

An integral approach of ecological sanitation in traditional and rural communities

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Abstract *This article presents an integral approach to work in community projects, based on Guattari's three ecologies and its dialogue with psychosocial theorists, since it involves the need to combine technological interventions with social approaches. These contributions are explored to point out the need for dialogue in the implementation of sanitation actions, mainly in the rural area and in traditional communities, involving the individual, the groups served and their territorial culture. The approach presented was implemented in a joint action with the Caiçara Community of Praia do Sono and the Forum of Traditional Communities of Angra dos Reis, Paraty and Ubaituba (FCT), based on the Observatory of Sustainable and Healthy Territories of Bocaina (OTSS / Fiocruz). It could be verified that the inclusion of the actors in the social mobilization for the sanitation can entail an effective social participation that generates both a subjective change in the conscience of the diverse local actors and structural gains that promote health and quality of life. The panorama covered shows the importance of a global understanding of the problem, but also, of a simultaneous local, territorialized action, adapted to each reality through genuine dialogue and horizontal participation.*

Key words *Ecological sanitation, Knowledge ecology, Traditional communities*

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Introduction

This discussion presents an integral approach for acting in community projects that is based on the three ecologies¹ and on their dialogue with psychosociology theorists in order to establish a proposal for the development of actions in this field that consider not only nature itself but the human beings in their social formations and subjective issues.

Concerning environmental public policies in rural areas and traditional communities, it is fundamental to meet the commitments of social mobilization and environmental education to apply effective and efficient actions towards an inclusive social participation. In the sanitation field, specifically, public and private initiatives of implementing predefined exogenous alternatives from imposed knowledge, without considering the conversation with served communities and the local wisdom, usually present unsatisfactory results for all parts involved: the action's promoters and beneficiaries. Thus, deliberation and the establishment of different interpretations are mandatory for the development of new approaches, since participative processes represent, at the same time, a necessity and a challenge for public actions. According to Guattari¹, there is a piercing paradox between the continuous development of new technologies with the potential to solve ecological problems and, in opposition, the inability of the organized social forces and the constituted subjective formations to consciously claim and appropriate such tools in their territories.

Therefore, it is necessary to think about sanitation actions that contemplate an ethic-political articulation, called *ecosophy*¹, among the three ecological instances: nature, social relations and human subjectivity. To Guattari¹, it is from the "hard" sciences' side that a turnaround about subjectivation processes is expected. From that point of view, it is possible to predict actions that contemplate both nature and the social actors' awareness for the promotion of health, looking at these last ones not just as recipients of such technology, but as constituent and integrating parts of the technology in their territories. For the involvement of those individuals, questioning must be encouraged, as addressed by Paulo Freire² in the education field. Through this action/reflection "praxis", i.e., through conscious acting, men and women on each territory may assume their roles and fight for their rights².

The present study aims at the diffusion of strategies for an integral approach on sanitation,

aligned with interaction and dialogue mechanisms for the purpose of developing projects that promote positive impacts on the covered territory, in technological, ecological, social, economic and individual manners.

Sanitation and health promotion

Considering the current evidences of ecological imbalance, climate change, environmental disasters and the increase in social inequalities, it is evident the unsustainability of the established hegemonic mode of production and consumption³. In this context of disruption and antagonism amplification, ecological issues are urgent, which demand problematizations that are transversal to the other rupture lines in the social relationship formats, requiring the establishment of new paradigms through counter-hegemonic actions.

The development of the 2030 Agenda, after 2015, and the Sustainable Development Goals (SDG) highlight the inclusion of sustainability as a critical dimension in all knowledge areas and fields of action⁴. In the promotion of health, the commitment to SDG 6, which proposes the guarantee of sustainable management of water and sanitation for all people, shows the strengthening of the relationship between health and sanitation in a wide context as a strategy to enhance global equity⁵ and boost quality of life, since environmental sanitation is considered a universal right⁴. The importance of ensuring people's access to this right is testified by epidemiological studies about sanitation, published in the specialized literature, in which it is securely affirmed that interventions in water supply and sewage access provoke positive impacts in many health indicators⁶.

However, in Brazil, populational dispersion and the difficult accessibility to many rural communities and settlements make it complex to satisfy this right to a part of the population that is already more vulnerable⁷. Still, in the history of Brazilian public health, there are reports of challenges faced by sanitation and health technicians, in the principles of the 20th century, to accomplish the adhesion of residents of rural areas or peripheric neighborhoods to the construction of sanitary facilities⁸, usually by predefined exogenous measures that do not respect the local context.

Thus, deeper thinking and acting in sanitation field is essential to contemplate the diverse actors involved, promoting sustainability, equity

and autonomy. It is fundamental to establish the dialogue and to listen to the needs of the served group, through a transpersonal look at the individual and at the collective. So, it is necessary to weigh the sustainability of sanitation measures and how these devices for the production and incorporation of subjectivity could be, targeting an individual and collective resignification instead of the use of hegemonic technologies to attend different situations, territories and individuals¹.

Thereby, it is of great importance to promote integrations that are both structural, i.e., of effective implementation of sanitary technologies in the field, and structuring, i.e., educational and social-mobilizing, in order to produce a new subjectivity to the individuals, increasing the number of sanitation and common health possibilities to an approach that also contemplates mental and emotional issues.

The Three Ecologies

The urgency for transformations brings up the necessity of changes in collective worldviews and in the forms of acting to care for the environment. One of the prime issues to be deepened is the introjected concept of environment, in which human beings do not see themselves integrated and belonging to nature. The cartesian vision has dissociated wisdom, separating the observer from the observed, nature from the human being, culture from nature¹. The anthropocentrism understands nature as a good to be used and characterizes it as the environment. Thus, nature is transformed in capital to be consumed or restored, depending on the necessity. It is exactly this separation feeling that hampers the establishment of a relationship of affection and an effective care for the environment, perceiving human beings integrated to nature. According to Moscovici⁹, human beings must not be perceived as separated from the environment in which they are inserted. So, whenever there is care for nature alone, not considering the community and the individuals in the same territory, a social exclusion mechanism is nurtured.

The “ecoefficiency” approach as a path for the sustainable development exemplifies the practice of such dissociation. This approach has dominated social, political and environmental debates, producing solutions for “economic and ecological gains” and maintaining the hegemonic perception of nature as a selling capital asset¹⁰. Although the actions taken under such perception present positive impacts on the preservation of

environmental resources, they do not integrally consider the social issues of the territory, focusing just on the economic and environmental pillars and neglecting the psychosocial one.

The dissociation between nature and mankind in environmental interventions can be illustrated by the creation of national parks, which are generally preceded or followed by displacement or expulsion of native populations, ignoring the role that these populations perform in the conservation of the environment they live in¹¹. Additionally, the traditional wisdom is frequently not considered and these native communities are often marginalized through legislation that belittles their ways of living. From this vision, it is possible to comprehend the simultaneity between the destructions of nature and culture, i.e., the “ecocide” is, in certain aspects, an “ethnocide” that takes place through the disregard of local culture⁹.

The concept of “environmental justice” prioritizes the empowerment of marginalized populations and their life conditions, evidencing the importance of the native peoples’ autonomy, sustainability and equity in meeting their needs¹². It is worth highlighting that, in order to promote sanitation measures and “environmental justice” in isolated or traditional communities, it is crucial to consider not only the available technologies and technical standards, but rather the ecological, social, economic and individual dimensions of the territory.

For that purpose, it is advisable to understand and differentiate the conventional technologies (CT) from the social technologies (ST). Briefly, CT are environmentally unsustainable, alienating, hierarchical and holder of coercive control mechanisms that reduce effectiveness. This type of hegemonic technology does not appraise the social and local context, nature and the human beings involved in the process.

On the other hand, social technologies (ST) are adapted with non-conventional systems, which represents alternatives to the conventional visions and promotes social emancipation¹³. The concept used by the Social Technology Network (RTS, in Portuguese) is: “social technologies are transformative techniques and methodologies, developed through interactions with people, that represent solutions for social inclusion”¹⁴. Briefly, the ST are: i) adapted to small physical and financial sizes; ii) not discriminatory in working relations; iii) oriented for the internal mass market; iv) liberating of potential and creativity; and v) capable of economically making small

and self-managed businesses feasible¹³. In Brazil, these technologies have been highlighted in social movements, as public policies¹⁵ and in the sanitation field.

The Environmental Ecology

The natural issue originates in the crisis of humanity place on nature, from a rupture and the separatism feeling experienced in these relations. In order to establish a new paradigm of interconnection, it is essential to return to nature, which means return our bodies to the body of bodies, the earth, where each and every one finds its home⁹, focusing on the interaction between mankind and nature, on their interdependence and on their integration. Humans are systemic beings and, just as society and the planet itself, they only function when integrated with nature¹⁶.

For that purpose, ecologists and scientists must walk side by side, after all, the establishment of a scientific or technical method should depend not only on its technological efficiency, but also on the assessment of its psychic, physical and social advantages and disadvantages. The critical look of ecologists is mandatory to maintain the respect for life, in the first place⁹. Their focus is precisely on the recycling rule, which is applied not only to materials but equally to ideas and to all life forms.

In this scenario, sanitation is getting revisited through the use of ST with the development of ecological sanitation actions. The so-called “*ecological sanitation*” represents an alternative vision of neoclassic environmental economy in relation to the sustainability of the current development standards and it promotes the correct management and reuse of waste from humans and animals as products, guaranteeing sanitary safety and closing the nutrient cycle¹⁷ in a way that is more integrated with nature and with social conditions of each territory.

In essence, the difference is: while conventional sanitation systems are linear, treating the effluent and later releasing it in the nature, ecological sanitation systems reuse it through modifications and utilization of the nutrient cycle in the natural world¹⁸⁻²¹, which enables the recovery of macro and micronutrients, organic matter, water and energy contained in residual waters. There is also the segregation at the source, i.e., separation of black water (from the toilet) from gray water (not contaminated by feces). This allows the practical and decentralized treatment of the distinct types of domestic wastewater and the

minimum dilution of effluent streams, resulting in an enhancement of hydric availability by water economy and reuse, and in the protection of water resources by the release reduction of treated or untreated sewage in watercourses. These phenomena help enhance the concentration of resources to be exploited²⁰⁻²³. The treatment of gray water is relatively simple depending on the reuse purpose, which can be done in the household itself through direct use in the soil for the irrigation of trees and gardens, as long as some sanitary criteria are followed²⁴. Also, gray water represents 70% of all domestic wastewater²⁵. The use of tanks of evapotranspiration (TEvap) for black water treatment, which is an example of ST, presents potential to be applied in popular condos and rural areas, and it can be used as gardens next to the households, where there may also be beneficial by producing fruits^{18,22,25}.

TEvap uses sewage as a nutrient for the soil. It is composed of a unique sealed chamber in the shape of prism with average measures of 2 m wide x 5 m long x 1.6 m high. Inside it, there is a septic chamber made of holed ceramic bricks that build a sort of pyramid or of sequential tires, where anaerobic digestion stage takes place, followed by a filtration chamber in a multi-layer porous medium (rubble, gravel and sand, in sequence), and an area of roots, where nutrients and water are absorbed by the plants. Finally, closing the nutrient cycle, the system produces fruits (bananas) and returns water to the atmosphere through evapotranspiration¹⁸.

Chart 1 presents a comparative board built from the consulted references.

Additionally, the perspective of social inclusion in the process concerning decision making and in the constructive stages brings up a new connection between human beings and nature and promotes an environmental ecology, i.e., the uprising of a new environmental conscience, in practice. As discussed by Freire², it is from the human being's comprehension of seeing themselves implied to and integrated with nature, through “praxis”, that a consciousness capable of generating new impulses aligned with the care for the systems occurs.

Many among these new practices, which originated from the interactions between ecologists and activists, face doubts concerning their academic validation for possessing only empiric data about their implemented solutions. However, instead of restricting them, the academy should study them to assess their results, and optimize and improve their methods. It is import-

Chart 1. Comparison between conventional sanitation and ecological sanitation. Source: authors themselves.

Basic Sanitation	Ecological Sanitation
Measures for disease prevention and pollution control.	Measures for disease prevention and health promotion.
It consists of sewage treatment and adequation in the legislation standards for its proper final disposal.	It is sustainable, socially accepted and economically viable.
It mostly considers the technical and economic aspects.	It considers the social, environmental, technical, economic and cultural aspects ¹⁹ .
It considers waste and wastewaters as rejects, which must be treated and properly disposed.	It considers waste and wastewaters as resources, which must be reused, saving natural resources ^{20,23} .
There is no differentiation among the types of domestic wastewater and their treatment is unified.	It separates domestic wastewater in two groups, black water (from the toilet) and gray water, for later reuse ^{20,22,24} .
It treats nutrient and water cycles linearly.	It promotes the closing of nutrient and water cycles with its improved reuse.
It is a conventional technology (CT).	It is a social technology (ST).
The technique is built in a conventional way.	The technique is built considering the local socio-environmental and cultural dimensions.
It is built for the population, who is a passive beneficiary.	It is built with the population, in a way to generate its autonomy. The subject of rights is active in the territories.
It is conducted by technicians, without community participation.	It is conducted with dialogue and community participation.
Operators go through short and quick qualification processes.	Qualification and education processes about health, with popular education, constructive sharing, chat groups, among others.
It prioritizes individualized information.	It prioritizes collective formation and educating social mobilization.
It is instrumental and timeless, based on technical solutions.	It is a part of and an expression of community arrangements, strengthening itself on social media.

ant to appreciate the social experimentation field, since it is a practice capable of producing change.

Many activists and researchers are already substantiating these new concepts and measures based on “praxis” and on a new relation between mankind and nature^{17,18,22,26-29}. Such measures present technical benefits while focusing on socio-environmental issues. They also corroborate the need of creating projects that integrate sanitation measures that are structural (investments in construction and infrastructure) and structuring (educational, participation and social mobilization measures) and, at the same time, conjugated and aiming at the development of a new socio-environmental way of acting, which is based on the comprehension and internalization of the interdependent relation between mankind and nature³⁰.

The promotion of measures and researches applied to the systematization of knowledge in the ecological sanitation field becomes essential

to propitiate humanized options that are also academically qualified for the rural and traditional communities⁸. Also, the systematization in this field may propitiate new possibilities of public financing and budget channeling to meet SDG 6 (of sanitation universalization), through measures that are more adequate to the needs of the territory.

The Social Ecology

As previously discussed, it is not possible to separate nature from culture and we need to learn how to think transversally about the interactions between ecosystems and universes of social and individual references¹. A collective/participative management and a sense of self-responsibility are mandatory to channel sciences and techniques towards more humane finalities. In this context, it is not fair to separate actions taken over nature from the ones taken over the

socius, its ensemble of community values and the psyche of its individuals. When sanitation is glanced through social ecology, its principles concern the promotion of an affective investment in human groups of various sizes. The challenge is the development of specific practices that tend to modify and reinvent ways of being in different contexts and collectives, reconstructing the ensemble of modalities of being in a group. For that purpose, it is necessary to focus on the production modes of subjectivity: of knowledge, culture, sensitivity and sociability, which relate to the production of new symbols in the collective movements engaged with human care.

In order to cause this type of exchange and social symbolic change, the projects must promote the dialogue and exchanges among all actors, with full involvement of the groups served in the territory, in a horizontal format through a *knowledge ecology*, which generates individual and collective autonomy^{31,32}.

The knowledge ecology confronts the monoculture of modern science, because it is based on the recognition of the plurality of heterogeneous knowledge sources (being modern science one of them) and on sustainable and dynamic interactions among them without compromising their autonomies. Thus, this ecology's purpose is to cross-check knowledge and, as a consequence, ignorance. It also seeks to provide credibility to non-scientific knowledge, which does not imply in discredit of scientific knowledge, but simply its counter-hegemonic usage. And this is exactly the reason why the counter-hegemonic usage of science cannot be limited to science itself. The definition of knowledge ecology expands the testimonial character of knowledge in order to equally cover the relations between the scientific knowledge and the non-scientific one, enlarging, therefore, the outreach of inter-subjectivity as inter-knowledge and vice-versa³¹.

Moscovici⁹ corroborates the vision of knowledge ecology when arguing about the importance of "winning in the margins", i.e., encompassing all possible actors, occupying the spaces that are currently silent in our society and letting the social minorities' ideas penetrate the ecology and vice-versa. Nowadays, a blossoming of active minorities reshapes the map of our society.

By collectively acting in each territory, it is possible to reinvent and adapt technologies while considering all the voices involved in the process to ensure horizontality and equity. In order to perform effective changes, it is important to take advantage of diversity as a strategy of living sys-

tems for a greater resilience, promoting local autonomy and empowering congruent groups^{33,34}.

Taking into account all the issues discussed, to achieve the social ecology and an effective symbolic change, it is important to act in the territory, always involving the local group in the effective measures, to learn the real necessities and to promote an integration of local culture for the sanitation process.

The utilization of action research (AR) generates a holistic look for the implementation of ST, considering the technique, the context of the territory and the served population. One of its main goals is to provide to researchers and participants the means to solve the problems of the situation they are in more efficiently through guidelines of transformative measures. It means to facilitate the search for solutions to the real problems, to which the conventional procedures are little contributing. In this sense, the new procedures to be chosen must follow the priorities established from a diagnosis of the situation in which all participants have a voice³⁵.

Without a doubt, the action research demands a relationship structure between researchers and local people that is participative. Thus, horizontality is established in the relationship between the facilitator and the member of the community through the valorization of qualitative, informational and group aspects from the system being studied³⁶.

From the sociological point of view, the action research emphasizes the evaluation of different measures. Thereby, it does not intend to focus on individual psychology and is not appropriate for the macrosocial point, either. This research is a working tool for investigations with small and medium size collective groups. In opposition to certain tendencies of psychosocial research, the sociopolitical aspects are more relevant than the psychological aspects of intrapersonal relations. Nevertheless, this vision does not ignore the psychological reality and its values³⁵. Thus, the action research is considered a method or strategy of research and action that aggregates several techniques of social research.

For a better understanding of the popular demands, in action research, elaborate processes are necessary to comprehend people's reality, such as qualitative social research, which is recognized for both its capacity of grasping symbolic elements and also for improving the relation observer-observed. This approach deals with the universe of meanings, reasons, aspirations, beliefs, values and attitudes. The performance of an

empiric social research encompasses the articulation of several techniques, such as participative observations, individual and group interviews, focal groups, participative diagnoses, secondary quantitative data surveys and bibliographic research about the theme. For the evaluation of these data, triangulation is used, which enables their linkage and validation, allowing a deep immersion in the context from which the individuals' talks, actions and facts come⁸.

The methodology proposed represents a possibility of integrated intervention, in which many research tools can be combined to achieve the expected goals, helping the introduction of a dialogue among distinct cultures and social groups, according to the critique to the cultural relativism posed by Boaventura Sousa Santos⁸.

Over the process period, it is observed that the argumentative aspects are articulated, mainly in communicational situations: dialogues between researches and participants. In these cases, it is admitted that a "spiritual community" or an "intellectual bonding" is established in order to accomplish a consensus about the description of a given situation and the conviction about how to act. Nonetheless, it is of great interest to study cultural differences, highlighting the ones that pose obstacles to the inter-comprehension, because it is not just a matter of making the participants accept notions or points of view that did not belong to their universe of representations. The experts may also alter their own representations to complement the content on which they already had experience from another source³⁵. One way to amplify the results of an action research is to emphasize the communication mechanisms that enable each individual to verbalize their truth in order to co-create shared senses that are inclusive and to generate, in everyone involved, a feeling of belonging through an "ecology of senses".

The Mental Ecology

While working with collectivities, mental ecology indicates that it is important to reconstruct human relations in all levels of the *socius*, acting on the ensemble of community-related values and on the individuals' psyche. It must be considered that capitalist power has relocated and deterritorialized itself, permeating even the most unconscious subjective strata, from macro to micro.

Therefore, one of the key-problems between social and mental ecologies is the introjection of repressive forces by the oppressed individ-

uals. Even the defenders of oppressed people's interests reproduce, in their intimate relationships, the same pathogenic models that hinder the freedoms of expression and innovation¹. It is not possible to oppose capitalism just externally, through social practices and traditional policies. It is imperative to face these effects on the domain of mental ecology of the covered individuals, since, from this perception, it is crucial to cultivate dissent and the singular production of existence. Philippi⁸ brings a complementary vision when arguing that the individuals recreate themselves through their own representation in the world. Thereby, to evaluate an individual, it is important to consider their context in the social structure they belong to, assuming elements of culture, language and representation of the group that they are inserted in.

Whenever there is dialogue among representatives of different collective groups, even if it is through knowledge ecology and in communication spaces where horizontality is intended, the subjective identity that is defended by each of them speaks louder, showing of their different worldviews. In politics, conflict is always present. Thus, whenever these plural collective identities seek to defend their own concepts, even if they end up deciding for consensus, there is always the exclusion of something or someone, which discloses the human tendency for exclusion. If a politician often excludes something or someone, it is supposed that he or she presents a hostile behavior. Therefore, the action field of such politician consists of relations between a collective group characterized as an "us" (collective identity) versus a "them" (exteriorization of that collective identity). In this sense, there is a collective body that is totalized and closed on itself, on its social identity, and an external body that is unable to possibly become part of "us"³⁷. In the current social context, in order to keep the identification with one's social roots, instead of cooperating, i.e., believing in the construction of an "us", one takes action in subduing "them", which enables the perpetuation of the capitalist culture of oppressed and oppressor.

Thereby, it is crucial to find ways through which people may be owners of their own lives, both through personal control and through social influence. Empowerment is a process that allows people to become conscious of themselves³⁷. An important way of aligning the many actors on a territory is to build together worldviews that encompass all conceptions. Also, Nasciutti³⁸ discusses that the individual cannot be studied

from a single angle and that the social structures around them make sense because they are organized as functions of their individual lives.

The “ecology of senses” argues that the knowledge is neither limited to the mind (of the person) nor in the world (the object), but *in media res*, among the possibilities of the person interacting with the object through organic and symbolic processes of assimilation and accommodation. The Latin expression *in media res* refers to the place where the possibility of knowledge is built from the communication between people³⁹. Communication is regarded as a biological mechanism that enables the person to make sense of themselves and the exterior world, after all, any movement inwards is related to another movement outwards. However, the ecology of senses and the constructivist-critical methods enable the evaluation of both cooperative interactions and communicative pathologies because they take into account the transversality of knowledge. By understanding how reason and emotions evolve over the lifetime of people that are immersed in groups and culturally and historically built societies, Campos³⁹ advanced in the construction of the ecology of senses theory, which allows a look at the configuration of senses that emerge from the constructions and co-constructions of world images expressed in schematized discursive productions³⁹.

According to this theory, the cooperative solution, which demands ethic-social transformations, passes through dialogue and through a radical revision of structure and functioning of democratic procedures, notably the action of researchers who look at the people that communicate in the world³⁹. So, by creating spaces that enable genuine dialogues and sharing of world images, new mental ecologies are co-constructed in each person, who become more conscious, empowered and detached from patterns based on capitalism, therefore, more autonomous.

The sharing of senses and the co-construction of a collective image enable the emergence of new solutions, considering the contribution of each person, who represent only one voice of the intelligence collective that takes place *in media res*.

The integral approach

From the propositions of Guattari¹ and the theoretical guidelines of psychosociology, it is proposed an integrated way of acting that contemplates the multiple facets of the actors in-

involved in the process. Figure 1 illustrates this integral approach.

With the integral approach, the technologies may be implemented through a point of view that contemplates the reconnection of people with nature, with their collective groups and with themselves. Therefore, this type of approach is necessary in the implementation of effective actions in the sanitation field since it promotes the environmental ecology (through humans' reconnection with nature and its transformation processes), the social ecology (through the inclusion of served groups by valorization and incorporation of all their knowledge related to the issue), and the mental ecology (through effective dialogue and respect to each person's singularities).

It is important to ratify the necessity of an expanded vision to propitiate intra and intersectoral cooperation: facilitating agents, community agents, public agencies, environmental inspection agencies, financing agencies and civil society. Thus, the synergy of knowledge ecology amplifies the results obtained in a territory. Because of its transversality, the dialogue permeates all these dimensions and reconnects each human being to their worldview, promoting an internal contact of the person with themselves. The interchange of senses between individuals makes new world images rise, which are more inclusive and co-constructed by all, promoting a feeling of belonging and establishing conditions for cooperation. Also, the contact with diverse worldviews allows each person to reflect on their own actions identified with collective groups and to detach themselves from the traditional approach of oppressed-oppressor, which enables them to become a social actor, improving results and bringing people together.

Thereby, in sanitation projects, whenever new methodologies for integrating the ecologies of knowledge and of senses are presented, besides direct communication through sharing of worldviews, other approaches for non-verbal communication are necessary in order to promote new forms of inner understanding inside all individuals involved.

The Brazilian national program of basic sanitation (PLANSAB, in Portuguese)⁴⁰ brings innovation that allows effective transversal actions that are aligned with the three ecologies of Guattari¹ and the integral approach proposed. Also, as pointed out by the Brazilian national program of rural sanitation (PNSR, in Portuguese)⁴¹, which has been being constructed participatively since 2016, to accomplish sanitation in rural areas, the

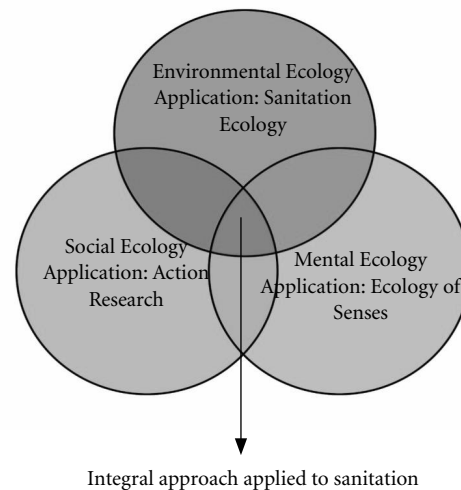


Figure 1. Integral approach on sanitation process in rural and traditional communities.

Source: authors themselves.

following strategic axis is considered: (i) Management of services; (ii) Education and social participation; and (iii) Technology, which are all interconnected in the practical world⁴¹.

In Brazil, many ST of ecological sanitation that are still not certified are currently being applied, such as biogas, evapotranspiration tanks, biogas sumps, gray water filters, dry toilets, among others. The *Fundação Banco do Brasil*⁴² has already certified 10 experiences in this field. A few examples are: i) “De Olho na água” (Observing water, in English) (Ceará State); ii) Using participative methodologies in the construction of agroecology (Minas Gerais State) and filtration gardens – ecological sanitation systems (Rio Grande do Sul State); and iii) Gray water filters built by *Caiçara* institute of permaculture and education (IPECA, in Portuguese), which shows the importance and relevance of strengthening studies and actions in the rural sanitation field⁴². It is important to stress that all these actions must be established to meet the interests and necessities of the territory and that the served parts must be consulted⁴³ and included in the discussion.

As mentioned before, it is already stressed in legislation and in national conjuncture that the ST for sanitation that are adapted to each specific territory contribute for the capacitation and perpetuation of their respective traditional

communities. It can be highlighted that this integral approach was developed and implemented for the collective construction of environmental sanitation ST using TEvap technology¹⁸. This action research project hired constructors from the community as social mobilizers⁴⁴ and environmental educommunication development⁴⁵, between 2014 and 2018, in association with *Caiçara* Community of Praia do Sono and the Forum of Traditional Communities of Angra dos Reis, Paraty and Ubatuba (FCT, in Portuguese), based on the Observatory of Sustainable and Healthy Territories of Bocaina (OTSS / Fiocruz)^{18,44,45}. Over the four years of action research, it could be noticed that using an integral approach for sanitation process promotes conscience changes in the individuals and a differentiate action throughout the whole process, causing changes not only in the community but in the local actors themselves.

Thus, in the context of capillarization and the construction of territorialized solutions, from an integral approach perspective that converges traditional knowledge, permaculture and engineering, the presented action research has shown, throughout the process’ period, to be efficient in the dialogue and in promoting public policies that present and stimulate ecological sanitation practices that may be replicated. Therefore, beyond the research itself, it sought to promote ac-

tions that may be reapplied in order to generate real social development.

Conclusion

The presented integral approach that was implemented in a traditional community has shown that the dialogue may be favored in several dimensions: the ecological sanitation may propitiate a realignment and a dialogue between mankind and nature; the action research and the knowledge ecology promote dialogue among different actors collectively; the ecology of senses and its unfolding provide the formation of new worldviews inside each individual, which causes an impact on the mental ecology, generating a detachment from the collective group, a greater autonomy of reflection, and, as a consequence, a bigger availability for cooperation.

As discussed throughout the article, sanitation process, which is still approached in an exogenous way, must encompass the local traditional wisdom for the management of waters through an effective knowledge ecology. Besides taking care of nature, it is an important measure of health promotion. The transversal approach has the potential to promote positive effects on several health aspects, as the social, the economic and the mental ones, ensuring the sustainability and promoting equity and autonomy in the

served populations. It is worth stressing that equity is one of the biggest goals of the measures established by United Nations (UN) to reduce inequalities and guarantee quality of life.

Therefore, this article discloses an effective path through the utilization of ecological sanitation as a methodology of application, based on action research with the knowledge ecology and the ecology of senses, in order to promote the horizontal inclusion of all actors involved, a differentiate look on the development of a new conscience through “praxis” and the construction of collective senses. So, in the work with traditional and rural communities, it is fundamental to apply social technologies that are inclusive, efficient, low-cost and that may be assimilated and replicated by the population served.

The conclusion is that the adoption of an integral, transversal and intersectoral approach for sanitation and community projects presents more inclusive ways that are adequate for the territory and produces greater satisfaction and learning for all people involved, through the understanding that, alone, we all know very little.

In this direction, an ecosophy that mashes and integrates the triple ecological vision may and must replace the ancient forms of associative involvement, promoting subjectivation and resingularization processes that enable individuals to become, at the same time, solidary and ever more diverse.

Collaborations

GCXMP Machado took part in the conceptualization, writing of the original draft, data curation and evaluation of this article through his doctoral degree research. TMFB Maciel and M Thiollent took part in the conceptualization, writing of revised versions and critical analyses of this article as doctoral degree advisors.

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