

# Educational processes experienced in the social practice bicycling agroecological

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**Abstract**— *The objective this article is comprehend educational processes experienced in the social practice bicycling agroecological. Phenomenological qualitative approach 4E Cognition of embodied, situated, extended and enactive cognitive processes since existential description “Pedaling for Cityzenship”. For data collection, we performed two bicycling trips in the years 2017 and 2018, pedaling 4200 kilometers each trajectory with the objective interviewing nine farmers in the five Brazilian states from inclusion criteria: 1) agroecological farmer; 2) working with agroforestry systems and c) development community education projects for citizenship. For speeches analysis, the approach “situated phenomenon” being constituted ideographic analysis organized in a framework discursive convergences for nomotetic matrix. The units of meaning emerged: a) Agroforestry knowledge; b) Care for environmental health; c) Agroecological community training support general category “Bicycling agroecological as a cognitive-educational process”. We believe promotion bicycling culture through social practice bicycling agroecological, should be as a driving alternative for human motricity development between urban cyclists and family farmers producing organic food consciously preserve biodiversity, generating benefits for collective health environment.*

**Keywords**— *bicycling, education, citizenship, sustainable agriculture, environment and public health.*

## I. INTRODUCTION

Agroforestry systems used as an effective methodic production of food by several rural producers in Brazil, addition to being a complementary alternative income, collaborates for the restoration native vegetation <sup>1</sup>. This cultivation technique based on management, stratified agroecological consortium reproduces the process of natural plant succession with the purpose increasing biodiversity <sup>2</sup>.

On the other hand, bicycling collaborating for urban environmental health <sup>3</sup>, including a micro politic action mitigating effects of climate change <sup>4</sup>. In this sense, documents gives World Health Organization (WHO) <sup>5</sup> and United Nations (UN) like as Paris Agreement <sup>6</sup>, Secretary General's report on sustainable transport <sup>7</sup>, New Urban Agenda (Habitat-III) <sup>8</sup> and Sustainable Development Goals

(SDG) <sup>9</sup>, bicycling involved 17 goals to the according to the European Cyclists Federation <sup>10</sup>.

In relation Brazilian letters commitment, featured for Statute of Cities <sup>11</sup> institute municipal public managers organization planning cities, the elaboration of Director Plans; the National Urban Mobility Policy <sup>12</sup> establish hierarchy of importance for the transit with Urban Mobility Plans <sup>13</sup> and Bicycle Brazil Program <sup>14</sup> to the promotion bicycling culture. We also highlight, family farming gains strategic importance with National Food and Nutrition Policy <sup>15</sup> and National Family Agriculture Policy and Rural Family Enterprises <sup>16</sup>, in addition to other constitutional provisions related to Brazilian family farming <sup>17</sup>.

These official documents expressing ideas of Latin American social movements contextualized with the

proposals of Dialogical Pedagogy<sup>18</sup> and Cultural Biology<sup>19</sup>. Given practical knowledge is essential for the conscious emancipation of "know-how", bicycling trip<sup>20</sup>, pedaling takes an interdisciplinary character related to health, leisure, mobility, economics, politics and ecology. From this, the concept education for citizen formation, educational processes occur from the praxis shared among individuals in their groups, outside formal teaching-learning spaces for their reproduction control of survival and coexistence<sup>21</sup>.

With the intention of expanding discussion phenomenon bicycling in the field "Agriculture, Environment and Rural Development", we performed a search keyword "cycling" in database *International Journal of Advanced Engineering Research and Science*, we found eighteen articles outlined from: materials engineering<sup>22-26</sup>, civil construction<sup>27-32</sup>, metabolism energetic<sup>33</sup>, aeronautic engineering<sup>34</sup>, habitat conservation<sup>35</sup>, contaminants from food packages<sup>36</sup>, waste management<sup>37-38</sup>. However, there is little research bicycling from an educational perspective, the human right to active mobility<sup>39</sup> and bicycling culture as institutional policy<sup>40</sup>. Therefore, we present bicycling agroecological contextualized research strategy with a view an alternative of social practice to bring urban inhabitants together family farmers of recreational-recreational potential for population free time<sup>41</sup>.

The objective research is comprehend educational processes experienced in the social practice bicycling agroecological.

## II. METHODS

### Participants

We approached nine farmers from the states of São Paulo (SP), Paraná (PR), Rio Grande do Sul (RS), Minas Gerais (MG) and Bahia (BA), Brazil, based on the inclusion criteria: a) be an agro-ecological farmer; b) working with agroforestry systems; c) development community education projects for citizenship. For data collection, used digital recorder capturing interviews semi-structured methodological format<sup>42</sup> and a model camera *Go Pro Sesion* making videos, resulted documentary "Cicloturismo agroecológico"<sup>43</sup>.

The following research subjects participated in the study: 1) *Ari Batista*, 70 years old, farmer *Associação dos Agricultores Agroflorestais de Barra do Turvo e Adrianópolis (Cooperafloresta)* - Barra do Turvo (SP)<sup>44</sup>; 2) *Adilson Batista*, 32 years old, farmer *Cooperafloresta*<sup>45</sup>; 3) *Nelson Eduardo Corrêa Neto*, 66 years old, creator *Agroflorestar Project*<sup>46</sup>, coordinator *Assentamento Mário Lago* - Ribeirão Preto (SP)<sup>47</sup>; 4) *Lucas Faria Machado*, 32

years old, farmer *Sítio das Mangueiras - Florestal (MG)*<sup>48</sup>; 5) *Luiz Silva*, 62 years old, farmer *Assentamento Contestado - Lapa (PR)*<sup>49</sup>; 6) *Juan Santos*, 37 years old, farmer *Assentamento Contestado*, integrating *Articulação Nacional de Agroecologia (ANA)*<sup>50</sup>; 7) *Nilo Schiavon*, 56 years old, farmer *Colônia São Manoel - Pelotas (RS)*<sup>51</sup>; 8) *Gilberto Ribeiro Alves*, 40 years old, farmer *Sucupira Agroflorestas - Valença (BA)*<sup>52</sup>; 9) *Ernst Gotsch*, 72 anos, farmer *Sítio Olhos d'água - Pirai do Norte (BA)*<sup>53</sup>.

### Procedures

We adopt a phenomenological qualitative approach *4E Cognition* for understanding cognitive-educational embodied, embedded, extended and enactive processes<sup>54</sup>, referring existential description "*Pedaling for Cityzenship*"<sup>55</sup>. During years 2017-2018, two bicycling trips pedaling on each trajectory, averages 4000 kilometers over two months:

a) the first trip in 2017, left city of Botucatu (SP), Barra do Turvo (SP), Curitiba and Lapa (PR), Timbó, Balneário Camboriú and Florianópolis (SC), Porto Alegre and Pelotas (RS), Punta del Leste and Montevideo (Uruguai), Buenos Aires and Mendoza (Argentina) and Los Andes and Valparaíso (Chile);

b) the second trip in 2018, left again from the city Botucatu, São Carlos and Ribeirão Preto (SP), Passos, Florestal, Belo Horizonte, Governador Valadares and Teófilo Otoni (MG), Vitória da Conquista, Pirai do Norte, Valença, Ilhéus, Porto Seguro and Prado (BA), Linhares and Vitória (ES), Campos dos Goytacazes, Rio de Janeiro and Paraty (RJ), Caraguatatuba, Campinas and Santa Bárbara do Oeste (SP).

For speeches analysis, the approach "situated phenomenon" being constituted ideographic analysis that makes subjects ideology visible with emphasis units of meaning emerged from reduction by attitude, disposition and suspension beliefs, organized in a framework discursive convergences; and nomothetic analysis to the formation matrix composed individual analyzes identified by comparison and imaginative relational phenomenon<sup>56</sup>. Participants signed the Free and Informed Consent Form (ICF) in agreement with the research procedures and the breach of anonymity. The project registered Brazil Platform, proof 029413/2015, record CAAE: 43889115.1.0000.5465, official opinion 1.202.636, Ethics and Research Committee of the Rio Claro Biosciences Institute of Paulista State University "Júlio de Mesquita Filho" (IBRC-UNESP)<sup>57</sup>.

## III. RESULTS

In the methodological application *4E Cognition*, the cognitive-educational embodied, embedded, extended and enactive processes emerge among researchers and

interviewees for the constitution world-life or lebenswelt body production cultural and sensori-etnografy experience<sup>58</sup> related bicycling agroecological. Thus, the world-life or lebenswelt concept<sup>59</sup>, moving towards interpret scientific knowledge developed at both the formal theoretical and common sense levels, which results in a hermeneutical analysis of society<sup>60</sup>.

At phenomenological reduction formed by 60 discursive convergences construction nomothetic matrix organized from the units of meaning: 1) Agroforestry knowledge; 2) Care for environmental health; 3) Agroecological community training, structuring central category "Bicycling Agroecological as a cognitive-educational process". At the end exposition speeches, a conceptual analytical synthesis exposed.

#### IV. DISCUSSION

##### 1. Agroforestry knowledge

In the unit of meaning Agroforestry knowledge, Edson affirms the training agroecological farmer starts from daily work and complemented question improve his knowledge life:

It is sand there, we started using the tractor and was a problem erosion, why don't working a big machine, only mowing, hoe, chainsaw and tractor due to the high investment, with the hoe you can produce a lot. The garden will produce according farmer's care, monitoring is related to the reward, if you are not managing it, it will decrease acquire knowledge grows together, more give yourself return.

For Lucas, learning agroforestry systems occurred in the coexistence with farmers and the study group:

I learned agroforestry with family farmers and with students in a study group. There several reasons work: first, show feasibility system, have a campus at the Federal University of Viçosa (UFV) with agricultural science courses, but don't work agroecology, partnership is a process, teachers lack interest in reproduce research model laboratory, after three years of work, student initiatives have appeared. Second, food security, almost 80% our food is from family farmer and, in addition, Florestal small municipality most income derives from family farming. Thirdly, property serves as a school having all the realities for planting, top part flat hill mechanized with red soil, but it is very windy and dry with winter, it is strict, next to it we have an adapted valley for the mountain system, the front slope has gravel with sand, so we can show different situations and, in addition. We work on projects with the community

receiving a group of farmers engaged in creating an organic certification in the metropolitan region of Belo Horizonte.

For Luis, the economic income generated with implementation agroforestry system, contributed understanding processes of soil regeneration:

The agroforestry system used in this area, where are employed, it has already been paid for and I am not fully exploring it, the grass is winning the cycle fulfilling its function, then I place a vegetable garden and import organic matter to produce vegetables. I realized that the plants pass information from *napiê* grass with its pruning point. The job requires persistence and stubbornness, cold came and killed *napiê* pruned, it has principle must be a cattle rancher feeding his flock, eats two thirds grass and one-third ground. For agroforestry it is the same proportion, two thirds goes line and one-third between lines feed microorganisms, it cannot leave soil bare, before I pruned everything found half gave changed scheme concentrate planting interspersed bed, confirm plants transmitting information to their neighbors.

For Nilo, agroforestry methodology allows diverse management of plants whose interaction collaborates for efficiency in the production of healthy foods:

In this area we have 980 plants, 78 species of different trees in here among fruit, native and exotic, here I planted seedlings the way I wanted to leave, then there is no need to thin out, I copied a little of the native forest, mainly the fruits. We have a job with Embrapa people where they supply us with seedlings and we supply native seeds, in addition to Garden Forestry Cambuçu is a seed bank, we choose the seedlings by going to the unit they have and bring missing. I chose acacia because the best accelerator in the region a fast-growing nitrogen-fixing plant, the moment it stops playing role, I'm going to cut and all root becomes organic matter to enrich soil because here nothing else. We planted corn and beans, but it didn't grow, today observes the health and vigor of the plants with nothing, so the idea is to diversify production because I'll have a diversity of birds and from I don't plant anymore just select, at the beginning we planted cassorova, we harvested two tons in a year, when the citrus was small. We managed to create several trees such as capororoca, cedar, cajirana, taruma, plants resist the sun in the field, we also planted Adália shade, we harvested flower and save trees, have a lot yellow, red and pink flowers.

For Ernst, agriculture primarily needs knowledge to understand the syntropic processes of life regeneration:

Two important things to know: the climate and the resources available. The cultivation of cocoa in the south of Bahia produces 1,200,000 tons per year which, despite the large quantity, is of low quality, I dedicate myself to produce a quality cocoa. Agroforestry intercropping tree elements with the annuals, this is literature definition. I started teaching courses on syntropic agriculture process, the biggest external input is knowledge, Brazilian government is dictatorial, which generates a generalized problem of violence. Witch's broom is a fungus that attacks cacao with the lack of sun in the fruit, the result of aging shading and inadequate pruning, it would have no problem if the price of product was good, but one main factor low price, formerly if planted with shade, which requires pruning work, however, human production in agriculture is not valued. In addition, working conditions are inadequate due to tree climbing training requiring appropriate equipment as it is an unhealthy service, in addition to of the legislation being made to not happen, then it is not just monoculture, which justifies making room for opportunistic species, a capitalist term that we learned at school. Before it was a degraded pasture, so I planted cacao and all kinds of trees, here there are more than 500 varieties of plants that like each other, some are angry and exotic forget planted forests. There was a year that the average rain in the region was 1200 milliliters, on the farm, it was 1400 milliliters, here humidity has been higher than in the region.

For Gilberto, regeneration is the main component of agroforestry management with farmer having the function controlling the species he wishes to cultivate

Based on the experience of restoration in a mined area, we admit regeneration to make the succession progress and the grass suppressed with regenerates, which favors diversified biomass. The beginning of the work was in an area of 22 hectares with a yellow and cohesive soil, very dense and clayey that retains water, soils poorly used due to traditional livestock and with forest on the riverside, we have five hectares of good land recently deforested, so they were not spent like the others, a good part of the resources used are to manage the succession, inviting interesting plants to manifest and maintain those that have already been planted. There are 13 people working in the selective mowing, I run a site with woody biomass full of bushes. The farm increased to 82 hectares, with 52 planted, we have a seedling nursery, we plant what we produce, irrigation is reduced, I have two mechanical pumps that throw water gravity at zero cost. When there is biomass and the canopy closes, it ends with the sun, if it is efficient

it leaves soil covered, but it still does not support the demand, so I count on plants that grow alone.

Human ecology in forest management, property being a place for pedagogical practices, sensitivity to regeneration processes, the variety of biodiversity for the family economy, syntropy as a systematic relationship between species and increase humidity in the local, are perceived factors that directly contribute which optimizes agroecological knowledge. Furthermore, these existential conditions verified generates an increase quality of food linked conservation of the environment and people's health.

## 2. Care for environmental health

In the meaning unit "Care for environmental health", Ari emphasizes importance of the forest for ecosystem balance and consequently for human survival:

There was a visit from some people from the capital saying here in Barra do Turvo, were at the end of the world. I said contrary, you are at the end of the world, we are beginning of the world because is a strike and stop system transport, São Paulo will starve to death first than us, if it rains there for two hours it is flooded with concrete. We live in a paradise, beginning of the world because it was same as here, if every owner in São Paulo used half the land to build a house other grass and tree, there was no flooding. God, when planning the planet, did not think about concrete, so it really floods.

For Nelson, water economy of irrigation produced by agroforestry, contributes conservation and dissemination this cultivation technique with family farmers:

Agroforestry has greater resilience compared other type of agriculture. Here in Ribeirão Preto, families have an irrigation system, 80% fresh water extracted goes to irrigation agroforestry system is ten times smaller due to the soil cover reduces evapotranspiration forming a box water. Moreover, the bill paid because several areas managed nature works alone, putting vegetables and not every place drought irrigate a little, which keeps the soil covered, but when the rainy season comes, this water will be stored returned aquifer. I'm sure if you the balance will be positive, so we fulfill an environmental function and enhance food production families with the generation income for leveraging from a difficult situation, using irrigation sparingly, increases people's adhesion and restructuring the soil to save water.

For Lucas, the importance of restoring springs and soil moisture to farmers becomes a strategy for communicating agroforestry concepts:

We faced a drought crisis in the history of the municipality, the river dried up and the city had to be supplied for months by water truck coming from outside, my water dried up, I had to drill a well, but with little use because the agroforestry system conserves water in ground. We have an economy of 80% compared to conventional system; spend water intensively in the garden. In most of the plantation space we do not turn on irrigation, if it can rain for a week without watering, we must create an infiltration system with a reservoir for rainwater storage. Agroforestry shows water most valuable asset, it even transcends monetary issue. We are often able enter communities to talk about method for the sake of water because the producer creates barriers to an alternative crop, it is a general problem to talk about the pesticide which causes contamination and affects health, the farmer does not believe. The complexity establish a horizontal dialogue, which justifies science as a method with strategy for convincing farmers, otherwise they will stop participating.

For Nelson, the production knowledge about agroforestry systems is little valued in Brazilian research institutions, due to political power of industrial agriculture:

It has a huge strength Brazil called ruralist bench with its own interests. The wealth monocultures engaging economic activity industrialization generated from fertility of the forest, accumulated capital and went agricultural industry. There is a mentality-dominated government since the industrialization of the countryside, being an artificial place. Everything necessary produce comes from outside, it is a destructive activity to uproot nature place, the project is not manifest itself, a business subjected need for inputs, an impute transforms and removes things. Moreover, mastery-marketing technique entered universities, if you are studying agronomy; the doctor professor offers a scholarship study the optics of industrial agriculture. Hardly offer to work with agroforestry that regenerates sustainable processes. However, it is difficult interesting because make a profit, so domination manifests itself in the duality nature and food production are antagonistic, so we have to overcome. This view expressed Yanomami speech: when the forest is unprotected, mofocari solar entity burns, rivers and streams, swallows the fish, the earth burns with the scorching heat that hangs everywhere, earthworms die, leaves dry out, there are no more seeds in the soil and waters run away and wind refreshing us now hides fertility of the forest. The basis productive system attributed to spiritual characteristics beings of nature.

The importance of vegetation native cover in the soil to regenerate cycling of nature, the resilience hydrological for irrigation, the dialogical pedagogy for understanding agroforestry system and the capitalist interests, involved in monoculture are factors that exemplify the difficulties encountered by those work with agroforestry. In addition, we highlight justify little institutional political support wide care of water as a symbolic and indispensable material for biological life.

### 3. Agroecological community formation

In the unit of meaning “Agroecological community formation”, Ari describes functioning of Cooperafloresta:

We do community work, but the production is individual, Cooperafloresta's work is different because no one works free for the other, it is a joint work of respect where each one sells his product. The task force is the regiment, by law we have to do two task forces from network, using a pattern, if you brush and cover it is normal, cannot use fire, if you burn suspended for 30 days without selling, if you put poison 60 days, if you repeat, you can be expelled. Each one is part of the group in relation to the other, it is a job approved as organic production, when passing the poison and selling as organic, pass poison Ecovida chain, and finds out it will be the whole group canceled, so we are all inspectors for the regulations. If you want to join Cooperafloresta, we have a statute where you read to learn about your ability to participate and not harm the entire group. We are three groups, the producer takes his product, he can take it to be noted sends the amount, it is heavy and stays in the farmer's name, each one goes receiving what you sent, it is not because it is a cooperative that is the same for everyone.

Regarding commercialization, Lucas reports on the generation of income from family production aimed at fairs and organic food purchase groups:

We have the city fair every Saturday, where we started created network agroecological farmers in the municipality, these products in Belo Horizonte with a purchase order through website deliver every wednesday at a distribution point. I am also part Community Supports Agriculture (CSA) with delivery ready baskets, the chain holds a fair in a location in the city. We are trying articulate more points, working only with baskets makes it difficult and only the fair is unstable, we work two types businesses. The intermediary becomes a partner in the process expertise much it costs, everything done fairly for support idea.

For Juan, the engagement struggle for agrarian reform in his country of origin ended up guiding his way

until Farm Contestado, contributed deep understanding agroforestry as a strategic tool for citizen emancipation:

I came from Paraguay as part Paraguayan Farmer Movement and La Via Campesina, articulator social movements in the countryside. The Contestado Farm had slaves until recently, under the mansion slave quarters, we want revitalization become a cultural center. The MST occupied it in 1997 and in 1999 became a settlement with 108 families, the children grew up and got married, now are 150 families plots vary between 10 to 15 hectares. There were two Petrobrás projects, the Agroforestar Project with 60 families and the Flora Project with 30 families; many gave for not understanding proposal, currently 40 families working system, but only ten people who live on it. It is a challenge requires awareness for commercialization; the good thing work with collective. Agroforestry has helped to break paradigms, realized there is always someone showing results being a reference in the region. We are learning from mistakes, increased diversity of foods and improved lives people involved, helped to unite them by working together. On the financial side beginning, you need inputs and seedlings to start, but mainly take advantage whatever is within your reach. Our investment channel Family Agriculture Program (PRONAF), it is difficult to get money from a bank. There is case settler who obtained financing and planted creole seed, the bank's technician he saw situation cut credit because condition acquire conventional package - transgenic seed, pesticide and chemical fertilizer, we cannot depend on external financing, only on work and will, this is our reality.

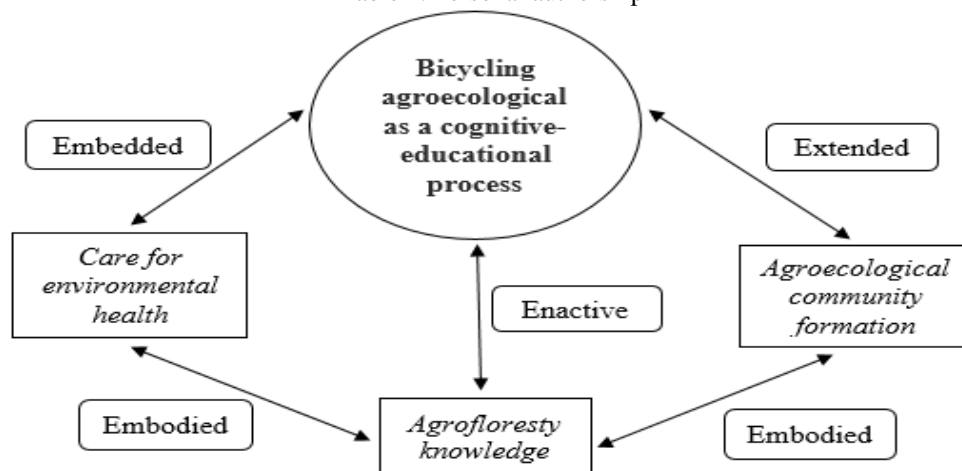
For Lucas, the interest of the public authorities directed towards the articulation of public policies that

substantially favor family agroforestry agriculture as a problem of strategic common interest for this type of food produced, to be the basis of Brazilian food:

We have no support from the public authorities, while praise them can barely see the importance of the work, are meeting with a group of farmers strengthening an association through a marketing network. The public power role collaborating in the articulation Rural Extension Company of the State of Minas Gerais - EMATER, responsible for technical assistance local producers. Each municipality has an office to promote public policies related to project financing and fundraising; now due changed mentality, it has turned agroecology for receiving pressure from top to bottom. Florestal city there is another producer agroforestry, also some transition experiences practice land cover and consortium. Based on the example, we intend to show problem way of applying knowledge, aimed at knowing how create productive systems that respect the ecosystem recovery of biodiversity as a value.

Despite the difficulties witnessed by the farmer to “close the account” because it does not fit into a macroeconomic logic generated with organic production, the government, as well as subsidizing the automobile industry, should favor subsidies for agroforestry as a food security measure. Thus, agroecological micropolitics emerges in the social practice bicycling agroecological as a form motricity human condition affects urban cognition with the logic of the rural worker in his time-space that sustains the population. As an analytical synthesis, the scheme units of meaning presented below supports general category “Bicycling agroecological as a cognitive-educational process:

Table 1. Personal authorship



Based on the above, we consider that the knowledge incorporated about agroforestry systems,

requires a permanent academic-professional dedication of the farmer in his operation. In a situated way, work

environment as a factor care for his own health environment as a notion of water as universal value doing whatever it takes protect. The extension knowledge his participation citizenship agroecological community formation at its various levels, through need work actively production of biodiversity, until pedagogy teaching method in an enactive way arrives in social justice trade relations; being an agroecological farmer requires a particular sensory-motor action of fundamental importance for social life <sup>61</sup>.

## V. CONCLUSION

We consider through social practice bicycling agroecological as a cognitive-educational process, an enactive proposal observing experiences agroforestry method, a work tool collaborates recovery of degraded areas for the production of quality food and a source permanent income due to the variety of species produced by farming families. In the same way, we perceive union of communities care for the common good <sup>62</sup>, as an example Ciclovida Project <sup>63</sup> bicycling campaign recovery of natural seeds, a cultural form values ecomotricity process human apprehension of nature in playful-ecological interaction <sup>64</sup>.

The relationship between bicycling and agroecology promotes awareness of energy use and equity <sup>65</sup> as an ethical way of life, but as they are alternative social practices. They lack interest on the part general population, who are alienated ecological crisis in its temporal dimension <sup>66</sup>, in large urban centers and can even as a preventive measure public health <sup>67</sup>. That said need more institutional attention, whether from the university with production of knowledge, from executive creation of strategies for political articulation and fiscal incentives and road safety, promote social peace as a politics of recognition <sup>68</sup>.

In this sense, we affirm that the position of mobility for women is more limited in view of the lesser possibility of going out a long time away from home to pedal, be it because of the responsibility generated a mother judgment not complying with this pattern, criminalized as opposed to being a parent where abandonment is normalized. We also observed in the two trips that women in the field are invisible, giving more importance to men in this work, being essential that women given space to express and make visible, since many work over 12 hours daily and outside work, have to carry the housework excluded from the cultivation process whose decision is made by men. In this way, the patriarchal model is implicit in the agroecological practice, which justifies working of the land connected with women. We are seen from a role of caregivers and we can still think that someday that violence against women may decrease, because violence that the earth experiences with

chemicals, toxic, poison, for seeking a better production and appearance in food, is the same women experience with our corporeality, transformed into machines used by capitalism.

Therefore, the concept bicycling agroecological, emerges in the field of humanities sports as an alternative connecting physical activity “rural-city”. In order attention, population's awareness regarding production and commercialization organic foods, as structuring territorial food system, cognitive-educational process “teaching-learning” aimed at cooperation with intention seeking new knowledge for human evolution.

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