



IMPLEMENTATION OF THE SACHA INCHI AGRIBUSINESS (*Plukenetia volubilis*) AS A STRATEGY FOR THE GENERATION OF DECENT WORK AND PRODUCTIVE SKILLS IN RURAL WOMEN PRODUCERS

CARLOS GUTIERREZ DE PIÑERES¹, CARLOS RAMÓN. VIDAL TOVAR^{1,2}, HERMES IZQUIERDO TORRES³, YIMY GORDON HERNANDEZ^{1,2}

¹Universidad de Santander (UDES), Valledupar, Cesar, Colombia

²Universidad Popular del Cesar (UPC), Valledupar, Cesar, Colombia

³Leader of the Arhuaca ethnic group Valledupar, Cesar, Colombia

acceptance date: November 12, 2022; Publication date: December 13, 2022

Abstract

During the period of the armed conflict in Colombia, the Rural Women of the Pueblo Bello municipality, Department of Cesar in Colombia, were subjected to victimizing acts, of 1,408 events officially reported in the Victims Unit of the Ministry of the Interior, 1,275 were against indigenous women and 189 against Afro-descendant or black women, for this reason a group of rural women sought a productive alternative of an Agroindustrial nature of high productivity in a prudentially short time and with real demand in the market, with added value for their labor force, for this, the cultivation of sacha inchi was chosen to transform it into a snack. 60 women were selected among the Arhuaca and Afro-descendant ethnic groups, who were trained in issues inherent to food production and business formalization, they also received technological strengthening for the implementation of 5 hectares of Sacha inchi and an agribusiness to transform this seed into snack. The results represent a true laboratory of peaceful coexistence and hope for decent work to reject the illegal proposals of the groups that generate violence in Colombia.

Keywords: Agribusiness, Technological capacities, Rural Women, Indigenous Women, Black Women

1. INTRODUCTION

During the period of the armed conflict in Colombia, Rural Women of the Pueblo Bello municipality, among others, were subjected to victimizing acts, of 1,408 events officially reported in the Victims Unit of the Ministry of the Interior [1], 1,275 were against indigenous women and 189 against Afro-descendant or black women; one of these events is represented by the forced displacement of their productive lands on behalf of illegal armed groups, in other cases the disappearance of the romantic partner or some close relative (daughter, son, father, mother, brother, sister), also sometimes they themselves were raped, subjected to servitude in favor of illegal armed groups without any remuneration [2]. For these reasons, the municipality was prioritized in Decree-Law 893, called Development Programs with a Territorial Approach-PDET, with DANE code 20570 (May 28, 2017), motivated by the level of victimization of these communities [3]. The Constitutional Court of Colombia, by means of judgment T-045/10, victim of internal armed conflict who holds the status of displaced, has issued the libel of direct reparation for Rural Women who return to their lands trying to carry out legal productive activities, in fact they are small family farmers, many are mother's heads of household precisely because of violence [4].

In this context, Rural Women sought a productive alternative of an Agroindustrial nature of high productivity in a prudentially short time and with real demand in the market, with added value for their labor force [5]; that is why the vast majority chose the cultivation of Sacha inchi (*Plukenetia volubilis*), of which there are about 5 Hectares in production in Pueblo Bello [6]. This crop produces a seed with a high nutritional content of which can be converted with relatively simple semi-manual techniques into a snack product, in high demand in cities [7]. Therefore, the present project aimed to support 60 rural women in their right to decent work through the agribusiness of the Sacha Inchi (*Plukenetia volubilis*) in the municipality of Pueblo Bello, Department of Cesar, Colombia.



2. MATERIALS AND METHODS

The research had two main activities: 1) Training for the beneficiaries and 2) Strengthening of technological capacities. For the first activity, a team of expert facilitators in education with communities was formed, based on the andragogical methodology. Likewise, the work was carried out through the application of a situational, applied and transectional analytical research using as a sample 60 rural agricultural producer women victims of the armed conflict in the municipality of Pueblo Bello, department of Cesar, Colombia. In addition, there is a bibliographic review of theoretical supports, consultation with experts, regulatory documents and internet pages for the above, the theoretical review and conceptual supports on research competencies are carried out through consultation with experts, normative documents, bibliographic review and review of web pages in order to construct, describe, identify, analyze and infer on the dimensions strategies for the development of research training, human capital and micro curriculum to define their indicators, relationships and contributions to the formation of research competencies in the engineering programs of the popular University of Cesar [8], in addition to the contribution in the context of strengthening technological capacities to a group of expert professionals in Food Engineering supported the beneficiaries, based on the principles of university extension [9].

The first phase consisted of selecting the interest group, for this reason the information consigned to the Victims Unit of the Ministry of the Interior, Colombia, 2020 was considered. Which reported 746 indigenous women victims and 68 black or Afro-Colombian women victims. All the previous victims of the armed conflict in the municipality of Pueblo Bello, Department of Cesar, Colombia. Subsequently, with the due permission of the ethnic and gender authorities, the convocation process was proceeded with, and 60 women were chosen, 40 of them belonging to the Arhuaca ethnic group and 20 of African descent [10]. The following is the discrimination of the beneficiary population:

Table 1. Characteristics of the beneficiary population.

Description	Number
Female gender	60
Ages between 20-40 years	36
Ages between 41-60 years	20
Age over 60 years	4
Belonging to the Arhuaca Ethnic Group	42
Belonging to Afro-descendants (peasant women)	18

The second phase was the development of the two macro activities mentioned in the first section, Training and Strengthening. The training activities are illustrated in Table 2.

Table 2. Activities for the trainings

Training activity	Details of the activities s
Management of Community Business Administration to Rural Women	Training in marketing and marketing strategies. Packaging design and advertising Instruction on retail and wholesale sales. Basic business accounting, registration and document management.
Elaboration, handling and conservation of Sacha inchi crunchy seed type snacks.	Andragogical instruction for the preparation and handling of food to the 60 Rural Women. Andragogical instruction for the conservation of food to the 60 Rural Women. Production in the context of Cleaner Production and Good Manufacturing Practices.



The activities for technological strengthening are summarized in Table 3.

Table 3. Activities for the strengthening of technological capacities.

Strengthening activities	Details of the activities
Tasks of pre-sowing, sowing and maintenance of the crop	Technical table for selection of the plot for the sowing of 5 hectares of Sacha inchi. Soil study, feasibility storage and drainage of rainwater. Purchase of materials and elements of basic utensils for the cultivation of Sacha inchi (wires, tutors, templets, machete, hoe, wire) Purchase of seeds, biofertilizers, biological pest control and organic inputs for community Hectares. Daily wages for conditioning, ground preparation and support, crop maintenance (80 days / hectare - are 5 He.
Acquisition of machinery and equipment for the production of Sacha inchi crunchy seed type snacks	Opening of bidding process in accordance with the current legal regulations. Purchase of equipment and machinery: Toaster, manual packer, manual sealer; for community Agribusiness Purchase of consumable materials (harvested seed as raw material) and biodegradable packaging for First Production of 250 Kg. Equipment for husking, peeling machine, sorting table, canopies, set up for community agribusiness
Regulatory and Technological Management, Business Support	Technological services: Bromatological analysis of the Sacha inchi crispy seed. Perescibility study of the crispy Sacha inchi seed. Management of health records before INVIMA and brand before the Superintendency of Industry and Commerce. Support and follow-up activities to business development under the cleaner production framework (with a Project manager and a Field Coordinator). Visibility and Dissemination of the project

Likewise, a participatory, collaborative, and dynamic methodology was used, where some women were hired directly with the resources of the project for different tasks. The University of Santander designed an andragogical participatory strategy where initially they were organized in 5 groups of 12 members of different ages and gender, that Afro-descendant women interacted with Arhuaco women. The andragogical methodology implies the free expression of traditional and ancestral knowledge, its analysis of each group, constructivist discussions to finally reach consensus considering the sum of postulates and analysis of said knowledge [11]. To do this, the facilitators of this andragogical methodology must have knowledge and experiences in the area to avoid confrontations by creed, race, or religion.

3. RESULTS AND DISCUSSION

The results were significant, because there was a generalized integration, zero conflicts between the beneficiaries, rather friendship ties were strengthened and even new friendships were generated, which has been called a Living Laboratory of Peaceful Coexistence [12]. In the context of the trainings, the knowledge learned in different areas of interest is a relevant differentiating factor, from the preparation, preservation, and marketing of food to the administrative and financial management of formalized production units, with cross-cutting trainings such as biosafety, good practices and environmental conservation. Figure 1 illustrates one of the training days.



Figure 1. Training Day On Food Processing And Handling The Municipality Of Pueblo Bello, Cesar. August 20, 2022.

One of the milestones of the training days is represented using the microscope, for many the first encounter with this laboratory equipment, the experience told by the beneficiaries implies how a micro image impacted on the hygiene and health habits of the beneficiaries, comments such as: “For these invisible we must wash our hands and apply good hygiene habits”. The above is illustrated in Figure 2.



Figure 2. Practice On Micro Germs Seen With Microscope, Arhuaca And Afro Women
Images authorized by the ethnic leaders.

In the second macro activity of Strengthening technological capacities, it begins with the relevant results of pre-sowing and sowing of 5 He of sacha inchi cultivation in the Sierra Nevada de Santa Marta.



Figure 3. Pre-Sowing And Sowing Of The Sacha Inchi Crop.

Images Sierra Nevada de Santa Marta, Pueblo Bello, Cesar, Colombia. December 2022.

Importantly, the agricultural frontier was not expanded, the beneficiaries decided to form productive units of 0.5 He, that is, 10 properties were selected that had availability of land suitable for cultivation, from regular crops such as cassava, corn, reserved half a hectare for the cultivation of sachá inchi, so that the land will not be affected [13]. The acquisition of machinery for the processing of sachá inchi seed was one of the relevant activities for the structuring of the agroindustry, two toasters were supplied, a vacuum packing machine, because they managed the other equipment and machinery to complement the agroindustry.



Figure 4. Instruction On The Use And Maintenance Of Vacuum Packer And Toaster.

Figure 4 illustrates the instruction of the vacuum packing machine of a member of the Arhuaca ethnic group (left) shown by the field coordinator of the project, also a member of the Arhuaca ethnic group, the sachá inchi seed toaster is also appreciated (center) and the toaster in use is observed on the right. All the beneficiaries received instruction on operation, hygiene and cleaning, as well as preventive maintenance.

For the business formalization, the relevant procedures were carried out for the trademark registration of the product and the registration with the National Institute of Drug and Food Surveillance-INVIMA, for its acronym in Spanish, according to the provisions of the Ministry of Health and Social Protection [14]. It is relevant to highlight that for the definition of brand and logo the best graphic design proposal was analyzed at worktables with the leaders, in Figure 5 the logo and brand defined for the sachá inchi snack product can be seen.



One of the important aspects of these communities is their cultural identity, which they capture in backpacks that they knit by hand, so for the logo and brand images were extracted from these backpacks, leaving the name *sacha sein* which means origin of Life. Finally, Figure 6 presents a summary of the main results obtained with the development of the project.

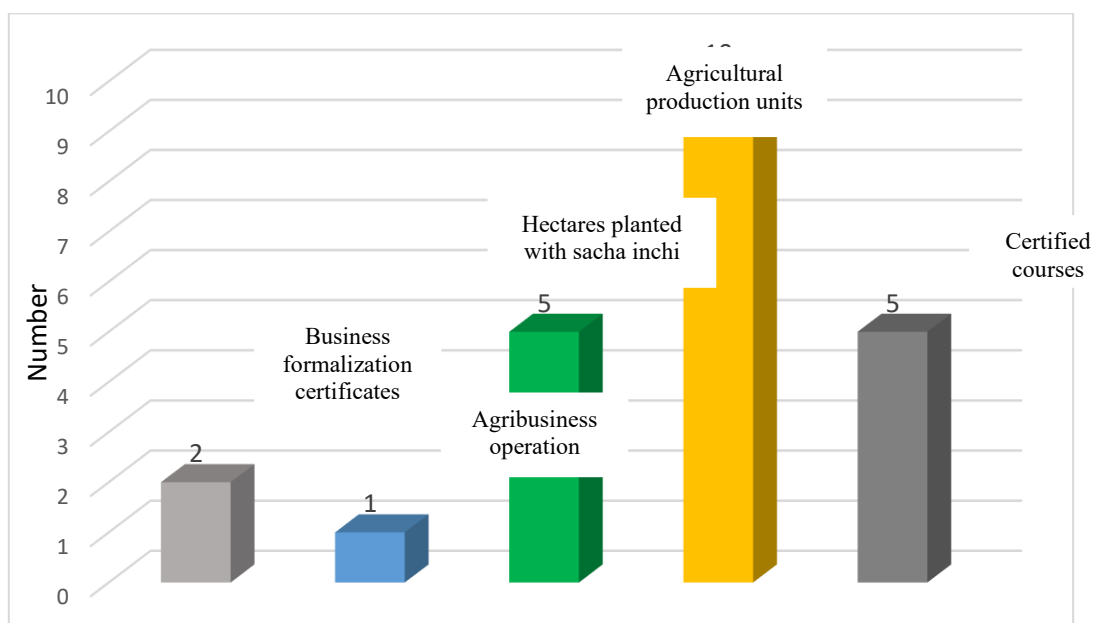


FIGURE 6. SUMMARY OF THE MAIN RESULTS OBTAINED.

These are concrete results that directly impact a community in the field of Social Innovation with a productive approach [15], because based on the knowledge acquired by communities in conjunction with the acquisition of modern technology to produce a good, they support what has been defined as the Sustainable Development Goals-ODS, by its acronym in Spanish [16]. Therefore, it is recommended that more Latin American countries can develop similar projects.

4. CONCLUSION

It was possible to fulfill the general purpose due to the implementation of an andragogical methodology developed by the University of Santander, which was tested with this diverse group in gender, ages, traditional and ancestral knowledge, with excellent results. It is mentioned because the University of Santander had developed projects with rural groups, but without so much diversity



of gender, creed, religion and knowledge, although it must be recognized that at the beginning there was fear, on the part of the University's senior management, about the generation of conflicts between the group, due to the aforementioned differences; in the end, on the contrary, there was harmony, tolerance, respect, group integrity, because they worked as teams. It was important to observe how these beneficiaries interrelated to generate hope for a decent job that will undoubtedly reject in the future any illegal proposal or linked to groups that generate violence.

ACKNOWLEDGEMENTS

To the Canadian Fund for Support to Local Initiatives-FCIL for its majority financial support and guidance. To the Agroindustry Laboratory of the University of Santander, Valledupar campus and the UDU and SEYKEYNOWA Foundation in the municipality of Pueblo Bello, Department of Cesar, Colombia.

REFERENCES

- [1]. Ministry of the Interior. Victims Unit. Technical Report, Database on Victims in Colombia. Bogota, Colombia, 2015. <https://www.unidadvictimas.gov.co/es/registro-unico-de-victimas-ruv/37394>.
- [2]. Municipal Mayor of Pueblo Bello. Development Plan 2020-2023. The town we all dream of. Approved by Decree No. 055 of July 21, 2020.
- [3]. Presidency of the Republic. Decree-Law 893 of 2017 "By which the Development Programs with a Territorial Approach -PDET are created". Bogota. Colombia. Constitutional Court of the Republic of Colombia. Judgment T-045/10, Bogotá, Colombia, 2010. <https://www.corteconstitucional.gov.co/relatoria/2010/t-045-10.htm>
- [5]. Technical Table with family farmers of the Pueblo Bello municipality, July 2019, Colombia.
- [6]. Municipal Mayor of Pueblo Bello. Development Plan. Inclusive Government and Generator of Peace, 2016-2019.
- [7]. Agrodata Peru. (June 2017). Vegetable Fats, Avocado Oil, Sacha Inchi, Jojoba, Chestnut, Chia, Peru Export 2017 June. Obtained from <https://www.agrodataperu.com/2017/07/grasas-vegetales-aceite-sachainchi-aceite-palta-aceite-castana-peru-exportacion-2017-junio.html>.
- [8]. Vidal, C.R., Gordon, Y., Barreto, D., Fajardo, J., Fragoso, P. (2021). STRATEGIES FOR THE IMPROVEMENT OF RESEARCH COMPETENCES IN THE PROFESSIONAL TRAINING OF ENGINEERS. ASME International Mechanical Engineering Congress and Exposition, Proceedings (IMECE), 2021, 9, V009T09A020. <https://doi.org/10.1115/IMECE2021-69400>
- [9]. Colombian Association of Universities - ASCUN University Extension Policy Guidelines, National Extension Network. Bogota, Colombia, 2017.
- [10]. Working table with leaders of the Arhuaca ethnic group and Afro-descendants, with the Governor's Cabildo and the representative of Afro-descendant communities. Pueblo Bello, Department of Cesar, 2023. Colombia.
- [11]. Chacon P. 2012. Andragogy as a knowledge-promoting discipline in higher education. Center for General Studies. Universidad Nacional Heredia, Costa Rica, Published in the Electronic Magazine Educare Vol. 16, N° 1, [15-26], ISSN 1409-4258.
- [12]. Gutierrez C. 2022. Technical progress report addressed to the Canadian Embassy, funder of the project. Valledupar, Cesar Department, Colombia.
- [13]. Left Hermes. 2022. Field coordinator of the Arhuaca ethnic group. Technical progress report addressed to the Canadian Embassy, funder of the project. Pueblo Bello, Cesar department. Colombia.
- [14]. Ministry of Health and Social Protection. 2013. Resolution No. 2674, by which article 126 of Decree-Law 019 of 2012 is regulated and other provisions for the food sector are issued. Bogotá, Colombia. <https://www.invima.gov.co/otros-alimentos-y-otras-bebidas>
- [15]. Jürgen Howaldt & Michael Schwarz, Social Innovation: Concepts, Research Fields and International Trends. Studies for Innovation in a Modern Working Environment -International Monitoring (www.internationalmonitoring.com) Department of Information Management in



Mech. Engineering Center for Learning and Knowledge Management Ass. Institute for Management Cybernetics e.V. IMA/ZLW & If U - RWTH Aachen University. Editors. Prof. Dr.-Ing. Klaus Henning Dr. Frank Hees. Volume 5, 2010, Germany.

- [16]. United Nations Organization-UN, 2015. Definition of Sustainable Development Goals-SDGs. <https://www.un.org/sustainabledevelopment/es/objetivos-de-desarrollo-sostenible/>