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Implementation of agro-ecological family orchards, an opportunity for women in Dominican Republic

Implementación de huertas agroecológicas familiares, una oportunidad para las mujeres en República Dominicana

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ABSTRACT: Agroecological family gardens are agricultural practices known throughout the world for their socioeconomic and environmental contributions. In Cuba, they are conducted through Urban Agriculture and the Local Agricultural Innovation Project (PIAL, according its acronyms in Spanish) of the National Institute of Agricultural Sciences (INCA). On this basis, INCA, together with Nicolás Guillén Foundation, established links with the Ministry of Women, in Dominican Republic, to implement this experience in three of its provinces, to offer opportunities to women in vulnerable localities, due to the low economic income they have, and to strengthen ecological production and local Food Sovereignty. These actions are in line with the mitigation of climate change effects, sustainability and gender equity. The following methodology was applied: (i) Participatory Rapid Rural Visual Appraisal, with a gender focus; (ii) capacity building linked to knowledge management; and (iii) implementation of highly diverse vegetable gardens in each locality. On the basis of female volunteering, 12 work zones were implemented with 35 vegetable gardens under execution, with the participation of 42 women, 29 % of whom were under 35 years of age. The work raised the cognitive level and self-esteem of the women, as they learned and applied agroecological techniques. They learned about and increased the dominant biodiversity, which is useful for the family and the community. The experience offered the opportunity to incorporate women to work that achieved economic income, in addition to favoring the quality of family life, accompanied by social recognition with the strengthening of the environmental dimension.

Key words: agrobiodiversity, gender equity, empowerment, food sovereignty, sustainability.

RESUMEN: Las huertas agroecológicas familiares constituyen prácticas agrícolas, conocidas en el mundo por sus aportes socioeconómicos y medioambientales. En Cuba, se conducen a través de la Agricultura Urbana y el Proyecto de Innovación Agropecuaria Local (PIAL), del Instituto Nacional de Ciencias Agrícolas (INCA). Sobre esas bases, el INCA, junto a la Fundación Nicolás Guillén, establecieron vínculos con el Ministerio de la Mujer, en la República Dominicana, para implementar dicha experiencia en tres de sus provincias, para ofrecer oportunidades a las mujeres de localidades vulnerables, debido a los bajos ingresos económicos que cuentan y fortalecer la producción ecológica y la Soberanía Alimentaria local. Estas acciones están en correspondencia con la mitigación de los efectos del cambio climático, la sostenibilidad y la equidad de género. Se aplicó la metodología siguiente: (i) Diagnóstico Visual Rural Rápido Participativo, con enfoque de género; (ii) formación de capacidades vinculadas a la gestión del conocimiento e (iii) implementación de huertas con una alta diversidad, en cada localidad. Sobre la base de la voluntariedad femenina, se implementaron 12 zonas de trabajo con 35 huertas en ejecución, y la participación de 42 mujeres, de ellas, 29 % menores de 35 años. El trabajo permitió elevar el nivel cognitivo y la autoestima de las féminas, mientras aprendieron y aplicaron las técnicas agroecológicas. Se conoció e incrementó la biodiversidad dominante, de utilidad familiar y comunitaria. La experiencia ofreció la oportunidad de incorporar mujeres a labores que retribuyen ingresos económicos, además de favorecer la calidad de vida familiar, acompañada del reconocimiento social con el fortalecimiento de la dimensión medioambiental.

Palabras clave: agrobiodiversidad, equidad de género, empoderamiento, soberanía alimentaria, sostenibilidad.

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INTRODUCTION

Food production, in urban and peri-urban conditions, by agroecological methods, is a current of great actuality, worldwide, that the FAO, since 2010, has approved and promoted as an alternative for a healthy and diverse food; within which the production of regulatory foods, such as fruits and vegetables, play a decisive role (1).

Dominican Republic has in its rural agricultural fields a high diversity of varied foods, simultaneously, imports a considerable amount of food, which coincides with, when stating that agricultural production consists mainly of sugar cane, coffee, cocoa, cereals, particularly rice and corn; edible legumes, roots and tubers, musaceae, fruits and vegetables (2). It lacks, however, an alternative development program for urban communities, where low-income families with a derisory quality of life predominate. Agricultural production consists mainly of coffee, sugar cane, cocoa, tobacco, rice, rice, plantain, banana, banana, beans, cassava, potato, onion, sweet potato, taro, fruit and vegetables.

The implementation of socio-productive development programs, with scope to the main dimensions of sustainability, enables access to food production free of pesticides, with the use of efficient agroecological alternatives, protective of the environmental dimension and advocates the protagonist participation of women, as an essential element for strengthening this objective; defended by grassroots organizations, trade unions and companies, up to the Member States and intergovernmental bodies (3).

With the Declaration and Platform for Action of the Fourth World Conference on Dominican Women (4), their socio-cultural role has been strengthened, with the introduction of the concept of gender mainstreaming in all policies and public action programs; and the concept of empowerment, as a process of capacity building and construction of values related to technical, political and decision-making knowledge, the basis for their autonomy. This makes it possible to achieve a closer approach to actions that promote adaptation to climate change and to overcome the gap that exists between rhetoric and reality.

Based on the above reasons, and taking into account the good practices contributed by the PIAL focused on gender, this research was carried out with the aim of implementing diversified agroecological family gardens in three provinces of Dominican Republic, aimed at the production of healthy food, strengthening the resilience of the food system, and promoting actions for adaptability to climate change.

MATERIALS AND METHODS

Development of the research

The work was conducted in three provinces of Dominican Republic: Bajos de Haina, Monte Plata and San Pedro de Macorís, between October 2018 and August 2019, in a tropical climate and an average temperature of 25 °C. Soils selected for the research, are part of the yards and

backyards of the houses, have a flat topography and conditioned to apply artificial irrigation, however, an author states that the surface deterioration and crust of the land is increasingly evident, the damage or impoverishment of soils observed, are influenced by various factors, among them, the population dynamics (growth and migration), which generates the need to use more soil; and production patterns, motivated by the need to meet consumer demands (5).

The applied methodology of Participatory Appraisal with a Gender Approach (PAGP), for the development of the research (6), consisted of three stages:

(i) Diagnosis (PAGP) in the action scenarios: this provides the possibility to participate, both sexes, from different backgrounds and educational levels, with the use of presentation techniques, sensitization and group work.

In the first stage (January-February 2018), all the selected scenarios were visited and awareness-raising actions were carried out. As part of the diagnosis, the "Rain of aspirations" technique was used, which allows sensitizing the community on the top priority gender issues: roles, needs, practices and strategies.

(ii) Capacity building stage (June-July 2019), linked to knowledge management: through awareness-raising workshops, training and exchange of experiences that make it possible to provide knowledge and tools to participants in the promotion of vegetable gardens.

(iii) Implementation stage: consisted of the construction of vegetable gardens in the selected areas, the introduction of different varieties of vegetables, which made it possible to elucidate the tastes and preferences of consumers. The production achieved was recorded and the economic results achieved were evaluated qualitatively. Other indicators were also evaluated, such as changes in subjectivity: self-esteem, empowerment, recovery of agrarian culture, and exchange of knowledge in social activities generated in the community, as part of the initial work program.

(iii.1) Agrobiodiversity recording and analysis stage: all species were recorded for each scenario, by their popular and scientific names, which were classified by their utilitarian values (7), according to their function in food or as non-food complementary species, whose main value, such as flowers and ornamentals, are part of the spiritual life of the families.

The necessary qualitative analysis was established to know the before and after the establishment of the orchards and the objective and subjective factors that influenced each study scenario were recorded, in order to finally make the respective pertinent recommendations.

Description of the intervention scenarios

The orchards were established in 12 communities in three provinces (Table 1). For their selection, the voluntariness of each proposal and the real personal possibilities and socio-productive conditions and availability of the whole family were taken into account.

To evaluate the results, in a second stage (June-July 2019), the progress made in each orchard by locality and province was assessed in a national participatory workshop, where the final balance and the relevant corrections and recommendations for future work were made.

RESULTS AND DISCUSSION

(i) Participatory Diagnosis with a Gender Perspective (PAGP) stage

It was observed that women were willing to grow their own vegetable gardens and that they were not aware of the importance of producing their own vegetables to be consumed fresh and in an ecological way. It was also noted that some men were willing to support the work in the gardens. By means of examples, they were persuaded about the benefits of planting vegetables in small spaces, the use of organic fertilizer and the management of vegetable gardens for the well-being of the families, so that a total of forty-seven women participated. From the forty-one scenarios diagnosed, thirty-five were finally quantified for execution.

It was also possible to confirm the willingness of some men to support the work in the orchards, accompanied by their wives; an attitude that is not common in the communities studied. In general, studies carried out in Latin American countries, such as Brazil, show differences in the relationship between women and men in productive technologies (8); for example, in the productive sector of tourism, there are marked inequalities in terms of opportunities for women in various activities, compared to men, which reflect a large gap and disadvantages for Brazilian women.

For the application of agroecological principles, participants were persuaded, by means of examples, of the benefits of planting vegetables in small spaces, the use of

organic fertilizers and the management of elementary agronomic techniques in vegetable gardens.

A total of 42 women participated, and of the 41 scenarios diagnosed as possible to develop, 35 vegetable gardens were finally materialized. Those not established were linked to problems beyond the control of the participants and their facilitators.

The final balance showed 35 vegetable gardens built in 12 work zones, with the participation of 42 women, 29 % of whom were under 35 years of age, a situation that shows the advantage of strengthening the activity in the work zones and the possibility of opening new scenarios. Table 2 shows the composition of the action scenarios for the implementation of family gardens in the three provinces.

The results of the "rainfall of aspirations" application technique showed the real possibilities that exist for women to improve their social position, personal life and community life.

When asked how they would like to have a vegetable garden in the future, the women identified a group of needs, prior to their future dreams, that would allow them to propose actions to strengthen and reform their current situation, such as training (strategic need) on alternative topics of use and management of family vegetable gardens, with special reference to the possible contributions through the creative work of the members of the community. An illustrative example was the elaboration of compost to supply nutrients to the plants, without having to buy them in the market. The technique used also allowed them to systematize and revalue experience and local knowledge and to contribute to the acquisition of new knowledge and results that coincide with previous studies (9).

What they learned about these methods allowed them to systematize and revalue local experiences and contribute to the acquisition of new knowledge, results that coincide with previous studies (10).

Table 1. Species composition by scenarios for the implementation of home orchards in three provinces of Dominican Republic

Provinces	Localities	Work made
Bajos de Haina	Comunidad Carril abajo	1 orchard
	La pared	1 orchard
	Mata Naranjo	6 orchards
	Cajulito Norte	1 orchard
	Barquesillo	2 orchards
Monte Plata	El Laurel	3 orchards
	Mijo	1 orchard
	Cruce de Mela	3 orchards
	El Coquito	10 orchards
	Hatillo	3 orchards
San Pedro de Macorís	Villa España	4 orchards
	Chicharrones	1 orchard

Table 2. Composition of the action scenarios for the implementation of home gardens in three provinces of Dominican Republic

Indicators	Monte Plata	Bajos de Haina	San Pedro de Macorís	Total
Women incorporated at the beginning	29	14	4	47
Diagnosed scenarios	21	10	10	41
Scenarios implemented	20	11	4	35

A general assessment of the diagnosis showed that the highest percentage of women had no knowledge about planting vegetables in family gardens, nor did they perceive the importance of producing fresh and healthy food. They were also unaware of the possibility that their soils could be used to promote the cultivation of vegetables. Through group work, they visualized the plots or spaces as socioeconomic and environmental elements, with other plants such as fruit, medicinal and ornamental plants.

(ii) Capacity building stage.

Work was based on the gender approach, focusing on equal relations between men and women, and thus having an impact on intergenerational relations within the families in search of equity in the definition of objectives and planning, as recommended by some stakeholders (11,12).

(ii.i) Awareness-raising workshops

Through the pilot project carried out in the three provinces, women and men in the communities where the gardens were to be implemented were sensitized.

In parallel to the visit to the sites, other topics were discussed, such as the importance of vegetable production and the use of organic products and their importance in nutrition and human health.

It was shown that there is a lack of knowledge about the daily nutritional needs of people, according to their age, daily physical effort and sex (13) and the foods that provide it and their quality, according to the inputs provided to them during their growth and development (14). This suggests that this knowledge should be deepened as a way to achieve a culture of nutrition, in order to improve the quality of life of human beings.

(ii.ii) Training workshops

The training activity was carried out in groups in the seven scenarios. Important aspects of the methodology were the relevant selection of women, the presence of local decision-makers, corresponding to the responsible organizations, together with the rest of the local organizations, which facilitates the mobilization of women by offering them the opportunity to access this new alternative. When any link in this organizational chain is missing, success is reduced.

It seems that, as a result of the training activities carried out, the women were stimulated and expressed their willingness not only to build their own vegetable gardens, but also, in the heat of the discussions, the possibility of learning how to preserve food and the willingness of some men to share in this work.

An element to be highlighted was the level of stimulation reached towards self-improvement, by requesting a course on food preservation, socializing knowledge in the assimilation of productive activities to achieve their own autonomy. This change of attitude towards the defense of their rights for decision making, constitutes the basis for their empowerment and thus diminish the gaps of subordination.

(ii.iii) National Workshop for the Exchange of Experiences.

At the National Workshop for the Exchange of Experiences, women from the three provinces presented their results; a favorable atmosphere of collective optimism was created, which facilitated the proposal for the creation of a network of women vegetable producers, committed to the process of socializing knowledge for the exchange and commitment of new women.

This activity completed the process of systematizing the results by presenting the progress achieved in the three basic dimensions of sustainability (economic, sociocultural and environmental).

The qualitative analysis made it possible to assess the positive impact on the economic dimension. Although few women have sold their products, they have consumed the vegetables produced at no additional cost. In addition, these productions have served to feed their families and neighbors in the communities. However, irregularities in the production controls prevented a quantitative economic analysis.

The beginning of a change in relation to the condition and position of women was observed, once they have been able to collaborate with the household economy, through the production of healthy and fresh food, which represents a social impact. If analyzed from the environmental point of view, the fact of producing these foods, using good agroecological practices, environmentally friendly, also constitutes a modest contribution to mitigate the effects of the imminent climate change.

At the community level, the experience favored the development of local sources of employment for the production of food and ornamental plants. In an integral way, it contributed to the development of models of empowered women, with greater participation in the functioning of the community.

As a conclusive aspect of this stage, the bases were created to initiate an aesthetic improvement in the homes of low-income families, by creating an attractive visual spectrum with varied scents that perfume the breeze, from the presence of new species that include a diversity of attractive colors; symbol of the presence of a greater ecological balance and a complement to environmental protection (15).

(v) Implementation

Implementation is the most complex and difficult step to carry out in any project related to the incorporation of women into the labor market (16), something that occurs in most countries, among which Dominican women are not exempt. However, the methodological steps taken made it possible to create the conditions that, from the point of view of the actors in this work, contributed to its viability.

(iii.i) composition of the scenarios for the implementation of the gardens.

Yards and plots, before and after the intervention, showed a notable increase in vegetables for the three provinces of

the country (Tables 3, 4 and 5). The analysis of the increase in the number of species in already established yards is a highly significant action for women who are starting out in this endeavor, since it is an exchange of knowledge with actors who have experience and phytotechnical knowledge, from which they also learn about their utilitarian values, chemical composition and importance for health (17).

Tables 3, 4 and 5 show the differences between provinces in terms of the number of orchards and the number of species per orchard, expressed in percentages of established species.

From the orchards in Monte Plata province, two stood out as having the highest number of species, while in Bajo de Haina province there were also two outstanding orchards. In San Pedro de Macorís province, with only four orchards, two showed a high number of established species. In fact, this province had a high initial diversity. In the most outstanding orchards, diversity fluctuated between nine and eleven species, while those with a lower number of species reached figures between three and five species. The differences are linked to the diversity of actions carried out, with greater or lesser rigor, together with others of a sociocultural nature that mark the differences.

These results are consistent with work carried out in Cuba (18), where the mainstreaming of actions with a gender perspective has motivated and promoted the active participation of women in the different activities carried out. Progress in increasing diversity depends on many factors, some of which are sometimes adverse as a result of sociocultural development. In spite of the success observed from an objective point of view, results also show that not all provinces advanced at the same pace and this occurred, fundamentally, where the methodology was not implemented with the rigors that sustain it.

Among the most significant results, 35 family vegetable gardens were built with the participation of 42 women, who implemented their gardens in 12 areas, which represents 120 % compliance with the figure set as the aim of the work. The research generated employment for these women, most of whom were at home carrying out reproductive roles, in addition to providing their families with the possibility of incorporating family members into this socially useful activity.

(iii.ii) Production achieved in each province

From the 15 species of vegetables offered in three provinces to be established by women according to their tastes and preferences, Table 6 shows the level of attention according to their establishment, expressed as a percentage.

The most implemented species in the three provinces were: tomato, peppers and eggplant, while the species of the cucurbitaceae family were the least established, which shows the existence of a defined general demand that characterizes the three provinces. However, the analysis by province showed that there are differences in the demand for specific vegetables among the provinces. While in

Monte Plata and San Pedro de Macorís the molondrón species was in high demand, in Bajos de Haina it was not chosen, probably because they are unaware that this species has important energy and protein values. Likewise, the high demand for carrots in San Pedro de Macorís, compared to the other two provinces, is also noteworthy. From the analysis, it can be inferred that San Pedro de Macorís has a greater awareness of the importance of vegetables for health, which was also evident in the case of spinach, which was the most highly valued.

The value of this analysis lies in the fact that it demonstrates the importance of participatory decision making, since the pleasure of those who do the work according to tastes and preferences guarantees the success of the community work.

This analysis also allows us to know possible deficits of species that may be necessary for health and that, due to cultural problems, are not consumed and in such case, we begin to stimulate their consumption, for the well-being of the locality, in a gradual way through the dissemination of their importance.

Unfortunately, species such as spinach, rich in iron and of great importance for the consumption of children and the elderly because of its role in raising protein levels (12), was not among the most used, although a favorable trend was observed in the province of San Pedro de Macorís, where there seems to be a greater culture of the role of vegetables in human health, according to the percentages of selection, compared to the other two provinces.

An analysis of the selection and production of vegetable species by province indicated that San Pedro de Macorís made the greatest contribution, followed by Bajos de Haina and, finally, Monte Plata. Future work should evaluate the causes of these differences, apparently related to food culture, aspects that should continue to be investigated.

The analysis of the percentages of vegetables established in the three provinces, as an average (Figure 1), corresponds completely with the previous analysis. The species with the highest demand (peppers, tomatoes and eggplants) and the least preferred (cucurbits and parsley) indicate the preferences of Dominicans in the three provinces where the research was carried out.

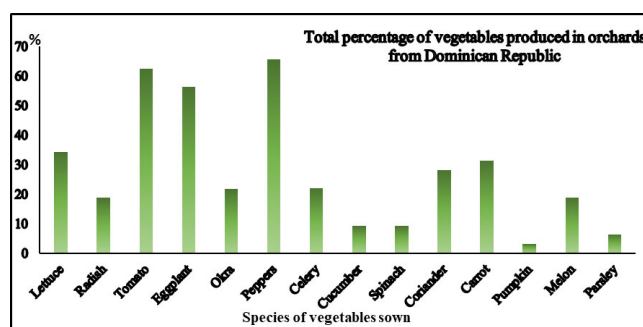


Figure 1. Results of the implementation of vegetable species orchards in three provinces of Dominican Republic

Table 3. Analysis of the implementation of vegetable orchards in Monte Plata province

Orchard/ provinces	Before	After
Orchard 1	banana (<i>Musa</i> spp) eggplant (<i>Solanum melongena</i>) yam (<i>Discorea</i> spp) pigeon pea (<i>Cajanus cajan</i>) pineapple (<i>Ananas comosus</i>).	lettuce (<i>Lactuca sativa</i>) eggplant (<i>Solanum melongena</i>) okra (<i>Abelmoschus esculentus</i>) pumpkin (<i>Cucurbita pepo</i> L.) peppers (<i>Capsicum annuum</i>) tomato (<i>Solanum lycopersicum</i>) spinach (<i>Spinacea oleracea</i>) carrot (<i>Daucus carota</i>) radish (<i>Raphanus sativus</i>).
Orchard 2	Timber and ornamental fruit trees Timber trees: mahogany (<i>Swietenia mahagoni</i>) oak (Catalpa), cedar (<i>Cedrela odorata</i>) star apple (<i>Chrysophyllum cainito</i> L.) Fruit trees: (<i>Manguifera indica</i> L.) Ornamentals: pilea (<i>Pilea cardieri</i>) spathiphyllum (<i>Spathifillum stanligh</i>) daisies (<i>Bellis perennis</i>).	lettuce (<i>Lactuca sativa</i>), tomato (<i>Solanum lycopersicum</i>) coriander (<i>Coriandrum sativum</i>) carrot (<i>Daucus carota</i>) chili (<i>Capsicum annuum</i>) coriander (<i>Coriandrum sativum</i>) melon (<i>Cucumis melo</i>) cucumber (<i>Cucumis sativus</i>) okra (<i>Abelmoschuse sculentus</i>).
Orchard 3	tomato (<i>Solanum lycopersicum</i>) chili peppers (<i>Capsicum annuum</i>) cucumber (<i>Cucumis sativus</i>)	coriander (<i>Coriandrums ativum</i>) tomato (<i>Solanum lycopersicum</i>) pepper <i>Capsicum annuum</i>)
Orchard 4	It had nothing	tomato (<i>Solanum lycopersicum</i>) pepper (<i>Capsicum annuum</i>) eggplant (<i>Solanum melongena</i>).
Orchard 5	It had nothing	tomato (<i>Solanum lycopersicum</i>) pepper (<i>Capsicum annuum</i>) eggplant (<i>Solanum melongena</i>) radish (<i>Raphanus sativus</i>) okra (<i>Abelmoschuse sculentus</i>).
Orchard 6	Prepared soil	tomato (<i>Solanum lycopersicum</i>) pepper (<i>Capsicum annuum</i>) eggplant (<i>Solanum melongena</i>) okra (<i>Abelmoschuse sculentus</i>).
Orchard 7	Fruit trees: mango (<i>Manguifera indica</i>) custard apple (<i>Annona cherimola</i> Miller) cherry (<i>Prunus cerasus</i>) star apple (<i>Chrysophyllum cainito</i>)	tomato (<i>Solanum lycopersicum</i>) pepper (<i>Capsicum annuum</i>) eggplant (<i>Solanum melongena</i>) okra (<i>Abelmoschuse sculentus</i>).
Orchard 8	Small space without plants	tomato (<i>Solanum lycopersicum</i>) pepper (<i>Capsicum annuum</i>), okra (<i>Abelmoschuse sculentus</i>).
Orchard 9	banana (<i>Musa</i> spp) eggplant (<i>Solanum melongena</i>). pigeon peas (<i>Cajanus cajan</i>).	tomato (<i>Solanum lycopersicum</i>) okra (<i>Abelmoschuse sculentus</i>) lettuce (<i>Lactuca sativa</i>) coriander (<i>Allium porro</i>) carrot (<i>Daucus carota</i>) pepper (<i>Capsicum annuum</i>) celery, (<i>Apium graveolens</i>) melon (<i>Cucumis melo</i>) cucumber (<i>Cucumis sativus</i>)
Orchard 10	They had only a few fruit trees	tomato (<i>Solanum lycopersicum</i>) eggplant (<i>Solanum melongena</i>). coriander (<i>Coriandrum sativum</i>)
Orchard 11	coffee (<i>Coffea arabica</i>) mango (<i>Manguifera indica</i>)	tomato (<i>Solanum lycopersicum</i>) eggplant (<i>Solanum melongena</i>). coriander (<i>Coriandrum sativum</i>)
Orchard 12	mango (<i>Manguifera indica</i> L) cherry (<i>Prunus cerasus</i>) Timber trees: abey (<i>Peltophorum berterioanum</i> urb.) jamaican caper (<i>Capparis cynopholophora</i> L.) guaiaicum (<i>Guaiaicum officinale</i> L.)	Seedling stage
Orchard 13	nothing sown	Seedling stage

Table 4. Analysis of the implementation of vegetable orchards in Bajo de Haina province

	Before	After
Orchard 1	rue (<i>Ruta</i>) aloe vera (<i>Aloe vera</i>) basil (<i>Ocimum basilicum</i>) rosemary (<i>Rosmarinus officinalis</i>)	radish (<i>Raphanus sativus</i>) carrot (<i>Daucus carota</i>)
Orchard 2	cherries (<i>Prunus cerasus</i>) pegeonpea (<i>Cajanus cajan</i>) basil (<i>Ocimum basilicum</i>) rosemary (<i>Rosmarinus officinalis</i>) aloe vera (<i>Aloe vera</i>) pegeonpea (<i>Cajanus cajan</i>)	tomato (<i>Solanum lycopersicum</i>) lettuce (<i>Lactuca sativa</i>), coriander (<i>Allium porro</i>) carrot (<i>Daucus carota</i>) pepper (<i>Capsicum annuum</i>) melon (<i>Cucumis melo</i>)
Orchard 3	rosemary (<i>Rosmarinus officinalis</i>) lime (<i>Tilia platyphyllos</i> , Scop) pegeonpea (<i>Cajanus cajan</i>) banana (<i>Musa spp</i>) avocado (<i>Persea americana</i>) breadfruit	lettuce (<i>Lactuca sativa</i>), coriander (<i>Allium porro</i>) carrot (<i>Daucus carota</i>) pepper (<i>Capsicum annuum</i>), melon (<i>Cucumis melo</i>), eggplant (<i>Solanum melongena</i>), coriander (<i>Coriandrum sativum</i>) melon (<i>Cucumis melo</i>) celery (<i>Apium graveolens</i>) parsley (<i>Petroselinum crispum</i>)
Orchard 4	pegeonpea (<i>Cajanus cajan</i>) banana (<i>Musa spp</i>)	lettuce (<i>Lactuca sativa</i>), coriander (<i>Allium porro</i>) carrot (<i>Daucus carota</i>) pepper (<i>Capsicum annuum</i>) chilli pepper (<i>Capsicum spp</i>) eggplant (<i>Solanum melongena</i>) coriander (<i>Coriandrum sativum</i>) melon (<i>Cucumis melo</i>) celery (<i>Apium graveolens</i>) espinaca, (<i>Spinacia oleracea</i>), apio (<i>Apium graveolens</i>), tomate (<i>Lycopersicon esculentum</i>)
Orchard 5	banana (<i>Musa spp</i>)	eggplant (<i>Solanum melongena</i>). tomato (<i>Solanum lycopersicum</i>) radish (<i>Raphanus sativus</i>).
Orchard 6	They had not anything sown	eggplant (<i>Solanum melongena</i>). tomato (<i>Solanum lycopersicum</i>) chilli pepper (<i>Capsicum spp</i>)
Orchard 7	They had not anything sown	eggplant (<i>Solanum melongena</i>). tomato (<i>Solanum lycopersicum</i>) celery (<i>Apium graveolens</i>)
Orchard 8.	They had not anything sown	tomato (<i>Solanum lycopersicum</i>) chilli pepper <i>Capsicum spp</i>)
Orchard 9	They had not anything sown	eggplant (<i>Solanum melongena</i>). tomato (<i>Solanum lycopersicum</i>) (chilli pepper <i>Capsicum spp</i>)
Orchard 10	banana (<i>Musa spp</i>)	eggplant (<i>Solanum melongena</i>). radish (<i>Raphanus sativus</i>) y lettuce (<i>Lactuca sativa</i>).
Orchard 11	Timber tress	eggplant (<i>Solanum melongena</i>).

Table 5. Analysis of the implementation of vegetable orchards in San Pedro de Macorís province

San Pedro de Macorís	Before	After
Orchard 1	They had not anything sown	radish (<i>Raphanus sativus</i>) carrot (<i>Daucus carota</i>),
Orchard 2	guava (<i>psidium guajava</i>) Medicinals: lime (<i>Tilia platyphyllos</i> , Scop) spearmint, (<i>Mentha spicata</i>) Ornamentales: Rosas (<i>Rosa</i> sp), hibiscus	lettuce (<i>Lactuca sativa</i>), pepper (<i>Capsicum annuum</i>), chilli pepper (<i>Capsicums pp</i>) eggplant (<i>Solanum melongena</i>), water melon (<i>Cucumis melo</i>), carrot (<i>Daucus carota</i>) tomato (<i>Licopersicom sculentum</i>)
Orchard 3	Fruit tress guava: (<i>Psidium guajava</i>) mango (<i>Manguifera indica</i>) Grains pegeonpea (<i>Cajanus cajan</i>) Fruit trees banana (<i>Musa spp</i>)	lettuce (<i>Lactuca sativa</i>) pepper (<i>Capsicum annuum</i>) chilli pepper (<i>Capsicum spp</i>) eggplant (<i>Solanum melongena</i>). melon (<i>Cucumis melo</i>) carrot (<i>Daucus carota</i>) celery (<i>Apium graveolens</i>) coriander (<i>Allium porro</i>) perejil (<i>Petroselin umcrispum</i>)
Orchard 4	Fruit trees Star apple (<i>Chrysophyllum cainito</i>) mango (<i>Manguifera indica</i>) banana (<i>Musa spp</i>)	lettuce (<i>Lactuca sativa</i>) pepper (<i>Capsicum annuum</i>) celery (<i>Apium graveolens</i>) tomato (<i>Solanum lycopersicum</i>) melon (<i>Cucumis melo</i>), pepper (<i>Capsicum annuum</i>) eggplant (<i>Solanum melongena</i>) carrot (<i>Daucus carota</i>)

Note: Scenarios that did not provide the information do not appear in the quantification of the information.

Table 6. Percentage of vegetables produced by women from the three provinces, during January-July 2019

Common name	Scientific name	Vegetables per province %		
		Monte Plata	Bajos de Haina	San Pedro de Macorís
Lettuce	<i>Lactuca sativa</i>	23.5	36.3	75.0
Radish	<i>Raphanus sativus</i>	12.0	27.3	25.0
Tomato	<i>Solanum lycopersicum</i>	64.7	63.6	50.0
Eggplant	<i>Solanum melongena</i>	41.1	81.8	50.0
Okra	<i>Abelmoschuse sculentus</i> .	41.1	0	75.0
Pepper	<i>Capsicum spp</i>	53.0	81.8	75.0
Celery	<i>Apium graveolens</i>	12.0	27.3	50.0
Cucumber	<i>Cucumis sativus</i>	17.6	0	0.0
Spinach	<i>Spinacia oleracea</i>	6.0	9.09	25.0
Coriander	<i>Daucus carota</i>	29.4	18.2	50.0
Carrot	<i>Daucus carota</i>	18.0	27.3	100.0
Pumpkin	<i>Cucúrbita pepo</i>	6.0	0	0
Melon	<i>Cucumis melo</i>	6.0	27.3	50.0
Parsley	<i>Petroselinum crispum</i>	0.0	9.09	25.0

As a result of the exchange of experiences with the actors in the Dominican localities, it was possible to verify that there are points of convergence in consumption habits between the two Caribbean countries. Consumption priorities coincided in vegetables, tomatoes and peppers, and although eggplant is also consumed in Cuba, leafy vegetables (lettuce and cabbage) have priority over it. It is remarkable what can be achieved with these projects, according to the Cuban experience, where the participation of women amounts to 80 %; and 70 % of them are engaged or participate, in some way, in lines such as: production of vegetables and medicinal plants in family gardens, preservation of fresh food and production of dried condiments, flowers and ornamental plants; productive lines that constitute a strategy of the country to achieve sustainability and food self-sufficiency.

These initiatives have generated new jobs and income for women in ten provinces (9), which has allowed them recognition at the community level, greater participation in innovation spaces, as well as raising their self-esteem and advancing towards more equitable relations between families.

Testimonies from several Dominican women revealed that the women expressed their satisfaction at having access to job opportunities, improvement and social recognition in their communities, which have led them to have a new perspective on the development and quality of life of themselves and their families.

CONCLUSIONS

- The implementation of tools of the Local Agricultural Innovation System allowed a change of aptitude in families of studied scenarios, which facilitated success in horticultural production, based on agroecological foundations.
- The participatory appraisal methodology with a gender approach was successful and constituted an opportunity for the integral development of women in favor of gender equity.
- The existence of a significant horticultural wealth that could be multiplied through the incipient network created from the initial experience of the study was demonstrated.
- The work presented here contributed to increase the capacity for local resilience, with a simultaneous strengthening in the adaptation to the effects of the imminent climate change and to the food sovereignty of Dominican families.

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