Revista Brasileira de Educação do Campo
Brazilian Journal of Rural Education
ARTIGO/ARTICLE/ARTÍCULO

Update of educational strategy for community training in the sustainable user of water

Raquel de la Cruz[1], Nisdalys Marrero Hernández[2], Tamara Jiménez Padilla[3], Adalberto Q. Gavilla Quiroga[4]
[1, 2, 3, 4] Universidad de Sancti Spíritus José Martí Pérez - UNISS. Centro Universitario Municipal Cap. Silverio Blanco Núñez, Cabaiguán, Cuba.

Author for correspondence: raquel@uniss.edu.cu

ABSTRACT. The objective of paper: implement actions that imply different social actors and socioeconomic entities to update an educational strategy focus in dissemination and application of measures to protect water and its sustainable use. The research is mixed based in learning-learning strategy contextualized to environmental education. The strategy was implemented as results were trained and awareness 354 participants in sustainable use of water and the qualitative impacts were confirmed. As conclusion the implementation of educational environmental strategies, constantly updated and developed, stimulate the introduction of practices in accordance with the sociocultural characteristics and the local context, within the framework of the sustainable development agenda until 2030, according to objective six.

Keywords: community training actions, water and sustainable practices, educational strategy.

Atualização da estratégia educativa de capacitação no uso sustentável da água

RESUMO. O objetivo da pesquisa foi de implementar ações que envolvam diferentes atores sociais e entidades socioeconômicas, para atualizar uma estratégia educacional focada na divulgação e aplicação de medidas de proteção da água e seu uso sustentável. A pesquisa é mista a partir de uma estratégia de aprendizagem contextualizada à educação ambiental. A estratégia metodológica foi implementada de acordo com os resultados, sendo que 354 participantes foram formados e sensibilizados para o uso sustentável da água e os impactos qualitativos foram confirmados. Dentre alguns resultados, a implementação de estratégias de educação ambiental, constantemente atualizadas e desenvolvidas, estimulam a introdução de práticas de acordo com as características socioculturais e o contexto local, no âmbito da agenda de desenvolvimento sustentável até 2030.

Palavras-chave: ações de formação comunitária, água e práticas sustentáveis, estratégia educativa.

Actualización de la estrategia educativa de capacitación en el uso sostenible del agua

RESUMEN. El objetivo del artículo: implementar acciones que involucren a diferentes actores sociales y entidades socioeconómicas para actualizar una estrategia educativa enfocada en la difusión y aplicación de medidas para proteger el agua y su uso sustentable. La investigación es mixta basada en una estrategia de aprendizaje-aprendizaje contextualizada a la educación ambiental. La estrategia se implementó conforme a los resultados se capacitó y se concientizó a 354 participantes en el uso sustentable del agua y se confirmaron los impactos cualitativos. Como conclusión La implementación de estrategias educativas ambientales, constantemente actualizadas y desarrolladas, estimulan la introducción de prácticas acordes con las características socioculturales y el contexto local, en el marco de la agenda de desarrollo sostenible hasta 2030, según el objetivo seis.

Palabras clave: acciones de capacitación comunitaria, agua y prácticas sostenibles, estrategia educacional.

Introduction

Science recognizes the deterioration of the environment as a major obstacle to improve the quality of life, on which the existence of the human species on the planet depends. There are various challenges in health, environment, sustainable development, the care and protection of natural resources, globalization, the need to preserve the culture and cultural identity of the peoples; for these reasons, actions are necessary; the implementation of prevention as an effective measure to respond to different types of uncertainties and achieve sustainable development.

The current Cuban university has become a relevant sociocultural institution in the territory, with a leading role not only in the training of undergraduate and post graduate professionals, but also in scientific, technological, social and cultural activity. In this sense, the Municipal University Center, in close ties with society and its institutions, must promote the development of the community, so, it is necessary a conscious venture into the processes inherent to it.

World Water Day was proposed at the United Nations Conference on Environment and Development held in Rio de Janeiro, Brazil from June 3 to 14, 1992. After which, on December 22nd, 1992, the United Nations General Assembly adopted the resolution A/RES/47/193 that declared March 22 of each year as World Water´s Day. In 2003, 14 challenges for the future of the resource were identified (ONU, 2003); the percentages of consumption in each use differ in developed and developing countries; there is also an average behavior on a global scale.

In documents UNESCO (2015) it is stated: to build a world with water security, the world hydrological community must: achieve safe universal access to drinking water, sanitation and hygiene; manage water resources sustainably through a basin approach and increase water productivity, while protecting ecosystems; manage all wastewater in order to protect water resources and ecosystems, increasing recycling and reuse, and building resilience to water-related disasters.

Water is classified according to its use in: water for use by the population, water for industrial use and water for irrigation (Francisco, López & Monteagudo, 2007). According to SAGARPA, (2015) water can have consumptive and non-consumptive uses; among the

former are: urban supply, agriculture, livestock and industry; and among the latter: the production of electrical energy, the cooling of industrial plants and power stations, aquaculture and flows for environmental and landscape purposes.

García, (2010) express there is a world water crisis, but it is not a crisis due to the insufficiency of the resource but rather due to the poor and deficient management of the planet's water resources and affirms that all The population must be aware of the importance of fresh water for life and the need for its use to be efficient and responsible. In the world 1,1 billion people do not have water at home. In Cuba, since 1960, the Institute of Hydraulic Resources was founded with the mission of ensuring water management; every year the state sets new goals to improve the infrastructure and drinking water services for the population and the different sectors of the economy.

International policies Unite Nations [ONU], (2015), those assumed and established by the Cuban State Science Technology and Environment [CITMA] (2017), CITMA (2016), (CITMA, 1997), what is addressed by (Rodríguez, 2012) are assumed as background to the research. Rodríguez & Peña (2019) concluded in their essay to promote environmental education and preventive and corrective actions, environmental promoters must know the subjectivities of the population, their needs, behaviors and practices in order to train and sensitize them and thus establish a link between the population and legislative action, within the realities and particularities of each territory.

What limits the knowledge and care of the environment, particularly of the water resource by the different sectors of society in the community?

• Insufficient mastery or knowledge on the part of society's actors regarding the rules for the use and care of the environment (water resources).

• Insufficient planning and dissemination of activities that promote proper use and care of water resources, by entities and the population.

• The treatment of actions to promote adequate environmental education is not systematic and is sometimes carried out in isolation.

• The environment close to the community is not optimally used to carry out activities related to the subject under study.

The criteria addressed by Laportilla & Arteaga (2017); Santos, Laportilla & Castro (2020), on education, the complex process of training subjects for sustainability, a goal in the renewal of values and appreciation of the environment. The development of awareness and

commitment enables change, from small individual attitudes and citizen participation and involvement in solving problems, and with it the adoption of healthier lifestyles.

It becomes evident the need to design and implement activities articulated in educational strategies, which are feasible to apply at the territorial and local level from educational institutions, whose core is the preparation of professionals, teachers and teachers in training, students and the population in general. On the conception of achieving a prosperous and sustainable society, where the contents are expressed in the spaces available from the classroom, since these are the ages where the students interact for a longer time with the environment that surrounds them, starting from the fact that the fundamental activity is based on the game.

Therefore, it is necessary to contribute in daily practice to the solution of the problem addressed in the sustainable development agenda for 2030 on the objectives that are oriented to the care and protection of water.

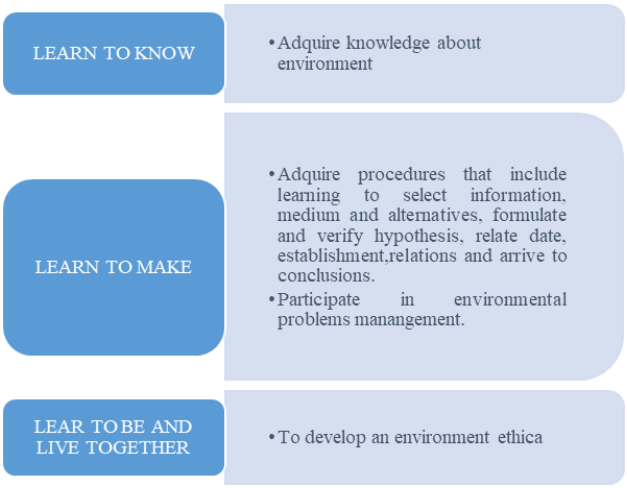
The article aims to implement training actions for different social actors and socioeconomic entities, as part of an educational strategy, for the dissemination and application of measures to protect water resources with emphasis on their rational and sustainable use and their updating.

Development

Methodology, materials and methods

The methodology contextualized the strategy learn to learn to environment education from the author consulted: Guido (2012), Caballero (2017), Martín (2018), considering the content to treat in teaching activities during different postgraduate forma, capacity of participants so that the people learn concepts, methods of how do it and implement practice for save water and its sustainable use. (Fig. 1):

Figure 1 - Learning-learning strategy contextualized to environmental education.



Source: self-made.

There for was design and strategy. Its implementation and evaluation considered the theory conception of de Armas et al. (2003) and the contents in environment education, related with water: saving electricity and water and the practices to protect water. Other topics are focus to: recycling, reused, reforest, practices to protect fauna, and soil, environment divulgation and respect the environment legislation treaties by (De la Cruz *et al*, 2018)

Scientific methods that sustain the methodology

Research in general, the implementation and updating of the strategy was supported in theory, empirical methods statistics and mathematical methods, integrated by the materialist dialectical method to improve the practice introduction in sustainable use of water (Lanuez, Martínez, & Pérez, 2010). This is treated as follow:

Analysis and synthesis

To analyze the problematic in rational use and protection of water in the locality to define the characteristics of learning and teaching process in different docent forms (formal, informal and no formal), a partier of regularities which are check with the applications of empirical methods such as: observation, interview and test. After were selected and synthesis their major relevance and importance to planning the strategy and actions to execute.

Induction and deduction

To establish generalizations in relations with the Scientifics results of the research and the gaps between the knowledge previous and the contributions of this results, the discussions of different authors´ point of view and the scientific theory.

Historic and logical

Due to its necessary reference and study the precedent of problematic and the knowledge of different people: students, specialists, engineer, producers, elderly persons, children and others members of community to project and execution the actions as part of strategy.

Modeling

Because it was necessary to take a reference of characteristics of actions and modeling the actions plan to development the educative labor.

Systemic

Because the strategy is conceived and have conditions to apply system conception. The strategy and actions require that teaching preparation is execution as gradual process, systematic, with the implications of different people: professors, tutors, directive, and mass organizations.

The **documents review:** informs and informative note about of Unit Nations Organizations were reviewed, different bibliographic specific of water topics, course note, phrases, documental, sayings, booklets, web sites, to make the auto preparation of teachers, the organizations, planning and executions of educative strategy.

The observations permitted checking in the practice the problems around water protection and the transformation of attitude of different persons that participate in the actions.

The survey and pre-experiment permitted to check the improvement of students during the implementation of educative strategy.

The seminar: as docent type of class permitted to evaluate the knowledge acquired by the student, organize the work in group, and recycling of experience in the implementing of evaluating tool, diagnosis, organization and supervision to save and rational use of waters in different sectors (industrial, home and service, agricultural).

The **questionnaire** permitted to motivate the auto evaluation of practices during use of the resource, the debate and la socialization of experience about correct practice, the necessity of its protection and save actions of this vital resource.

The inclusion criteria of the participants consisted of:

Consider students in a postgraduate course, in this case within a master's program in energy efficiency, to enhance the efficient use of water in the industrial context and at the same time socialize savings practices in the community.

Prioritize the agricultural sector as it has the greatest weight in the economic activity of the municipality, as it is a rural context

Consider older adults, because they have a classroom on the university campus and because they are an age group that can transmit to new generations the practices of sustainable water use in the community and from their experience in the work context.

Incorporate students of different educational levels in a contest with the motto of the year to celebrate World Water Day and in a scientific society in the case of pre-university students, taking advantage of the content of the chemistry subject in 10th grade.

In updating the strategy, the analysis of the sustainability indicator of the water footprint in the domestic sector and the associated energy consumption was considered, to comply with phase 3 of the strategy by continuing indicators that measure the transformation.

It is valid to note that the authorization of the participants was obtained in the research.

Results and discussion

The first result is the educative strategy according the characteristics of these, de Armas et al. (2003), as fallow: Strategy presentation, Introduction, Diagnosis, General objective: Strategic planning, Strategy presentation, Implementation of strategy and Evaluation of Strategy introduction.

Synthesis of the innovative proposal for the strategy. Its structure and content are discussed below:

In Cuba, it has been possible to provide the resource in industry, agriculture and the population, a key factor for economic and social development. Environmental education (formal, non-formal and informal) addresses the problems surrounding water resources (importance, demand, quality for different uses, the need to save it and avoid contamination). Systematizing and strengthening the treatment for the implementation of sustainable use practices in all sectors is necessary.

Diagnosis

Difficulties in the use, quality of water and its preservation with a systemic conception have been determined. Therefore systematize and deepen the knowledge about the need to preserve it by the different social actors and economic entities, specify the balance of the resource according to the requirements and its availability, the systemic analysis of its quality, reuse the residuals, after treatment, in socioeconomic activities where relevant; avoiding the contamination of drinking water basins, reducing vulnerability to periods of drought, ensuring the quality of production and service processes in society are contents to be dealt with in different spaces.

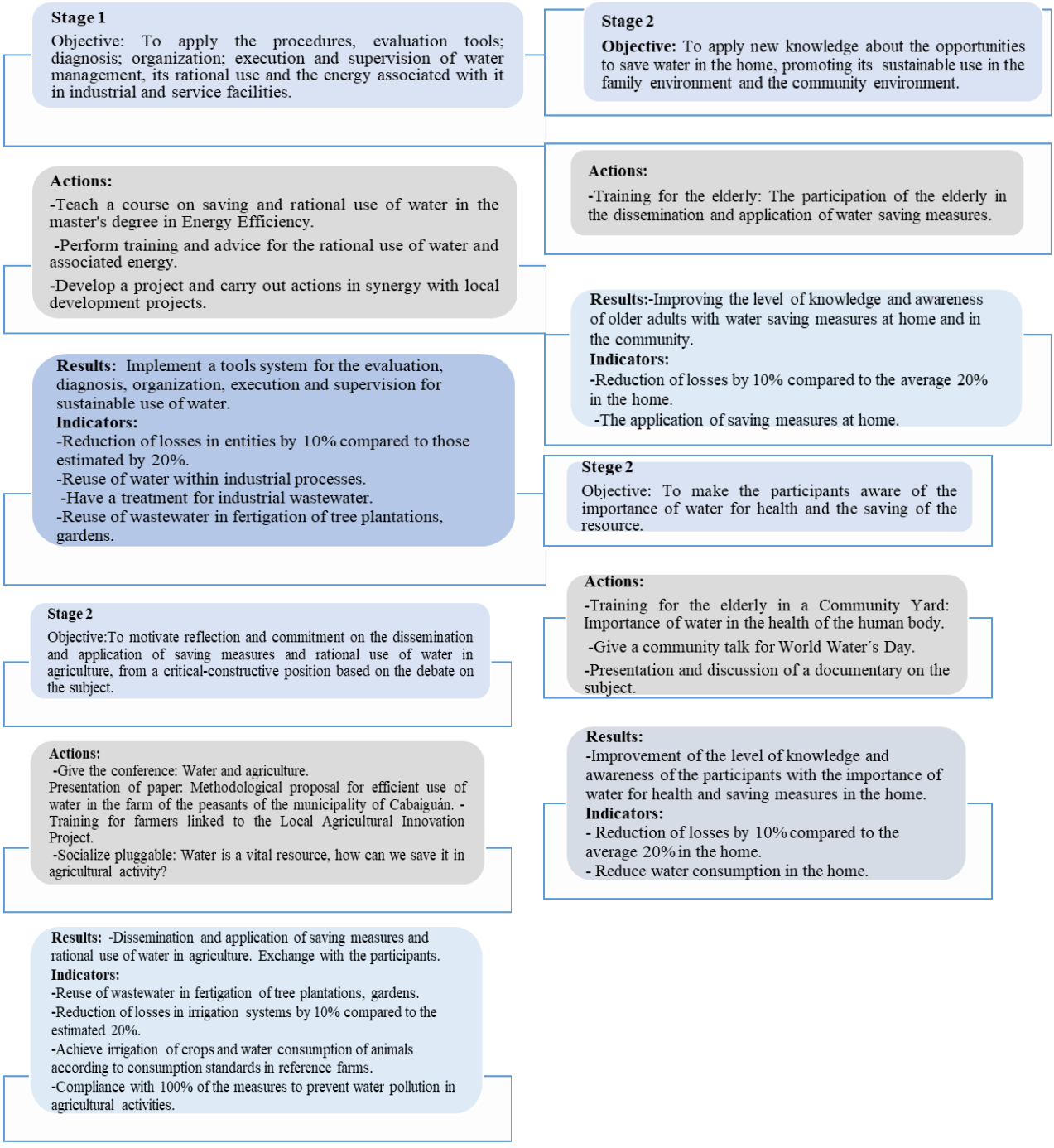
General objective

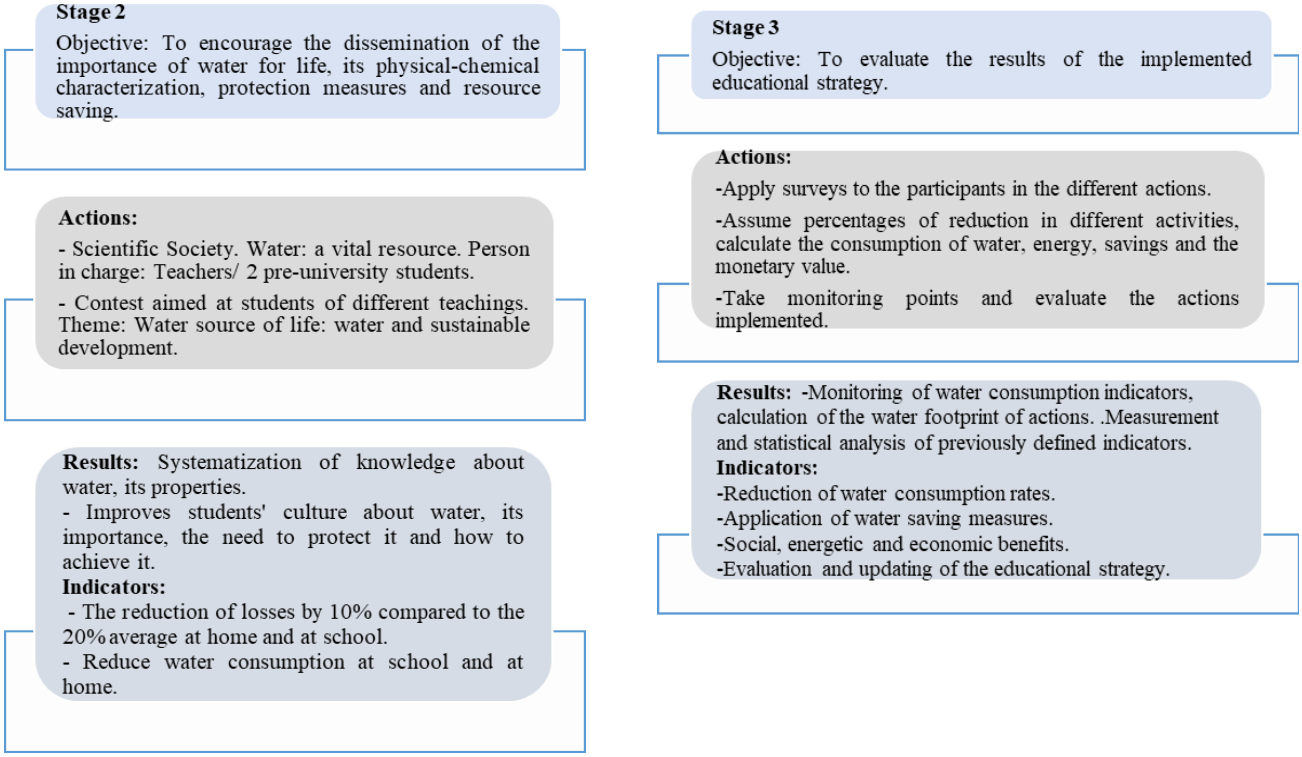
To systematize an environmental culture based on sustainable development, with a systemic approach oriented to the knowledge of water resources by different social actors with responsibility, sensitivity and cooperation for the materialization of practices that ensure the protection and rational use of the resource.

Strategic planning

Was carried out in three stages, which are represented as fallow (Fig. 2)

Figure 2 - Educative strategy (stages 1, 2 y 3).





Source: self-made.

Implementation of strategy

The planned, implemented and evaluated actions were introduced in different educational level with stake of the students, professors, professionals, producer, elderly people and community. How the strategy was applied is explained below, under what conditions, for what time, responsible parties, and participants. The results are presents in table 1, and indicate the introduction in practice of the result obtained.

Table 1 - Execution time and implementation date of the different stages.

Stages	Execution time	Date of implementation
Stage 1	It is carried out in 2 months during the teaching of the master's degree in Energy Efficiency, the training for producers and agricultural technicians and in the training given to the Oil Refinery Company.	It begins in 2014, the community training postgraduate course for the protection of water resources is carried out in 2017 and training is carried out in the company in 2018 with the aim of promoting measures to save water in the industry and give it monitoring of waste treatment so that the cycle of water use is closed and the rate of consumption per volume of production is reduced.

Stage 2	Five years.	Years: 2014, 2015, 2016, 2017 y 2018.
Stage 3	At the end of each action	Years: 2014, 2015, 2016, 2017 y 2018.

Source: self-made.

Evaluation of Strategy introduction

The evaluation implies the definition of the achievements, obstacles that have been overcome, assessment of the approximation achieved to the desired state. Social impact of the actions implemented.

Economic, social and environmental benefits of the strategy are present a fallow:

1. A total of 354 participants from different school levels and different activities were trained (postgraduate courses, conferences, workshops, talks, training).

2. Actions have been carried out to fulfill the main objective of the strategy, achieving benefits in the awareness of the participants in the saving and protection of water.

3. Based on training and learning, it contributes to the environmental education of the participating population and the implementation of saving measures.

4. The estimation of water savings is significant when applying measures in frequent activities in the community according to the diversity of the participating public. It is assumed for a total of 354 trained people, a minimum annual consumption in five activities in the house per person equivalent to 202 757,5 L, which means a saving of 71 776 155 L, equivalent a 71 776,15 m^3 of water per year, with economics value of $ 17 944, 038.

5. Follow-up of the environmental education strategy of the Municipal University Center of Cabaiguan and within this to one of the environmental contents (saving and protection of water)

As relevant results mention the colloquial educative communitarians, the realization of concourse for a World Water Day during 2017, 2018, 2019 had permitted the participation of more than 100 pioneers and the folio of pedagogic product consistent in text, poesy, draws about water as vital resource and its sustainable use. Besides, communicative products, consistent in a documental and pluggable of divulgations, were obtained. (De la Cruz, Rodríguez & Páez, 2022)

The following qualitative impacts were valued as result of strategy application:

1. The environmental culture of students and teachers in the school environment and in the community is increased.

2. It is possible to materialize the link between the structure of the water molecule, properties, uses and importance.

3. Reference material is available to analyze water pollution, its causes and prevention measures.

4. The link of the Municipal University Center with pre-university education and other teachings is achieved, thereby deepening the preparation of students in a topic of importance, relevance and relevance.

5. Water saving measures is applied in the school context, in entities and in the community.

6. Water saving measures is socialized in agricultural production, industry, the home and the community.

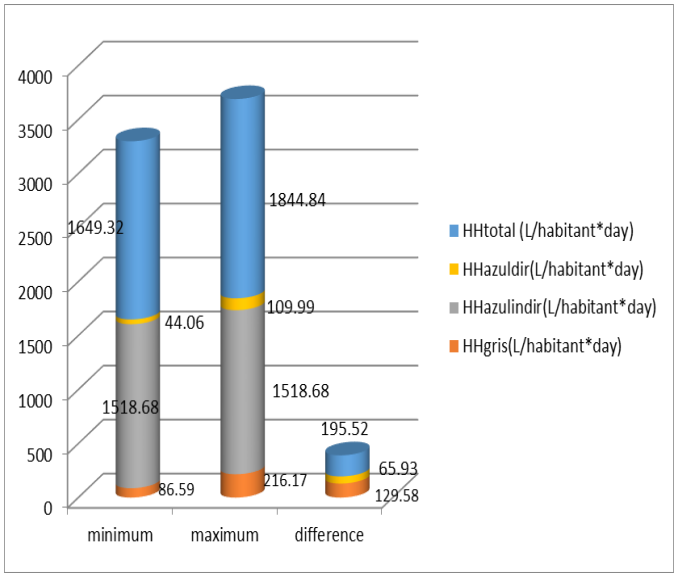
7. A cultural transformation is carried out on the water resource, which allows raising the level of awareness of people about the urgent need to protect this resource, due to its high demand and the effects of climate change.

The previous results and Francisco, López and Monteagudo, (2007), then the authors considered as relevant actualize the strategy and present the new stage initial with new topics to capacitate the peoples and the participants (students, professionals, professors, producers, researchers). This results were present as fallow.

Vision to actualize the strategy

López and Monteagudo, (2007), recommended sustainability in its use and management among the solutions treated to dispose of water. This means using technologies and systems that achieve stable operation with the resources available in the community being served, without relying too heavily on capital. The evaluation of the sustainability of the water footprint is a relatively new tool, which implies carrying out evaluations of the hidden water in the processes and services where the population benefits. (Hoekstra, Aldaya & Mekonnen, 2021), (Arévalo *et al*., 2017). A preliminary analysis of this indicator allows us to show the results of Fig. 3.

Figure 3 - Behavior of the components of the water footprint per person.



Source: self-made.

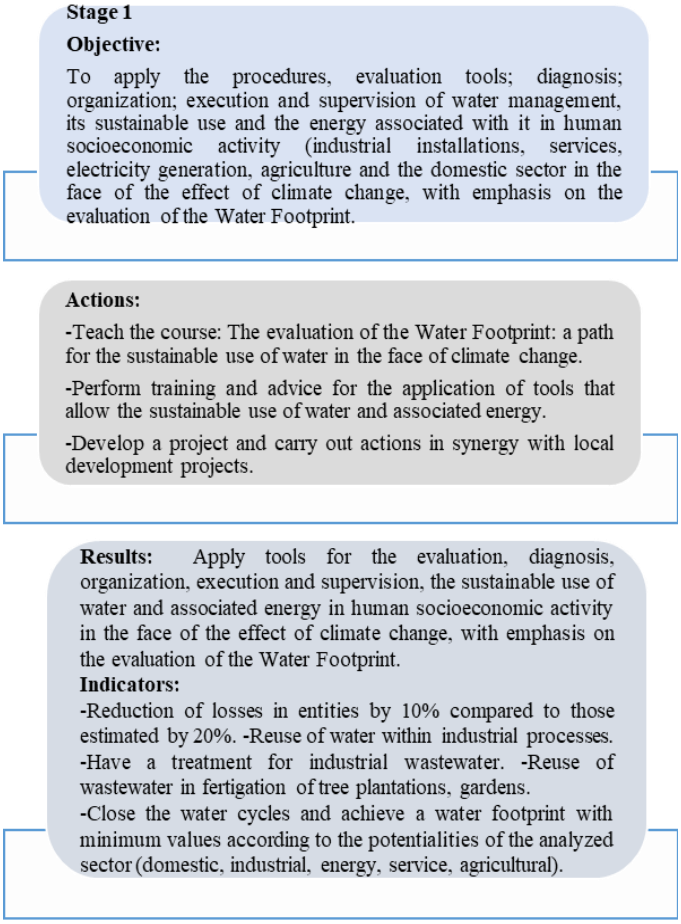
When comparing the components of the water footprint for maximum and minimum consumption of water in the domestic sector, the reduction of the total Water Footprint was shown to be 195,52 L/person*day; in 129,58 L/person*day in the case of the gray Water Footprint and 65,94 L/person*day.

These calculations demonstrate the need to update the strategy by considering an updated stage 1 where the evaluation of the water footprint indicator in different economic and social sectors is deepened, in order to systematize an analysis of the sustainability of water use at the local level. and outline strategies to reduce the water footprint.

Strategy update

In the analysis carried out above, it refers to the evaluation of the water footprint as a tool with potential to achieve the sustainable use of water, incorporating the treatment of this content into the update of the strategy represented (fig. 4).

Figure 4 - Updated educational strategy (stage 1).



Source: self-made.

Once this stage has been implemented as a result of the application of the Water Footprint evaluation methodology, the formulation of a water footprint response option strategy will be obtained as the main product.

Its relevant refer that had been imparted a course and conference about Calculating the water footprint: a path towards sustainable water use in the context of climate change and two conference about this topic as part of group of environment at the University of Sancti Spiritus and prone company with the participation of 30 students, professors and professional.

In addition, other actions could be planned, say an exhibition for the promotion of an environmental culture where different manifestations of art on environmental issues are presented, leading producers of organic food, examples of technological improvements made by industry and services in favor of the environment and the water resource.

The resources to be obtained by a project will be used to deepen the actions carried out as part of the educational strategy, the transportation of teachers to other communities, the development of teaching aids for conducting talks and educational activities, printing and distribution of communicative products (pluggable, brochures).

Another part of the resources can be used in the awarding of the best works presented in the contests, the purchase of means of Information and Communication Technologies to achieve greater effectiveness in the implementation of the strategy, in this regard it is specified: Personal computer, laser printer, smart cell phone, television, camera, flash memory, external drive, microphone, printer supplies, expendable materials (pens, crayons, cardboard, paper packets, notebooks, coloring books, materials didactic). These resources can be used to develop other teaching materials, teaching aids, teaching materials, audiovisuals.

Support the improvements that are introduced by different entities involved in the project, specifying the acquisition of water measurement equipment to monitor its consumption, such is the case of schools, the university center, the industry where the introduction of the Cleaner Production technology; as well as additions to improve the irrigation system of reference farms, implements for cleaning the stream bed in the urban area and monitoring its management (means of protection for the participants in the cleaning and control cameras, the latter for the identification of those who fail to comply with environmental legislation).

The results obtained with the project must be socialized in prestigious international events, so resources are required to participate in at least one international event in the year. It aspires to create a digital book with the innovation achieved from the updating and contextualization of the strategy in other scenarios of the Central American and Caribbean region. It is characterized by sociocultural aspects of the local and national Cuban culture, the significant aspects introduced in the industry, services, in agricultural production, in homes, in communities and the management of the sources of water resources of the locality.

Conclusion

The implementation of educative strategy for sustainable use of water influence in the transformation of attitude of people and contribute through ways of being, living, producing and consuming, as urgent necessity. Only through profound changes in people's practices and

habits will sustainability be embedded in the values and beliefs of communities, and will be passed on to succeeding generations and the sustainable use of water is materializing. Consequently, the education of the inhabitants, from an early age, through the different educational and community spaces is the starting point; the potentialities can be used to sensitize the students and the general public about the protection and sustainable use of water.

The educational environmental strategies is necessary constantly updated and developed, stimulate the introduction of practices in accordance with the sociocultural characteristics and the local context, within the framework of the sustainable development agenda until 2030, according to objective six.

Water, a precious resource we often take for granted, its scarcity is causing a significant challenge in various sectors. Essential for life, yet 1.1 billion people worldwide lack clean water, and 2.6 billion live without basic sanitation (Source, World Water Council), thus dramatically impacting health, education, and economic development. Today, as the world observes World Water Day, this year, the theme "accelerating change to solve the water and sanitation crisis" highlights the essential role of water in our lives and the need to protect and manage this precious resource, especially in the face of erratic monsoons, climate change, and the increasing demand for water resources. The world's population and water demand are growing, making it crucial for facilities to take action to conserve water and reduce its environmental impact. As a facility workforce, we are pivotal in ensuring this natural resource's optimal use while minimizing waste. Facility management plays a critical role, and facility managers must take steps toward implementing sustainable water management practices in their facilities. This article discusses strategies we can adopt as a facility workforce to conserve water in the facilities and campuses to promote sustainable water management practices. The world is becoming increasingly conscious of finite resources, and measuring water usage and tracking progress cannot be overstated. Proactive steps to measure water usage and track progress identify excess consumption or wastage areas to redirect the source to implement water-saving strategies.

Investigate all aspects of building operations that involve water and identify potential water sources. Developing a water conservation plan is crucial for implementing effective facility water conservation strategies. The plan should include a baseline assessment of water usage, identification of water-saving opportunities, and implementation of water-saving

measures. The program should have a monitoring and reporting mechanism to track progress and identify areas for improvement.

We must adopt and practice reducing water usage and conserving our natural resources while lowering operating costs. Effective water conservation in facility management requires a collaborative effort involving all stakeholders, including building occupants, maintenance staff, and external contractors. Awareness, accountability, traceability, and education encourage adopting water-saving habits, such as turning off faucets when not in use and reporting leaks. With the growing concern over water scarcity and climate change, adopting sustainable technologies for water is essential. Fortunately, with the rapid technological advancements, various technologies, from intelligent irrigation systems to greywater recycling, are available.

Acknowledgements

The authors would like to thank institutions participant whose were sensible and mobilizing to implicate in different activities.

References

Arévalo U., D., Zárate T., É., Fernández P., A., Kuiper, D., Moreira D., Castro C. & Cascante R. (2017). *Guía metodológica para la evaluación de la Huella Hídrica en una cuenca hidrográfica.* Costa Rica. Retrieved from http://ww.euroclima.iica.int

Caballero C. Y. (2017*). Aprender a aprender para aprender: más que un juego de palabras facilitadora de procesos de aprendizaje* – ÁBACO en Red. Retrieved from http://abacoenred.com/wp-content/uploads/2015/10/aprender-a-aprender-para-aprender.pdf, fecha de consulta: enero de 2018.

De Armas Ramírez, N., Perdomo Vázquez, J. M., & Lorence González, J. (2003). *Aproximaciones al estudio de las estrategias como resultado científico.* Villa Clara. Universidad Pedagógica "Félix Varela". 15p.

De la Cruz Soriano, R., Páez Martín, M. C., & Rodríguez Toledo, M. A. (2022). "Sistematización de experiencia en la educación ambiental: el concurso por el Día Mundial del Agua". *Revista Mendive, 20*(1), 139-157. Retrieved from https://mendive.upr.edu.cu/index.php/MendiveUPR/article/view/2382

De la Cruz S. R., Guevara R. O., Gotera E. P., Hernández S. F., Ledesma S. G., Presilla A. B., & García S. A. (2018). Acciones de capacitación para la mejora del manejo de los residuos sólidos urbanos y la protección del agua. *Revista Iberoamericana Ambiente & Sostenibilidad,*

1(1), 90-103. Retrieved from https://ambiente-sustentabilidad.org/index.php/revista/issue/view/2

Francisco Martín W., López Bastida E., & Monteagudo Yanes J. P. (2007). *Gestión y uso racional del agua.* Universidad de Cienfuegos. Cienfuegos: Editorial UNIVERSO SUR.

García Fernández. (2010). *Sobre los recursos hídricos internacionales y nacionales*. Director de Cuencas Hidrográficas INRH, Secretario Consejo Nacional Cuencas Hidrográficas. Retrieved from http://www.hidro.cu

Guido Williamson L. (2012). Aprender a aprender. Red tercer Milenio. Retrieved from http://www.aliat.org.mx/BibliotecasDigitales/Educacion/Aprender_a_aprender.pdf

Hoesktra A., Chapagain A., Aldaya M., & Mekonne M. (2021). *Manual de Evaluación de la Huella Hídrica*. Establecimiento de estándar mundial. AENOR.

Lanuez M., Martínez M., & Pérez V. (2010). *El maestro y la investigación educativa en el siglo XXI.* La Habana: Pueblo y Educación.

Laportilla Estévez. N. D., & Arteaga González, S. (2017). Apuntes para fundamentar el perfeccionamiento de la Educación Ambiental para el Desarrollo Sostenible en los Planes de Estudios y Programas del Sistema Nacional de Educación. En Colectivo de autores (Eds.). *Perfeccionamiento de la educación ambiental para el desarrollo sostenible en el sistema nacional de educación* (s./p.). Centro Nacional de Áreas Protegidas. La Habana, Cuba.

Martín Ortega E. (2018). *Aprender a aprender: una competencia básica entre las básicas*. Universidad Autónoma de Madrid. Retrieved from http://eoepsabi.educa.aragon.es/descargas/H_Recursos/h_1_Psicol_Educacion/h_1.3.Aprender_a_aprender/1.13.Aprender_a_aprender.pdf

Ministerio de Ciencia Tecnología y Medio Ambiente [CITMA] (2017). *Tarea Vida: Plan del Estado cubano para el enfrentamiento al cambio climático.* La Habana, Cuba.

Ministerio de Ciencia, Tecnología y Medio Ambiente, [CITMA] (2016). *Estrategia Nacional de Educación Ambiental.* Cuba*, 2016-2020.* La Habana: Centro de Información, Divulgación y Educación Ambiental, Agencia de Medio Ambiente.

Ministerio de Ciencia, Tecnología y Medio Ambiente [CITMA] (1997). *Ley 81 del Medio Ambiente*. La Habana: Centro de Información, Divulgación y Educación Ambiental, Agencia de Medio Ambiente

ONU (2003). *Agua para todos, agua para la vida*. Informe de las Naciones Unidas sobre el Desarrollo de los Recursos Hídricos. https://www.un.org/esa/sustdev/sdissues/water/WWDR-spanish-129556s.pdf

ONU (2015). *Transformar nuestro mundo: la Agenda 2030 para el Desarrollo Sostenible.*Cumbre del Desarrollo Sostenible.

Rodríguez Bueno F. (2012). *Nuevo orden climático, ambiental y ecológico. Necesidad impostergable.* La Habana: Editorial Científico Técnica.

Rodríguez G., A., & Peña F., L. (2019). La protección del medioambiente en Cuba, una prioridad gubernamental. *Novedades en población / CEDEM*, (30), 113- 122. Retrieved from http://www.novpob.uh.cu

SAGARPA, (2015). Uso consuntivo del agua de riego en el cultivo de caña de azúcar. *Nota Técnica Informativa.* [Online exclusive] Retrieved from www.conadesuca.gob.mx

Santos A. I, Laportilla E. N. D., & Castro S. L. (2020). El perfeccionamiento de la educación ambiental en el sistema nacional de educación como política pública en cuba. *Revista Cub@: Medio Ambiente y Desarrollo, 20*(38), 1-11. Retrieved from www.cmad.ama.cu

UNESCO (2015). *Agua, sociedad y cooperación – 50 años de los programas sobre agua para el desarrollo sostenible de la UNESCO.* Publicado por la Organización de las Naciones Unidas para la Educación, la Ciencia y la Cultura, Francia. Retrieved from http://creativecommons.org/licenses/by-sa/3.0/igo/.

UNESCO (2017). *Mobilizing UNESCO Chairs in Natural Sciences for Policy Action towards the 2030 Agenda.* Director-General Irina Bokova.

Websites:

file:///C:/Users/raquel/Downloads/DevelopingaSustainableWaterConservationStrategy.pdf

https://www.sciencedirect.com/science/article/pii/S1110016818302424

https://sdgs.un.org/partnerships/water-education-project

https://link.springer.com/article/10.1007/s13201-024-02214-2

https://www.linkedin.com/pulse/awareness-action-investing-sustainable-water-infrastructure

Article Information

Received on January 11th, 2024
Accepted on July 02nd, 2024
Published on September, 24th, 2024

Author Contributions: The author were responsible for the designing, delineating, analyzing and interpreting the data, production of the manuscript, critical revision of the content and approval of the final version published.

Conflict of Interest: None reported.

Article Peer Review

Double review.

Funding

No funding.

How to cite this article

APA
De la Cruz, R., Marrero Hernández, N., Jiménez Padilla, T., & Gavilla Quiroga, A. Q. (2024). Update of educational strategy for community training in the sustainable user of water. *Rev. Bras. Educ. Camp.*, *9*, e18468.

ABNT
DE LA CRUZ, R.; MARRERO HERNÁNDEZ, N.; JIMÉNEZ PADILLA, T.; GAVILLA QUIROGA, A. Q. Update of educational strategy for community training in the sustainable user of water. **Rev. Bras. Educ. Camp.**, Tocantinópolis, v. 9, e18468, 2024.