worldveg and my university professor for contributing such a priceless endeavour in my life. Not forgetting my research partner Oronce Djossa, who supported me throughout my stay in Benin.

Thank you.

Reference

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Picturesque

Fig 1: Data collection process with a VBN beneficiaries at Zè Commune.

Fig 2: Observing VBN beneficiaries work together on their field.

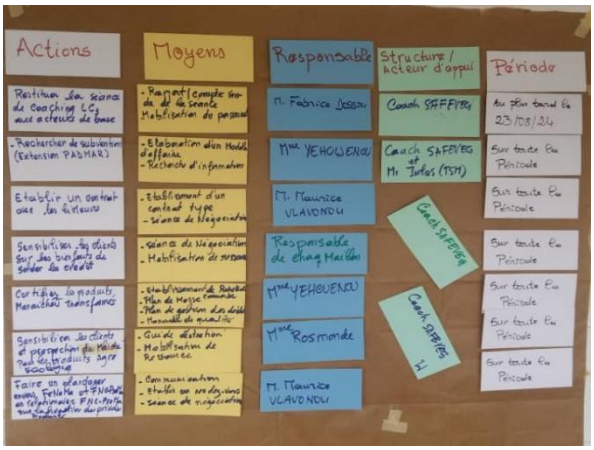

Fig 3: VBN actors problem diagnostic session

Fig 4: Workshop and group learning of session with VBN beneficiaries.

Fig 5: Orouce Djossa interviewing a VBN actor

Fig 6: Showing a VBN actor signing the consent form before the interview.