Centre of Science and Technology of Antioquia

Interview with Daniela Zapata López and Jaime A Arboleda Palacio

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How does CTA plan to assess the social and cultural factors that may influence the adoption and appropriation of electrochemical CO_2 conversion technologies in urban communities in Colombia, particularly in Medellín?

CTA plans to assess the different social and cultural factors influencing business and community dynamics across various sectors involved in the technology process – from waste treatment and CO_2 generation to capture, conversion, and utilization.

First by establish a base line that includes: Medellín socio-demographic characteristics, topography, waste and emissions generation patterns, air quality challenges, and community awareness of these issues. It is also assessing key waste management services (main waste-

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water treatment plant, landfill, and big cement industry), population needs related to waste-water treatment and emissions mitigation. Additionally, CTA aims to identify stakeholders within the socio-technical system and explore behavioural patterns in companies and individuals: How do they manage waste? How do they treat water? How do they adopt new chemical solutions derived from these technologies?

Based on this information, CTA is identifying the main factors involved on the different stages of the process are part of Medellín culture, the level of access to this kind of information, and what kind of divulgation and education strategies are needed for the adoption of WaterProof electrochemical CO_2 conversion technology in Colombia.

When it comes to the acceptance and support of new technologies, the uptake by local communities is key. What strategies is CTA considering to engage local stakeholders in the process and promote community involvement in the potential implementation of WaterProof's CCU technologies in Colombian urban areas?

CTA works in the design of different strategies based on the territorial context previously analysed, starting from structured and organized participation spaces, based on the knowledge of their environmental impacts, educational in environment topics with the industry, government, and organizations related to the entity, environmental education groups, social programs they develop as: Environmental roundtables, technical secretariats, Local environmental plans, technical workshops as in the Water chair. Information that points to each thing and to each aspect by Focus groups where CTA initiate by guiding questions and start the discussion regarding WaterProof project relation with the community needs in terms of political, social, economic, and technical. Considering what is working well in these sites, and encourage the stakeholders themself generates this type of spaces, in terms of sustainability, starting from the experiences that already exist, what has been done to mitigate these issues? To then transferring the knowledge to develop it themselves, starting from the knowledge that people have and combining technical knowledge.

These strategies focuses on three key aspects:

1. **Strategic Implementation in Waste and Industrial Sectors** – By discussing electrochemical CO_2 conversion in wastewater treatment plants, landfills, and high-emission industries, Medellín can transform CO_2 into valuable products like sustainable chemicals and fuels. This not only reduces emissions but also creates new economic opportunities.
2. **Public-Private Collaboration and Policy Integration** – CTA aims to align this technology with national and local environmental policies, working closely with government agencies and private sector stakeholders to secure funding, incentives, and regulatory support.
3. **Community Engagement and Social Appropriation** – Ensuring technology adoption requires educational programs, industry training, and participatory spaces where communities understand the benefits and contribute to the adaptation process. Through workshops, environmental roundtables, and local innovation hubs, CTA will promote social ownership and acceptance.

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Given Colombia's unique environmental and economic context, how does CTA envision an ideal adaptation of the WaterProof project's electrochemical processes to address specific urban challenges in cities like Medellín?

CTA envisions the adaptation of the *WaterProof* project's electrochemical CO_2 conversion processes in Medellín by integrating technological innovation with the city's environmental and economic priorities. Given Medellín's air pollution challenges, high industrial activity, and growing sustainability commitments. This future scenario includes national and local government funding mechanisms for the development and implementation of CCU (Carbon Capture and Utilization) systems in waste treatment facilities, alongside increased investment from public and private industries in electrochemical CO_2 conversion.
Furthermore, CTA aims to foster a significant rise in knowledge, acceptance, and support across business sectors and the general community. This includes greater willingness to invest in sustainable waste treatment services and consumer products derived from these technologies. By integrating policy support, industry commitment, and community engagement, Medellín can position itself as a leader in sustainable innovation and carbon management.

Considering CTA's expertise in promoting science, technology, and innovation, what educational or awareness programs could be developed to facilitate the understanding and acceptance of CCU technologies among urban communities in Colombia?

CTA is committed to advancing educational programs in both academic and business contexts to promote science, technology, and innovation. Its initiatives range from fostering scientific vocations in young people to teaching and collaborating with graduate and postgraduate experts. Additionally, CTA provides specialized consultancy to industries and implements social appropriation strategies to ensure that knowledge developed in academic and industrial sectors is effectively transferred back to communities.

In recent years, these efforts have been strongly focused on environmental and sustainability topics. Through practice communities and networks, CTA enhances the reach and impact of emerging global, national, and local technological advancements, innovative production processes, and best practices. By bridging academia, industry, and society, CTA drives sustainable development and technological adoption for a more resilient future.

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