

In reaction to the guiding questions as formulated in the Term of Reference:

I How can agroecology reduce the effects of drought on people and ecosystems?

- Recovery of riparian forests and aquatic ecosystems.
- Storage, rational use and reuse of water.
- Diversification of production; processing and storage of supplies and products.
- Seeds collection and storage; planting seedlings.
- Water desalination based on solar energy.
- Adequate management for soil protection and regeneration – neutralizing erosion and increasing water retention capacity.
- Crops of resistant / adapted species - plants and animals.

II To what extent can agroecology be considered as a relevant solution to the loss of biological diversity?

- > Expand the concept to **sociobiodiversity**, that is, include the social aspects of diversity and its interactions with biodiversity.
- Use of dead vegetation as protective cover of soil and its life, bio-defensives and bio-fertilizers; abandon chemical fertilizers and toxic pesticides.
- Expand agrobiodiversity; agroforestry.
- Promote significant reduction in the consumption of animal proteins.
- Make visible and support the guardians of sociobiodiversity. These are, usually, small farmers with a large and tradition-based knowledge of surrounding ecosystems. An expression of this are the ‘seed guardians’.
- Promote agroecological consortia with food crops and income generators.

III In what ways can agroecology respond to food crises and contribute to community food sovereignty?

To discuss Food and Nutrition Security (SAN) involves the recognition of the actors who produce food: rural women, indigenous and traditional peoples, peasants, youth. The production of healthy foods is a reflection of different tasks and rationalities. The research with ‘agroecological booklets’ (cadernetas agroecológicas), conducted with women from all over Brazil, shows that 65% of production is focused on self-consumption (in the logic of family care and reproduction of life), 20% were destined to the market (sale in fairs and local markets) and the rest is intended for exchange and donations. To speak of Food Security in the semi-arid region is to recognize the different tasks carried out by women and traditional peoples. These tasks reflect distinct rationalities to produce healthy foods, but also in the preservation of biomes and sociobiodiversity.

Another issue directly linked to food production capacity is water safety and access to technologies suitable for coexistence with the semiarid region. These technologies must be focused on the reality of the semiarid region and the subjects who are the protagonists. Technologies such as cisterns, barriers, water reuse systems (among others) should prioritize women and youth.

Food Security and Sovereignty in the semiarid region means to care for life in a broader and fuller way: promote dignified life of families, women and young people, life worthy of nature, animals, with respect to local food crops, with respect to animals, with preservation of the biome and in defense of territories. Food Security in the Brazilian semiarid region is supported by public policies such as the Food Acquisition Program (PAA) and the National School Feeding Program (PNAE); popular restaurants and public procurement programs for family farming further strengthen the fight against hunger and poverty.

Some considerations:

- Agroecological production is more diverse and resilient than conventional.
- Agroecological food is more nutritious and strengthens immunity.
- Agroecological food security is based on community and cooperative action – it is not market logic.
- Fair and supportive markets need to be promoted – strengthening short-circuit territorial markets.
- It is necessary to invest in practices and infrastructure for processing and storage of food – for people and animals.
- It is necessary to invest in communication and education about eating healthy.

IV How can agroecology be integrated into the definition and implementation of nationally determined contributions to climate change?

We found that in the Brazilian semiarid region many families respond to changing climatic conditions and desertification by demonstrating innovation and resilience through the intensification of production based on the valorization of local resources, the use of technologies and management practices that diversify production systems with activities that complement each other and allow the formation of water, forage, food and seed reserves and a greater circulation of nutrients, biomass and energy within agroecosystems. As part of the AVACLIM project, we found that the key principles and mechanisms that explain the resilience, health of the agroecosystem, technical and economic performance and quality of life and well-being of the systems presented a high performance (above 80%).

Of the resources that are acquired outside the agroecosystem (or inputs), most (60 - 70%) are within the agroecosystems expressed in a variety of products and infrastructure, indicating a high ecological and social reciprocity. In this context, it is necessary to rescue and map these agroecological-based agricultural systems as viable and so-called alternatives to increase productivity, sustainability and resilience to climate change, so that these experiences can be transmitted or shared with other peasant families around the world and public policy policymakers can respond in a timely manner, within the context of local or territorial realities.

Therefore, instead of the institutions, policies, plans and programs of the countries merely proposing "solutions" to their "problems", it is recommended to value the coexistence potentialities and strategies developed by the families themselves who live

in the territories and communities. Territories should be conceived as spaces in which it is possible to build or rescue coexistence relations between human beings and nature, based on environmental sustainability, combining quality of life of families with the incentive to appropriate economic activities. It is, therefore, a matter of breaking the adversity paradigm of and openness to a new one, guided by potentialities.

Some considerations:

- Agroecological farms generate colder microclimates.
- Scale expansion can have regional climate impacts.
- Controlled and reduced animal production reduces greenhouse gas emissions.
- Systemic view of agroecology contributes to the understanding of the causalities of climate change.
- Promote research, experimentation, and dissemination of technology for clean-based energy security.
- Promote universal access to agricultural technical advisory services with a systemic, dialogical - agroecological vision.
- Promote access to labor-saving technologies – with special attention for young people and women.

V How does agroecology contribute to the regeneration of degraded ecosystems and the conservation of intact ecosystems?

Agroecology allows the systemic understanding of the fundamental processes that regulate capital and flows of production factors, enabling predictive models of the effects of management techniques on the productive and regenerative capacity of the landscape matrix in the short and long term. The diversification intentionally designed by peasant logic promotes biological interactions and beneficial synergies between the various components of the landscape matrix, so that it allows the regeneration of systemic fertility of soil health and the maintenance of productivity capacity and regeneration of native vegetation.

Within the scope of the AVACLIM project, we verified that agroecological initiatives present good performance of indicators associated with the level of the landscape matrix, such as good primary productivity, good evapotranspiration, good leaf area index (0.6 mm⁻¹ of soil), good soil health and good regulation of surface temperature.

Some considerations:

- Agroecology is based on an understanding of diversity (biological, social, agricultural) as a generator of sustainability.
- Expansion of agrobiodiversity, agroforestry, water management, seed guardians, rescue, and valorization of traditional local knowledge.
- Community management arrangements of common use areas.
- Invest in techniques and practices of proper soil management.
- Diversified crops.
- Sustainable animal husbandry.

- Forest management for agricultural, pastoral and extractivism purposes.

VI In what ways does agroecology contribute to the One Health approach and provide answers to the global challenges of human, animal and environmental health?

In Brazil, we are advancing in the dialogue between distinct forms of knowledge and recognition of other epistemologies (with indigenous and rational peoples). This allows us to recognize narratives and ways of living and reproducing that go beyond the capitalist logic of access to income. Thus, we rethink methodologies and projects that seek to strengthen other meanings inherent to agroecological transition and agroecological experiences.

It is not just thinking about the transition of agri-food systems, without the use of chemical inputs, toxic chemicals etc. It points towards another approach of the relationship with life, with nature. It implies that we assume the challenge that we are all interdependent and ecoddependent; the center of the debate concerns care for the reproduction of life and a relationship of respect and symbiosis with nature, animals, spirituality. As such, agroecological transition must consider that producing food also involves a search for integral health.

Some considerations:

- Epistemology of sociobiodiversity.
- Agroecology and spirituality, ancestry.
- Agroecology promoting mental health.
- Dialogues between knowledge – indigenous, women, traditional, ancestral, local, academic ..
- Use of plants, land and other natural materials and therapies to promote integral health – physical, biological, mental and spiritual.
- Promotion of healthy environmental services in the countryside and in the city – landscape, afforestation, medicinal plants, fruit trees – with native and cultivated species.
- Solidarity, cooperation and reciprocity = humanity.

VII To what extent can agroecology provide relevant solutions to be integrated in projects to achieve neutrality by avoiding, reducing or reversing land degradation?

In general, we observed that agroecologically based agroecosystems are well diversified, composed on average of eight or more productive subsystems (productive yard, cattle, birds, sheep, agroforestry systems, swidden, pigs, cotton swidden, processing, caatinga forest), very well integrated with important fertility mediators (cisterns, silos, barreiros, wells, seed banks, esterqueira, biowater, biodigestor, feed house, bike). This enhances and facilitates production and work to some extent (or the working time in each subsystem).

High biodiversity and redundancy of components of agroecological initiatives allow a continuous and consistent functioning of agroecosystems, making them more resilient, for example to extreme environmental events (prolonged drought or hurricanes). Ecological heterogeneity in this sense means a landscape matrix with greater diversity of solutions, be it resistance, stability, adaptability, productivity and autonomy.

On the other hand, these agroecological initiatives do not occur in a social void, but as a product of a co-evolutionary process of exchange of matter and energy between the social nucleus (families) of agroecosystem management and nature. The health of the agroecosystem is linked to social resilience, that is, the ability of families to improve their ecological-social infrastructure. Thus, we observed that it increases the capacity to respond to changes outside its control in the social, economic and environmental environment of the agroecosystem, in agroecology-based agroecosystems with more structural, agroecological and social transformations, in combination with the strengthening of mechanisms of community reciprocity, strengthened by the implementation of contextualized public policies, which can interfere negatively or positively in its dynamic functioning or health status.

In this context, agroecology has a function, in addition to technique. It has a cultural function, which contextualizes appropriate knowledge and practices (technological, social, economic and political), recognizing the heterogeneity of its manifestations; the imaginary understandings of the local population about this space, its problems and alternatives of solution, which were being built and deconstructed throughout the history of its occupation. Therefore, environmental management takes on new meanings and meanings, by prioritizing appropriate solutions to local conditions, so that they modify perceptions and behavior in relation to nature.

Some considerations:

- Soil/earth is a living organism for agroecology.
- Agroecology teaches how to nourish the land.
- Agroecology involves low-greenhouse gas production systems.
- To work to raise awareness of the earth dimension as a MOTHER - generator of all the essential goods to life.
- Permanent construction and exchanges of knowledge on good practices of soil life management and restoration.
- Invest in appropriate soil management techniques and practices.
- Diversified crops.

VIII How can support for agroecological transitions contribute to achieving the land restoration, carbon storage and job creation goals of the Great Green Wall?

- Promoting the sustainable use of forests.
- Expansion of the biomes area with permanent Conservation and Preservation Units.
- More soil cover with native and cultivated vegetation.
- Installation of ecological corridors.

- Use of water and soil retention techniques with plant cultivation in level ranges.
- Use of green fences.

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