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Promoting Knowledge: Higher Education and Rural Ethiopia through a Podcast Journey

Marie-Anne Lorain
Universidad Complutense de Madrid, Spain
mlorain@ucm.es
0000-0001-5476-4389

Mercedes Vázquez-Furelos
Universidad Complutense de Madrid, Spain
mevazque@ccee.ucm.es

Elena Urquía- Grande
Universidad Complutense de Madrid, Spain
eurquiag@ucm.es
0000-0003-4724-7185

Alberto Martinez da Silva
Universidad Complutense de Madrid, Spain
albermar@ucm.es
0000-0003-1885-2781

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Abstract
This study has two goals. The first is to raise higher education students' awareness of accounting-financial practices aligned with Sustainable Development Goals. The second is to promote economic growth by training farmers in emerging countries—in this case in rural Ethiopia.
The study focuses on the use of Information and Communication Technologies (ICTs), specifically to record several podcasts on optimal agricultural practices, budgeting, sales strategies, and nutrition. Simultaneously, professors developed a case study on a project finance for an NGO working in rural Ethiopia. Subsequently, through seminars, students in four Spanish universities worked on solving this case after reading relevant research articles and listening to the podcasts. The research also involved a survey to measure students' commitment to economic development as well as critical reflection and improvement of systemic learning competences.
In a second phase of the project, conducted in rural Ethiopia, farmers listened to the podcasts. This phase aimed to assess the effectiveness of podcasts in transmitting information in rural areas. Such effectiveness is crucial to the project's sustainability, as it reduces the need for external trips in potential crisis situations

Keywords *Higher Education for Development; Information and Communication Technologies; Europe; NGOs; Rural Ethiopia*

1. Introduction

This study is framed within the directives of Agenda 2030, with two main goals. First, it seeks to sensitize and train Spanish university students in accounting-financial information along the lines of the Sustainable Development Goals (SDGs). Second, it seeks to drive economic growth by educating famers in emerging countries to eradicate poverty. More specifically, we researched the training and sensitization of university students to financial-accounting education for development through information and communication technologies (ICTs) and subsequent dissemination of information among farmers in Ethiopia.

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The study has several research goals, including:

- Using seminars to make university students knowledgeable about the real interactive case of a project finance for an NGO that works for rural Ethiopia,

- Using the right ICT tools for the area to which they are applied,

- And finally training the rural population in Ethiopia in financial-accounting education so they can better manage their microbusinesses.

The fieldwork was performed with an international cooperation project in several phases: selection and preparation of the material; preparation and recording of the podcasts; delivery of the seminars at the university; explanation, distribution, and application of the knowledge through seminars and podcasts in Ethiopia; and finally measurement of the results obtained through surveys of students and farmers.

The greatest difficulty in disseminating the podcasts was the language. Some (albeit, a small number) of the students had difficulty with the English (corrected based on the Spanish script), and quite a few farmers only spoke Oromo and not Amharic (the podcasts were only translated into English and Amharic). The Amharic was corrected thanks to the work of Ethiopian volunteers. Finally, although there is currently considerable instability in the region, the political instability in Ethiopia did not prevent us from moving among the villages to disseminate the podcasts. The instability did, however, delay the arrival in Spain of the person in charge of the NGO with which we collaborated and reduced the number of lectures delivered at the University.

Bearing the foregoing in mind, we define the research questions:

RQ1 Did the seminars conducted increase the university students' awareness along the lines of the accounting-financial information aligned with the 2030 SDGs?

RQ2 Was knowledge transfer from the University to an emerging country achieved thanks to podcasts disseminated in rural Ethiopia?

The article is divided into a bibliographic analysis of the links between university education, sustainable development, and financial education (so necessary to promote inclusion of the most vulnerable, who cannot currently go without technology in the context of sub-Saharan Africa). The methodology section explains the steps followed in the study, including a first analysis of the students' sensitization and a second analysis of the farmers in Ethiopia, performed with data taken by the students who decided to do internships in the NGO. Finally, we analyzed and discussed the results obtained to reach very interesting conclusions and contributions for managers of European universities and NGOs, and about the possibilities for innovation that can be achieved with the support of ICTs.

2. State of the art

2.1. Higher Education for Sustainable Development

Education must be a transformative process to foster citizens' participation in the fight to achieve a more solidary, just, and equitable society. The university must contribute value through instructors and students who are mindful of achieving the SDGs. Higher education institutions (HEIs) must play a central role as drivers of change (Sierra and Rodríguez-Conde, 2021; Sonetti et al., 2019). To include education for sustainable development (ESD) in their curricular activities, HEIs must face and overcome significant challenges involving adaptation of their study programs to developing multidisciplinary fields (Lengyel et al., 2019). Active learning methodologies, such as seminars and case studies, can be effective strategies for increasing students' commitment and motivation (López-Sánchez et al., 2020; Rivero-Menéndez et al., 2018).

These goals are relevant to degree programs in Economics, Business, and Business Administration, as future managers and leaders must learn the connections among key economic sectors, social needs, and the SDGs so they can align their financial results with social and environmental goals (Coleman and Gould, 2019; Delgado et al., 2019; Marathe et al., 2020). Generalized poverty in rural Africa suggests that agriculture is a key sector for development and achievement of the SDGs defined in Agenda 2030. Since nearly all African countries depend directly or indirectly on agriculture, this sector is key to development. Most African countries have not managed to fulfill the requirements for a successful agricultural revolution.

Education for Development (EfD) has changed in recent decades. How it is defined depends on the meaning given to the terms development and education, and this meaning depends fundamentally on the context and environment in which we find ourselves. The term dates back to the world of cooperation (late 1960s to early 70s) and originated in the solidarity work performed by NGOs in what was then called the "Third World." At that time, EfD seemed to be an indefinite term, its only goal informing, raising funds, and training professionals to work in solidary actions performed in countries of the Global South (Argibay, Celorio and Celorio, 2014).

One of the first milestones of EfD came with the 1974 UNESCO report *Recommendation on Education for International Understanding, Cooperation and Peace and Education related to Human Rights and Fundamental Freedoms*. This report recognized the importance of EfD in solving the problems humanity faced. The UNESCO report sought to educate for international understanding and cooperation, conceiving education as the engine to achieve the goals established in the United Nations, the UNESCO Constitution, the Universal Declaration of Human Rights, and the Geneva Conventions. The report noted the need to include an international dimension and a global perspective in instruction, understanding of the need for solidarity and international cooperation, and the willingness of all States to participate in solving the problems of one's own community, one's

country, and the world (UNESCO, 1974). EfD takes on international relevance when we think of education as a way to solve the fundamental problems that condition humanity's survival and well-being (e.g., inequality, injustice) and the cooperation measures that can facilitate their solution (UNESCO, 1974).

As the case study methodology is applicable to different areas of knowledge (Herreid, 2011), it can be applied in the field of cooperation for development. This method enables students to empathize with situations in specific contexts, and, in turn, facilitate the development of academic skills in real contexts (Pen et al., 2016). In addition to the developing cognitive skills, this methodology develops awareness and fundamentally involves teamwork. Numerous empirical results demonstrate higher education students' positive perception of the case study as a teaching method (Pérez et al., 2022; Yadav et al., 2007; Noorminshah et al., 2012; Marion et al., 2016).

2.2. Financial Education for the Eradication of Poverty

In parallel, the research published has shown us that financial education is key to development of microbusinesses in emerging countries and to fostering financial inclusion, in line with the 2019 Nobel Prizes (Banerjee and Duflo, 2011) and other authors (Leatherman et al., 2011; Armendariz and Morduch, 2010). Financial and accounting education is closely linked to successful management of microbusinesses. Traditional financial-accounting has not, however, had the expected success in improving the behavior of microbusinesses (Bali and Varghese, 2013). ICTs are thus an appropriate vehicle for developing a model for more efficient financial-accounting training. Other characteristics, such as the time at which training is delivered, its content, and its various pedagogical forms (dissemination of podcasts) are key elements in the success of financial training.

Numerous economic studies underscore the pivotal role of financial inclusion in driving economic development, yet its efficacy is hindered by persistent challenges, notably a lack of proper financial education. Scholars stress the need for comprehensive programs that incorporate training in business skills to enhance financial literacy and foster positive financial behaviors among beneficiaries. Goyal and Kumar's (2021) systematic reviews from 2000 to 2019 reveal the significance of financial literacy, planning, and education, as well as the growing importance of financial innovation and technology (FinTech) in facilitating inclusion and ameliorating income inequalities (Ozili, 2021).

In 2020, attention shifted toward understanding the multifaceted impacts of financial inclusion, particularly in the realms of poverty alleviation, empowerment of the rural population, and overall economic growth. Advocacy surged for tailored banking products and strategic deployment of digital technologies to bolster financial access and literacy (Koomson et al., 2020; Churchill and Marisetty, 2020; Adegbite and Machethe, 2020; Demirguc-Kunt et al., 2020; Zimmerman et al., 2020). Despite considerable progress, various studies stress that disparities persist, especially in terms of access to managerial and financial resources (Si et al., 2021; Bourgault and Donnell, 2020; Martinez and Jayawarna, 2020; Sangem, 2020).

2.3. Information Technologies

The swift integration of ICTs into low-income countries and communities has opened avenues for substantial developmental opportunities. When combined with the right human and financial resources, ICT adoption is a catalyst for economic advancement. Firstly, ICT implementation has shown promise in stimulating economic growth, opening paths to saving and income generation among individuals and microenterprises in low-income communities (Abraham, 2007; Donner and Escobari, 2010; Levy et al., 2010). Although comprehensive cost-benefit analyses are scarce, evidence suggests a favorable return on investment at both individual and community level, particularly in microenterprise settings (Jensen, 2007). Secondly, ICT adoption, complemented by accounting and financial software solutions, contributes to sustainable development by facilitating creation of additional assets and innovative financial strategies, which can yield long-term benefits (Heeks and Arun, 2010; Molla and Al-Jaghoub, 2007).

Integrating ICTs also fosters an educational virtuous cycle, enhancing the capabilities and motivation of individuals and employees in villages and small businesses in developing countries (Urquia-Grande et al., 2018; Kivunike et al., 2009; Olatokun, 2009). Rapid technological advancements have also opened avenues for generating and leveraging strategic information, avenues crucial to enabling small businesses to navigate the uncertainties of competitive markets (El Louadi, 1998). ICT adoption is especially imperative in economies dominated by microenterprises, as ICTs are essential for fostering economic development and growth. Analyzing the impact of ICTs on smaller enterprises thus becomes pivotal. Investing in these technologies could give small businesses a competitive edge, positioning them for better outcomes (Pérez-Estébanez, Urquía-Grande and Muñoz-Colomina, 2010; Ismail and King, 2005) due to their inherent flexibility and responsiveness.

In the African context, numerous studies stress the importance of creating an enabling environment that relies on ICTs to achieve long-term social and economic development (Perez-Estebánez, Urquía-Grande and Cañizares, 2022; Pérez-Estébanez, Urquía-Grande and Rautiainen, 2018; Dasuki, Abbott and Azrikatoa, 2014; Ojo et al., 2013; Hilty and Ruddy, 2010; Mbaku, 2000). Causal relationships have been demonstrated between ICT adoption and technological efficiency in both developed and developing countries (Brynjolfsson and Hitt, 1998). Various implementation scenarios have been proposed to explain the potential impact of ICTs on development (Orliwoski and Iacono, 2001; Sein, 2004). Globally, ICTs are acknowledged for their transformative potential in driving development, industrialization, and economic growth (Tongia, Subrahmanian and Arunachalam, 2004). Much research has focused on microenterprises as the unit of analysis in the attempt to understand ICTs' contribution to development through their impact on these enterprises (Heeks and Molla, 2009). Indeed, studies like that by Esselaar, Stork, and Ndiwalana (2006) show that ICT adoption correlates with higher labor productivity and sales turnover in African SMEs, identifying these technologies as key variables for achieving developmental goals.

2.4 Mobile technologies

Mobile technologies, especially podcasts, are essential in delivering educational resources to rural communities, especially in the agricultural sector. Such delivery stresses the cost-effectiveness and widespread accessibility of mobile phones as drivers in adopting podcasts as an educational tool. While mobile-based applications and services have proliferated in agriculture since 2007 (providing valuable information on market prices, weather, and agricultural techniques), challenges persist, and the full impact of these initiatives remains unclear. Despite past perceptions associating mobile use with wealth, rigorous impact evaluations are needed to gauge their effectiveness in enhancing farmers' knowledge, adoption of practices, and overall welfare. Figure 1 shows how Africa had achieved nearly 100% subscriptions among the population by 2023, although the process of incorporating smartphones is slower than in the developed world, with the MENA and sub-Saharan Africa regions showing the lowest rates of mobile Internet. In 2022, 55% of the world's population could access mobile Internet. Penetration was highest in Europe, at 85%, while North America had only 83% and sub-Saharan Africa only 23% access. This region also has a high usage gap of 60%. (The usage gap measures the proportion of the population covered by mobile data networks but lacking access due to barriers such as affordability or lack of digital skills.)

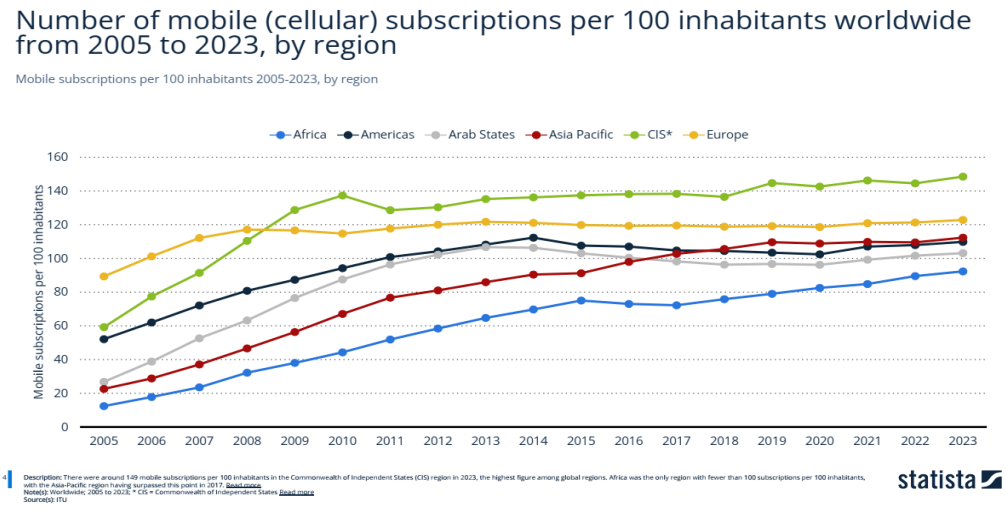

Figure 1: Number of mobile subscriptions by region from 2005 to 2023

Figure 2 adds the type of technology developed in this region. We see that 3G technology (the minimum needed to access the Internet) did not surpass 2G technology until 2020.

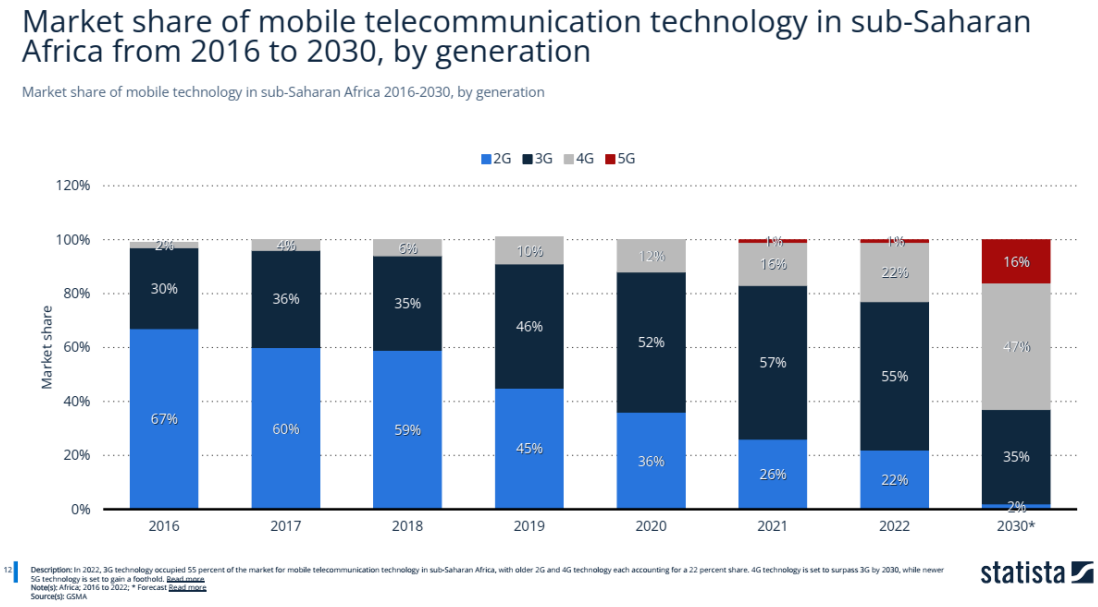

Figure 2: Mobile telecommunication technology market share

Given that sub-Saharan Africa has less penetration, worse technology, and lower usability of smartphones, it is difficult to reach the regions with applications that require speed, technology, and smart mobile devices.

In contrast to many other regions of the world, where smartphones dominate, basic telephones constitute an important part of the mobile market in Africa. Of the 40-50 million cell phones sent to Africa every trimester, over half are basic phones. In these regions, however, more people have access to mobile devices than to water or electricity. To take advantage of this opportunity in Africa, people are developing new applications for old phones, which continue to have important uses. Multiple applications are being developed that can be used through SMS to bring these apps to a large part of the population. Esoko, founded in Ghana in 2005, initially aimed to provide market price information to farmers via SMS. M-Pesa, launched in Kenya in 2007, facilitates mobile payments and transfers for those without access to traditional banking. M-Farm offers transparency for Kenyan farmers, providing market information and connecting them with buyers. Africa Podfest promotes African podcasters and aims to elevate diverse African stories in the media landscape.

In the African context, where massive development of mobile use is occurring through SMS voice messaging and an increasing number of downloadable app, the podcast is a very valuable tool for transmitting knowledge of any kind, especially in rural areas of different African countries. It is a form of sound recording that focuses on sharing ideas and providing knowledge. In our case, the goal is clearly to help people whose lack of economic resources makes it very hard to access any type of education. The content and goal of these educational podcasts is to help people in rural areas that are hard to access by providing them with transformation and learning. We therefore prepared serious

content narrated by local people. The open dynamic and simple questions for the audience make the podcasts both educational content and a pleasant, enjoyable talk that is easy to understand.

The technological part of the project is a system that can reach a large segment of the population with only a small amount of data. Content can thus be stored in the mobile phone (it takes very little space) so that the receiver can listen to it as often as necessary.

2.5. Context

Ethiopia is one of the most densely populated African countries. Agriculture is a substantial part of the gross domestic product (GDP), and approximately four fifths of the population lives in rural areas.

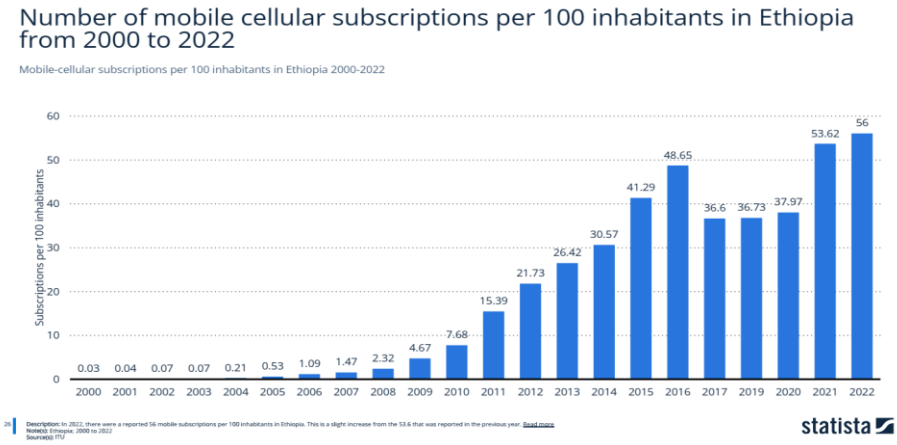

Figure 3: Number of mobile subscriptions in Ethiopia from 2000 to 2022

Network coverage and speed are also lower than average in Africa, with speed slower than 5 megas in most of the network.

Map of speeds 3G / 4G / 5G of MTN Mobile in Ethiopia

Red móvil MTN Mobile

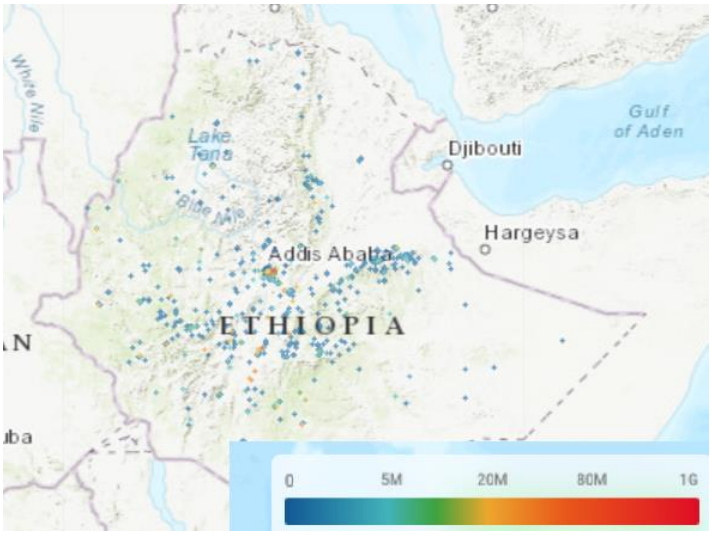

Figure 4: Map of speeds in Ethiopia

We performed the fieldwork in six villages around the city of Muketuri, 80 km north of Addis Ababa. These villages are located in the North Shewa zone, one of the poorest zones and among those with the greatest food insecurity in Ethiopia. Although only 80 km from the capital, the area is rural. Most of the population lives in mud houses, and access to basic services such as water, electricity, and communication is difficult. North Shewa is currently one of the least politically secure regions of Africa. Its citizens' way of life is based on agriculture, although only during the rainy season and with only one harvest per year. A small minority also raises cattle, sheep, and goats.

In our study, researchers collaborated with an NGO based in the Muketuri area of Ethiopia (Urquía-Grande et al., 2028; Urquía-Grande and Rubio-Alcocer, 2015). For over 20 years, this NGO has worked developing nutrition, agriculture, and educational programs. It manages a community sanitation project that includes preventive medical services, community training, environmental health, continuous training in agriculture and economics, nutritional rehabilitation, an animal farm, children's day care centers, and promotion of agricultural and new water resources. Recently, the NGO launched a new program that focused mainly on improvements in agriculture with donations for new wells (Urquía-Grande and del Campo, 2017). The NGO is also training farmers in six rural Ethiopian villages (Urquía-Grande et al., 2018). The villages are considered to be among the poorest in Ethiopia and at high risk of malnutrition. The main ethnic groups living in the area are Oromo and Amhara. Teff, a local grain and the only plant cultivated in the area, has low nutritional value. The NGO has managed to build 89 wells in the following six villages included in the study: Gimbichu, IguKura, Rob Gebeya, Jebene, Arkiso and Gore Ketama. These villages are the ones that have the deeper and more efficient drilled wells. The NGO provided much of the information about the empirical work and infrastructure grants. Typically, the hand-dug wells are 12 meters deep and cost on average 1,050 USD per unit. These wells enable farmers and their families to have access to clean water and to create small vegetable gardens. This ability to cultivate a variety of vegetables (potato, garlic, onion,

spinach, carrots, and cabbage) is very valuable both nutritionally and economically. The drilled wells are much more expensive and cannot be built in all the fields.

3. Method, Instrument, and Sample

The methodology followed in this study has two clear parts. The first stage began with development of seminars with clear content on social sustainability. In these, we created the tool that would be the foundation of the experiment—the podcasts. The students solved the case presented in the seminars, with the help of some podcasts designed and developed for this purpose. In the second phase, the podcasts on the agricultural and financial training that the NGO provided to the farmers in rural Ethiopia were improved using the feedback from the more sensitized university students and then disseminated in the villages.

Preparing the podcasts was a very complex task. They were designed using the following system. First, we chose the main tasks for improvement in the field of agriculture, family nutrition, and sale of surplus, with the help of specialized technicians and professionals. After we chose these activities, the scripts were prepared for the six podcasts on key agricultural activities, optimal times for these farming activities, preparation of budgets, sales strategies, nutrition, and food conservation (Appendix 1). Second, through a process of searching for students with links to Ethiopia and the topic, we chose people of Ethiopian origin to record the podcasts to ensure more fluid transmission. Two Ethiopian-origin university students studying at the Faculty of Information Sciences of University recorded the podcasts in English and Amharic (official language of Ethiopia, spoken by approximately 30 million inhabitants), with the help of the technical staff of that Faculty (see Figure 5). Whereas use of computers in emerging countries is hindered by cost and difficulties with electrical supply, the mobile phone is used widely and has become part of people's daily life (Pérez Estébanez et al., 2022; Urquía et al., 2018). These podcasts, devoted primarily to the best times to perform farming tasks, preparation of budgets, sales strategies, nutrition, and food conservation, were then disseminated to the university students and subsequently to six villages in Ethiopia. Two highly motivated students in the first phase did a 65-day internship in the area, and various local volunteers also helped to translate the podcasts into Oromo, the main local language, to cover communication with all farmers. The warm reception of the podcasts, first by the students and then by the farmers in most of the villages, shows that we chose well. Third, we established time limits of no more than three minutes per podcast to keep listeners' interest and used the question-answer format in each recording to make them dynamic and educational. The podcasts have been registered in Spain's Intellectual Property Office.

Figure 5: Ethiopian students recording the podcasts in the Faculty of Information Sciences

Phase 1 - Seminars

The professors from the project prepared a case study on management accounting and finance. The case consisted of a project finance that analyzed donation of wells for microfarmers in Ethiopia and performed a profitability analysis. The case, entitled “Among vegetables,” was based on the experience and data collected from professors and volunteers from several NGOs that work in Africa and that had provided prior data as the starting point for the case. The professors on the team delivered seminars in several degree and double degree programs in each of the Faculties of Economics at different Spanish universities (see Figure 6). Students in these seminars had previously to read two research articles on the topic. The first article analyzed the differences in perception of the improvement that farmers in a rural region of Ethiopia perceived after financial training sessions (Urquía-Grande et al., 2021). The second analyzed the variables that influenced the NGO’s beneficiaries’ perceived need for training courses on agriculture, nutrition, and accounting (Urquía-Grande et al., 2018).

To contextualize the case, the students were expected to listen to the podcasts on the key agricultural activities, best practices, preparation of budgets, and sales techniques. We also asked them to give feedback on the podcasts to improve them before disseminating them among the farmers.

Finally, the students completed a questionnaire on the case study, which assessed their commitment to cooperation and development, critical reflection and systemic learning through solving case studies, and perception of their participative learning and creative thinking. The survey also incorporated sociodemographic characteristics that could be moderators of the interrelations among the variables. The quantitative survey, accessible to all students through the university's platform, was

divided meticulously into three segments. The first gathered information on socio-demographic aspects, followed by a series of closed Likert scale questions about awareness, learning, and commitment in the seminars on cooperation for development. Each question informed students that the answers were ordered progressively such that: 1= Strongly disagree, 2= Disagree, 3= Neutral, 4= Agree, 5= Strongly agree. Binary queries, labeled as dummies, also provided succinct insights with affirmative or negative responses. The last five questions were about the case run in the seminars on a real NGO tackling its need for financial or infrastructure resources to help farmer beneficiaries in rural Ethiopia.

Figure 6: Students who attended the seminar worked on solving the practical case "Among vegetables."

Sample in Phase 1:

The sample consisted of 422 students, in accounting classes, who attended the seminars, solved the case, and completed the survey. The students were from seven undergraduate single or double degree programs in Accounting and Finance. More specifically, they were pursuing a Bachelor's in Economics and Business Administration, a double degree in Business Administration and Law, a Bachelor's in Business, a double degree in Commerce and Tourism, or a double degree in Business Administration and Service Management and Engineering. Although these degree programs were delivered at six different Spanish universities, data were only obtained from three universities (one public and two private) because the lecturers at the other universities did not have time for the students to complete the survey.

Our descriptive analysis of the sample shows a slight majority of male students (male 51% and female 49%) and an average age of 20 years. Most participants were from Business, followed by double degrees in Business with Law or Business with Computer Science.

Phase 2 – Dissemination of the podcasts

The second phase of the project was performed in rural Ethiopia. The goal was to disseminate the podcasts to the Ethiopian farmers and gather information on the farmers' listening to and degree of understanding of the podcasts. Two students from the University traveled to the area to disseminate the podcasts with the help of the NGO and to gather information on the dynamics of listening and the utility of the podcast as a means of transmitting information in rural areas to people with very minimal academic education (68% of the 320 had no formal education and the rest had only primary education). One of the priority goals of the project was to analyze whether significant differences existed in assimilation of the information received and putting it into practice, in line with Kandhway et al. (2014) and Woo and Hsinchun (2016).

First, the students met with the volunteers to explain the project to them and give them the podcasts (Figure 9). They estimated the number of people needed to disseminate the podcasts in the six villages. In some villages, they found people who could help disseminate the podcasts in the village and in other nearby villages. This method enabled the villages to be self-sufficient in listening to the podcasts, Reducing the trips the volunteers had to make was beneficial, as travel could be difficult in conflict situations, which were common in the area.

Figure 9: Students doing internships in the NGO in Ethiopia, teaching farmers how to listen to the podcasts

Second, the two students traveled to the six villages to administer the survey on listening to the podcasts and their benefits. Farmers who listened to the podcasts and completed the surveys were given seeds as a thank-you for their participation in the study. After having worked in several agriculture and commercial projects together with the NGO for several years (mainly 2011-2023), the researchers designed and performed a socio-demographic analysis with questions about agricultural and economic circumstances. The questionnaires were administered randomly among the farmers' households in the six villages mentioned. The questionnaire was designed to gather initial information about the NGO program beneficiaries. It was tested and validated by a panel of academic and

practitioner experts. The goal of the survey was to help disseminate the podcasts as a means of financial and accounting training.

Sample in Phase 2

The study involved 320 farmers from six villages, typically with more than 5 family members per household. Most respondents were between 20 and 30 years old with primary school education. The majority were self-employed in agriculture, though some also worked in manufacturing or services. Many farmers received training in agriculture and nutrition from the NGO, which they found valuable. Economic training was also seen as useful. Monthly income varies, with a typical farming household earning $50, though some earned less than $6 per month.

Data analysis:

The survey data were analyzed and multivariate analysis performed by applying backward stepwise regression with SPSS 27 software.

4. Findings

4.1. Findings in higher education: Student awareness and motivation through financial education

To answer RQ1, we can affirm that the study obtained positive results, thanks to the motivation of all groups participating in it—students, professors, and the student volunteers who traveled to the area—and the collaboration and dedication of members of the NGO, the Ethiopian volunteers, and the farmers.

The number of activities performed both in the University environment and in Ethiopia, enabled us to evaluate the execution of the project very positively.

As to the research question whether the seminars increased university students' awareness in line with the accounting-financial information aligned with the SDGS before the seminar, a majority (37.4%) achieved a medium level of sensitization (see Figure 10).

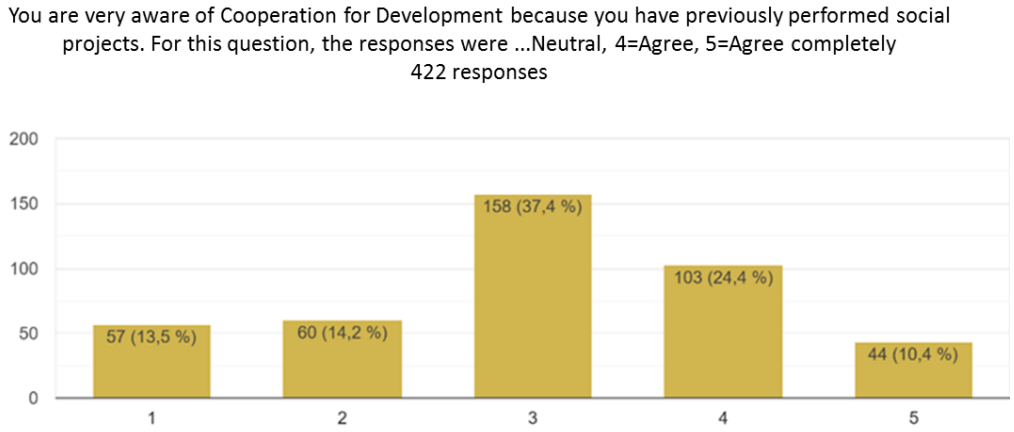

Figure 10: Average of the 422 student responses before taking the seminars on Sustainability

In the survey done after the seminar (figure 11), the responses show clearly that the students who took the seminar expressed greater involvement in topics of cooperation for development, as more than 73.5% of the responses ranged from “more interested than average” to “very interested.” This figure increased to 93% with the inclusion of students who answered “very interested.”

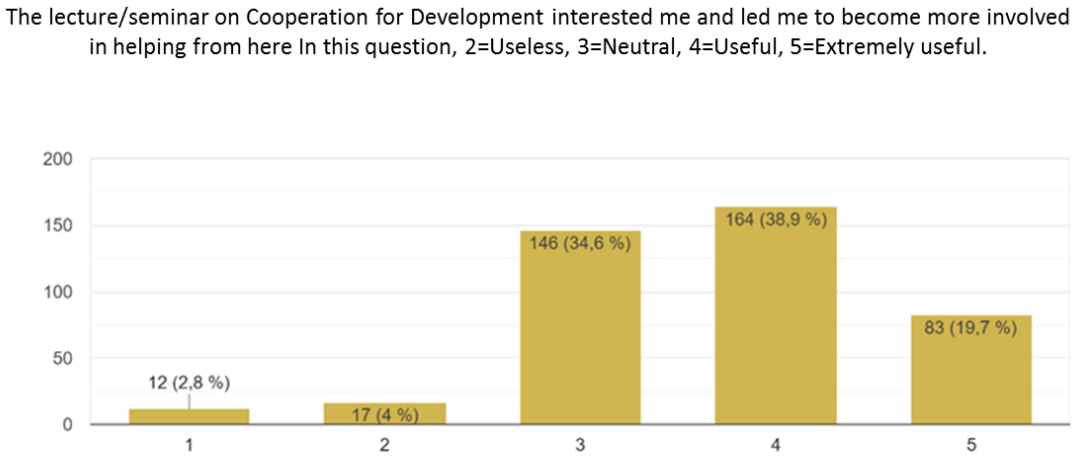

Figure 11: Average of the 422 student responses after taking the seminars on Sustainability

After the seminar, most of the students (43.6%) indicated that the NGO’s case study was very useful, as were the wells for the beneficiaries (Figure 12).

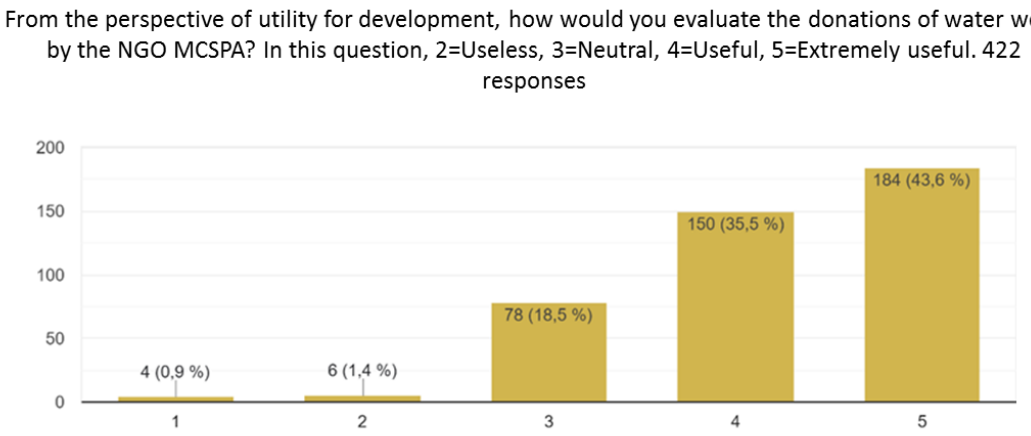

Figure 12: Average of the 422 student responses after taking the seminars on Sustainability and when evaluating the utility of the project finance case study posed in the seminar

Further, students showed excellent involvement, from the 2% of the students who took the seminars to 8.5% who asked to do a Degree Thesis on the topic—an increase of 325%. The curricular internships increased, from 5.7% to 17.1% of students who attended the seminars wanting to do internships in the NGO in Ethiopia. We also managed the substantial achievement of gaining permission for two students to perform the knowledge transfer from the University to the beneficiaries of the NGO through the podcasts. They traveled to Ethiopia during the months of July and August, 2022.

These students subsequently disseminated their experience in various seminars in the participating universities (after having signed a Frame Agreement for Educational Cooperation with the NGO). They traveled to Ethiopia during the months of July and August, 2022.

Another finding was our discovery that 84.6% of the students interviewed thought that they should have more courses that focused on cooperation for development.

The students believed that the seminar was very useful for learning and for deepening their knowledge of cooperation for development. Of 422 student responses, 70% gave the seminar a score of 4/5.

Having made a real case on cooperation for development available to the students was both a challenge and a satisfaction for instructors and students. The students' participation showed a latent awareness that small stimuli can achieve students' involvement in future projects on aid for development. Once the students knew the cases, they contributed proposals to improve the cooperation for development and were able to lead proposals and actions. Over 35% felt that they were able to lead a work group.

4.2. Findings in rural Ethiopia about knowledge transfer through podcasts

We now discuss the findings on RQ2, to analyze whether transfer of knowledge from the University to an emerging country (Ethiopia) has been achieved.

Thanks to dissemination of the podcasts, we achieved transfer of knowledge from the University to the strategic destinations in which the cooperation project was being conducted. The results differed by village, however. The villages that had been collaborating longer with the NGO showed less interest than the villages that had begun collaboration more recently. The latter evaluated the podcasts more positively. We observed that 100% of the farmers attended the training courses on use of the podcasts, all used a mobile pay phone with 2.5 G or 3G, and 31% provided information on the amount they paid for their cell phone card. Fifty percent of the farmers listened actively to the podcasts.

The students who did internships administered the survey to the farmers from six villages. The surveys included a series of questions that enabled us to evaluate their level of comprehension of the information in the podcasts. The scores ranged from 0 to 5 for podcasts 1 (introductory) and 5 (sales), which were the most representative. We assigned a score of 0 to the questions left blank. The average score for the full sample of six Ethiopian villages was 2.5 points for both podcasts, with a mean of 3, while 31% and 34% of the respondents gave podcasts 1 and 5 scores or 0/1, respectively (see Figure 13). These percentages were not distributed uniformly among the different villages.

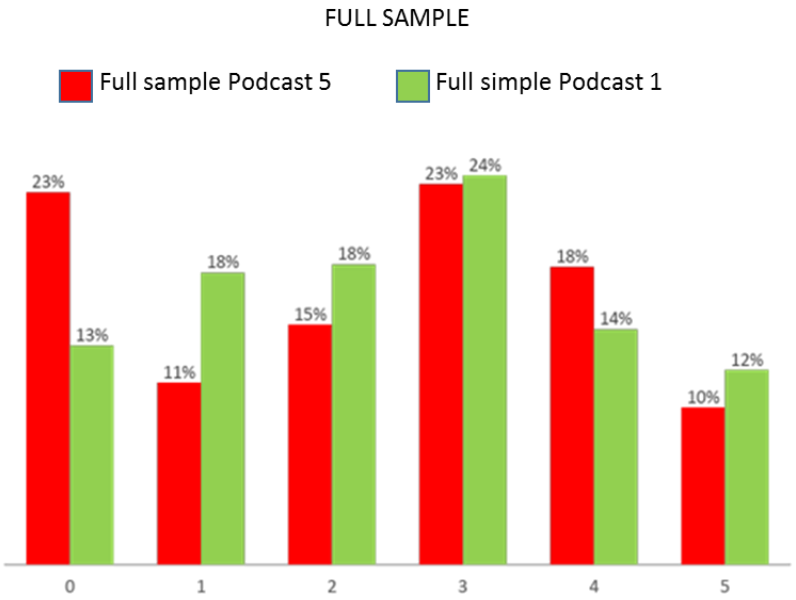

Figure 13: Evaluation of podcasts 1 and 5 with information from all villages

We analyzed the scores by village using the following criteria. We primarily evaluated the degree of interest in the podcasts (considering scores of 0/1 as indicating no or little interest) and dismissed villages with high percentages of these two values. We believe that a score of 0 (no answer) or 1 (very poor) indicates that the farmers were only motivated to participate by being given seeds from the NGO for listening to the podcasts. Due to this greater interest, we prioritize the results of podcast 5 (educational podcasts on sales techniques) over those for podcast 1. High scores are evaluated positively.

We now describe the results for listening to and understanding of the podcasts' content in the villages that had begun collaboration more recently. We end with the villages that had collaborated for the longest time.

In the village of Jebene (See Figure 14), 22% of the population for podcast 1 and 14% for podcast 5 did not participate at all (attended the meeting but either did not answer the questionnaire or gave a low score on the survey, scores of 0 and 1). In both podcasts, over 65% of participants approved, as the sales podcasts improved in high scores, with averages of 3 and 3.16, respectively. Education and knowledge transfer in the podcasts were evaluated positively.

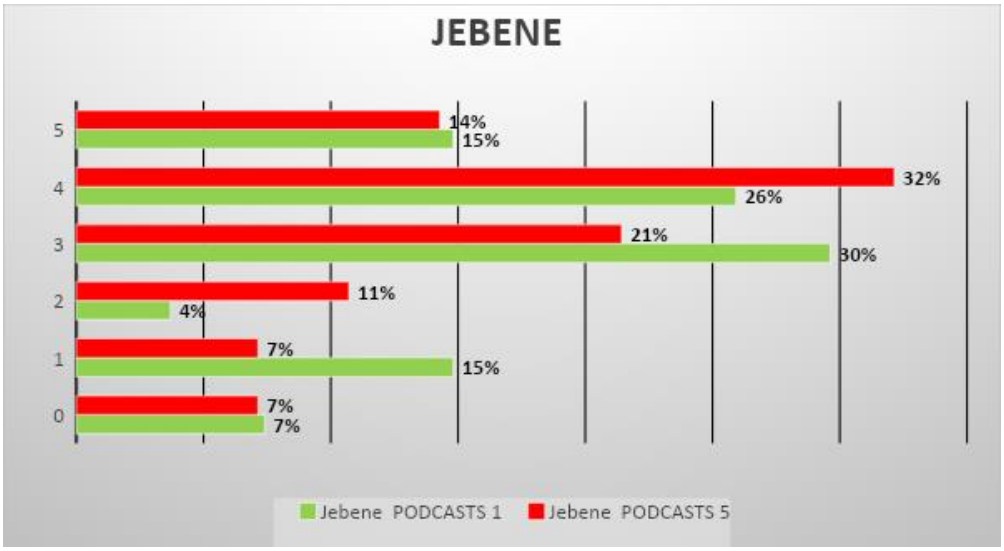

Figure 14: Evaluation of listening and comprehension of podcast content in Jebene

Participants from the village of Arkiso (see Figure 15) gave very few scores of 0 and 1 (6% and 13%), as well as very few very high scores. The averages were 2.9 for podcast 1 (introductory) and 3.1 for podcast 5 on sales. Here too, knowledge transfer was evaluated positively.

Figure 15: Evaluation of listening and comprehension of podcast content in Arkiso

Arkiso is a rural village with few wells built and donated by the NGO and with few families currently trained in agriculture and nutrition. The NGO has only recently begun to work with the village, having built and donated only four wells. Interestingly, farmers who had not registered wanted to attend, in addition to the farmers who registered for the training. This demand can be considered a success. The answers obtained in this workshop show that the majority of the farmers who attended have wells, have created vegetable gardens, and are cultivating the different vegetables the NGO taught them to cultivate. Farmers are very grateful for the NGO's help. When asked about the agricultural activities, they knew the main labor activities involved, affirmed their need for tools, and liked the financial training through podcasts.

In the village of Gore Ketema (Figure 16), the score for listening to the podcasts was on average 1.8 and 2, respectively. The percentage of scores of 0 and 1 was high, 53% and 43% respectively. Gore Ketema thus evaluated listening to the podcasts negatively.

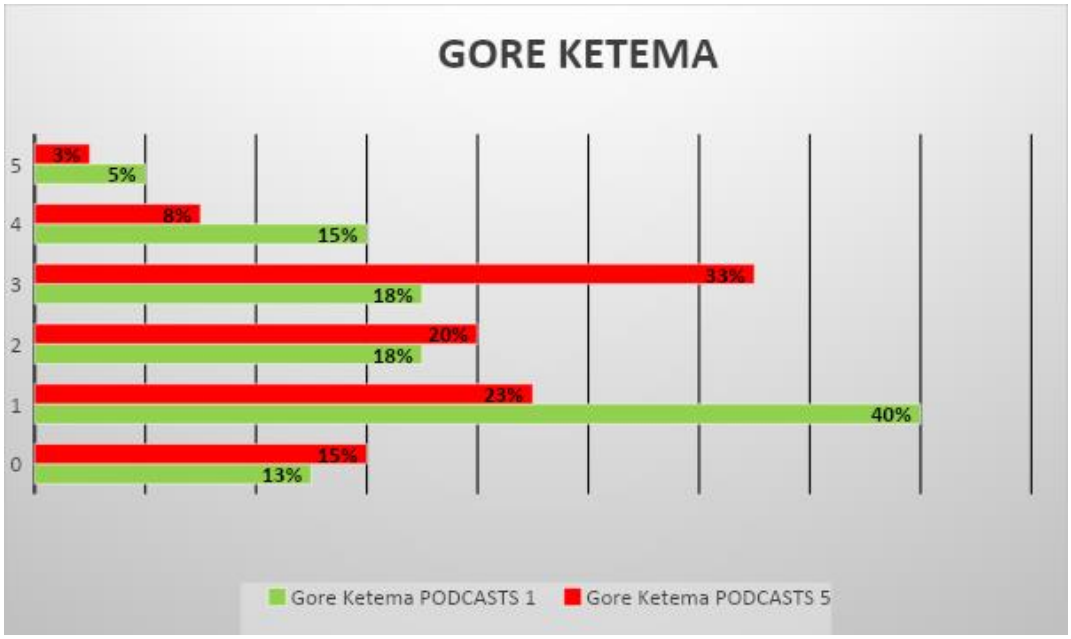

Figure 16: Evaluation of listening and comprehension of podcast content in Gore Ketama

Gore Ketama is a larger village with 3 wells built and donated by the NGO and families currently trained in agriculture and nutrition. It primarily cultivates teff. Most farmers who attended have wells, have created vegetable gardens, and are cultivating the different vegetables the NGO taught them to cultivate.

In the village of Igukura (see Figure 17), the averages for listening to the podcasts were 2.5 and 1.9, respectively. The average is especially low for the podcast on sales, one of the most important. For this podcast, 42% of the scores were 0 and only 22% of respondents gave it high scores. Again, this village evaluated the listening negatively.

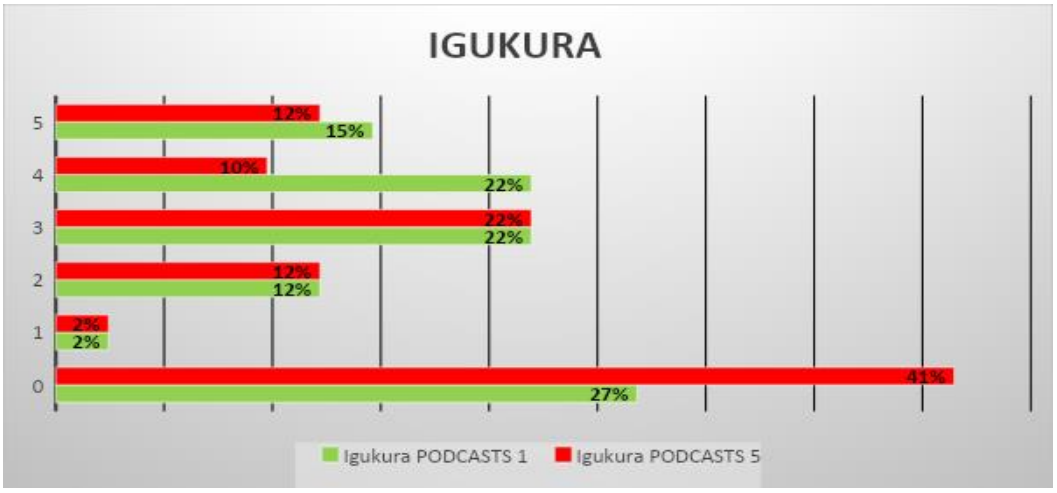

Figure 17: Evaluation of listening and comprehension of podcast content in Igukura

Igukura is a rural village with 11 wells built and donated by the NGO and few families currently trained in agriculture and nutrition. It primarily cultivates teff. The NGO began to work there 7 years ago and has built and donated only four wells.

In the village of Rob Gebeya (see Figure 18), podcast 1 obtained average scores of 1.9 and podcast 5, 1.6. This village has the worst results year after year, with decreasing frequencies: 39% of the population did not answer the test or was unable to understand the information contained in the podcasts. This is not a problem of language, as the podcasts had been translated into Amharic/Oromo. This village evaluated listening to the podcasts negatively.

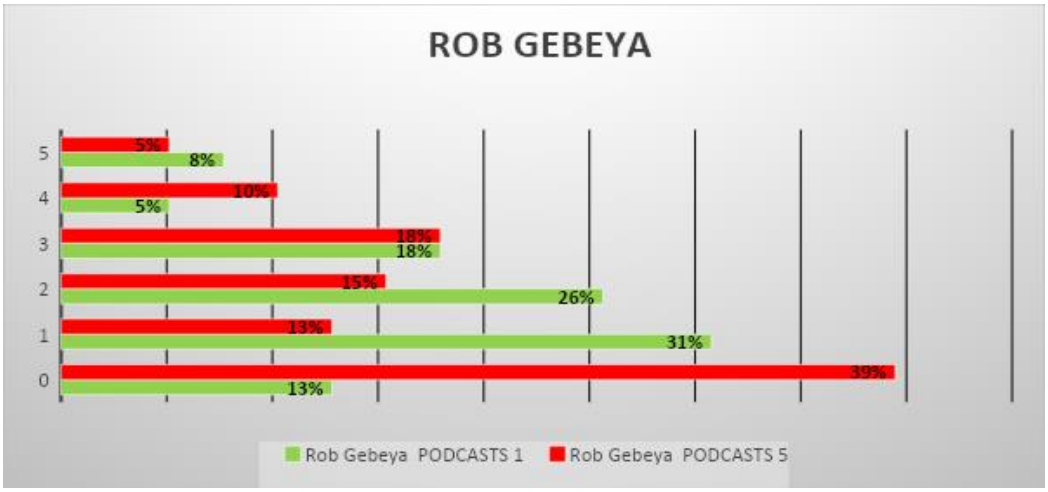

Figure 18: Evaluation of listening and comprehension of podcast content in Rob Gebeya

Rob Gebeya is a rural village that only recently began working with the NGO. It has 14 wells built and donated by the NGO and 63 families have trained in agriculture and nutrition. The village usually rented the regional governmental agriculture office for the training workshop. Participants were mostly women, and they participated actively. All were highly motivated and interested in the NGO project. They commonly thanked the NGO and the teachers and motivated the group to participate. Best practices in agriculture and value-added activities were not explained very well. Three translators were needed. When the workshops ended, the survey was collected, and seeds were distributed. In recent years, this town has demanded a lot from the missionaries. As the latter were unable to give the town more wells, the people have become less motivated and the relationship is now very tense and that could explain the negative results.

In the village of Gimbichu (see figure 19), the average on both podcasts was 3.2. High scores constituted 65% of the responses for podcasts 1 and 5. This village evaluated listening to the podcasts and knowledge transfer very positively.

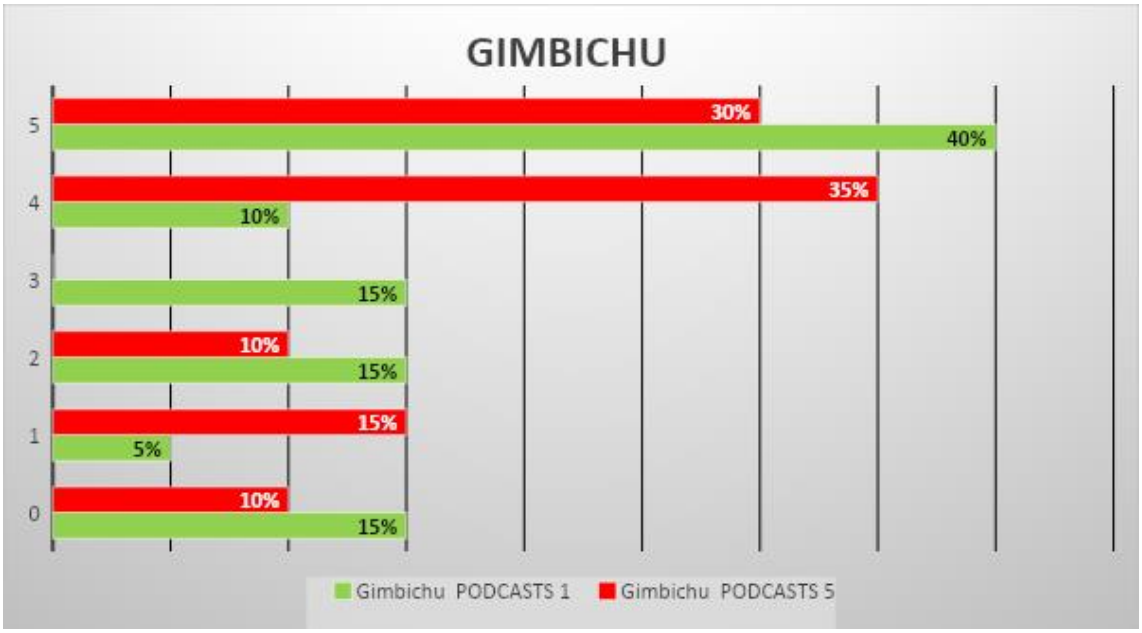

Figure 19: Evaluation of listening and comprehension of podcast content in Gimbichu

Gimbichu is the most rural of the villages where the NGO has built and donated 24 wells, with 90 families trained in agriculture and nutrition. It is the village where the NGO has been working the longest. Further, 10 years ago, a nutrition center was created where mothers rather than salaried workers are in charge. Most of the families who share a well have built a vegetable garden and cultivated several crops after being trained by the NGO, have provided better nourishment for their families, and have even sold their crop surpluses in the market. A group dynamic was established to begin the interactive questioning. All farmers participated actively and expressed interest in improving agriculture practices and nutritional habits. Analytical income statements, as well as concepts of savings accounts, were introduced. The participants expressed their gratitude to the NGO, which had built and donated the wells, while also providing training for the creation of vegetable gardens. The participants have achieved better family nutrition and have just started a nutritional center with a kitchen for children's needs. Most importantly, the villages have two leaders, Derribe and Kidane, a woman and a male farmer who have the full confidence of the NGO. These leaders are managing the nutrition center and leading the farmers. Three translators—NGO workers—are usually present because the workshops are introduced in English and translated into Amharic. These farmers participated actively and wanted to describe their experiences in the cultivation process. The workshops ended with gifts of seeds and survey completion. Finally, some farmers requested wells because they saw the improvements their peers had made and wanted to benefit from these improvements too. The whole seminar drove the researchers to redesign the presentation and adapt the curricular content to local needs.

In general, the populations of the different villages were very similar in education level and gender. The methodology was identical in all six villages. Yet three villages clearly show lack of interest and

understanding levels well below the others (most surveys showing scores of 0/1). It seems clear that people only attended the meeting due to the incentive (receiving seeds).

The villages with the worst scores were those that had had longer contact with the NGO. This result is interesting. We also observed this trend in other studies. Villages with high participation (in which the frequency of 0 is low) primarily obtained scores of 4-5. That is, the farmers understood the content of the podcasts and evaluated them positively.

Thanks to the diffusion of the podcast, we were able to transfer knowledge from the University to strategic destinations in which cooperation projects were being conducted. We also achieved double knowledge transfer that will improve the dissemination and impact among university students to increase their level of awareness and commitment to this type of project. It will also increase awareness and commitment among farmers in emerging countries, through training adapted to the conditions of life in these enclaves. The possibility of improving the education of farmers in developing countries is thus greater due to the incorporation of the ICTs and the University. The various workshops conducted in six villages with different paces and scenarios had good success.

There is clear evidence that the farmers give better information when they are surveyed and follow NGOs' directions on responsible agriculture when planting and when feeding their families.

5. Conclusions

The study achieved three fundamental goals. First, it transferred knowledge to university students, fostering first their curiosity and then their interest in cooperation for development projects. We also managed to involve professors who generally worked outside this topic, getting them to attend the seminars and conferences where members of the NGO with which we worked were present. Second, thanks to dissemination of the podcasts on which the students had collaborated during the process and when doing their curricular internships in the NGO, we managed to transfer knowledge from the university to strategic destinations in which the cooperation project was conducted. We predict that this double knowledge transfer will improve dissemination and impact among university students to increase their level of awareness and commitment to this type of project and among farmers in emerging countries, through training adapted to the conditions of life in these enclaves. The possibility of improving training of the farmers in developing countries is greater thanks to the incorporation of ICTs, as we hope to show with the results of this project.

This study has some limitations. The sample is small, and we only analyzed one NGO. Part of the project was conducted during the pandemic, and the civil war in Ethiopia made it difficult to access some towns.

Future lines of research could focus on better practices to improve efficiency of farming and farmers' agricultural activities through ICTs. Education through podcasts was the best option during a public health or political crisis.

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Appendix 1:

Podcast 1 – Introduction [https://wereadees.com/recursos/]

Podcast 2 – Main activities to grow vegetables – part 1 [https://wereadees.com/recursos/]

Podcast 3 – Main activities to grow vegetables – part 2 [https://wereadees.com/recursos/]

Podcast 4 – Earn money improving your crops [https://wereadees.com/recursos/]

Podcast 5 – Earn money improving your sales [https://wereadees.com/recursos/]

Podcast 6 – What to do with you money [https://wereadees.com/recursos/]