Global crisis of the "innovation for development". From positivism to constructivism for creating locally sustainable lifestyles

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Introduction

The "development" is in crisis (Domenach 1980); our way of innovating requires to be innovated. Ruptures and paradigmatic emergencies are the epicenters of the civilizatory changes transforming the human and non-human lifestyles since the second half of the XX century. With difference speeds and degrees of intensity, all the spheres of existence, fields of knowledge and human processes experience changes derived from the global crisis. The study identifies paradigmatic transformations for innovation organizations related with the field of local development. The classical innovation paradigm of modern science, in which some create, other transfer and the rest adopt, under its universal, mechanic, neutral and positivist rationality, lost its monopoly for the contextual, interactive and ethical-constructivist paradigm in studies of phenomena whose nature and dynamics depend on human perception.

The objective is to inspire innovation initiatives for family animal production from constructivist imagination that assume: (a) the context, as reference for creating relevant innovations, (b) the interaction, as strategy for facilitating the generation and appropriation of knowledge in the context of its application and implications and (c) the ethics, as a compromise with the sustainability of human and non-human life within each territory. Large transformations approach in the action for the relationship between science, technology and society in the innovation process (STSI). Those transformations place the institutional innovation before the technological innovation since while the latter "changes things" transforming the material reality, the first one "change people's mind" that change things by transforming their ways of interpretation and intervention (De Souza Silva 2013b).

Development

The "development" crisis and the role of institutional innovation. Reality is what our vision of the world allows us to perceive. A world vision –conception of reality- is a constellation of premises –truths- on what it is and how reality operates. One historical period establishes a hegemonic vision of the world that determines particular world visions, among groups, communities, towns and societies. Therefore, time crisis is also the crisis of the dominant world vision since their "truths" reveal false or irrelevant.

This is already happening in the world since the sixties. As consequence, in terms of anteriority, the institutional innovation precedes the technological innovation. If it is critical to change the premises (truths) inspiring decisions and directing actions from the people that will create the new "things", it is indispensable that they change first their perception of reality by assuming conscience of the crisis of the development world and getting engaged with world of life. Owing to this, institutional innovation precedes the technological innovation, since the first transforms the ways of interpretation and intervention of the persons that change things, while the latter transforms material reality changing "things" under the influence of the premises of the people leading the innovation process (De Souza Silva *et al*. 2005).

The mechanical vision of the world, conceived in the XVI and XVII centuries by modern science in Western Europe, is in crisis and, with it, the classical paradigm of innovation that made viable the capitalist industrial society (Capra 2003) as the ideal model of society that all people should emulate (Escobar, 1998). Such vision showed us a reality ruled by "progress" in the past and for "development" after Second World War. As in the case of "progress" before, the promise of "development" today is prosperity and happiness for all the people adopting the science and technology that the West "transferred" all over the Planet, influencing the scientific, technical and social imaginaries. However, all that is in crisis. Humanity is disillusioned with the "development"[1] that does not fulfill its promises.

We are living a change of time and not a time of changes (De Souza Silva *et al*. 2001). The symbol of "progress" of the industrialism time, the smoke from the chimney of an industrial factory, today represents pollution (Capra 2003). The coherence of the way of production and consumption of the industrial society is not in correspondence with the limits of Pacha Mama (Mother Earth); for that reason we are vulnerable, of the Planet citizen. The premises reproducing the Western civilization and its "development idea" have lost

[1]On "development" disillusionment see, for example, Sachs (1996), Rist (1997), ALAI (2009)

validity (ALAI 2009); as consequence, the intellectual frameworks derived from such premises are also in crisis (Wallerstein 2006).

If each historical period establishes the dominant innovation paradigm, the present crisis of the Western civilization and its industrial society determines the crisis of the "innovation for development". Consequently, the self-denominated "developed" are also in crisis. The way of life of the highest representative of the Western civilization, the United States is not sustainable or generates prosperity and happiness for all, not even in its territory. That country consumes 40 % of the total natural resources consumed in the world, it is the most unequal among the "developed" and its society is the world champion for drug consumption. Why, after "progress" centuries and "development" decades, humanity continues more unequal and the Planet more vulnerable? Why, in this context, Latin America is the region most imbalanced of the world? Responses to these and other similar questions create information for exploring their implications for the field of local development, the sphere of the family animal production and the technological innovation process. Reflecting on the paradigmatic ruptures and emergencies developing in the world, where only development alternative proliferate and in Latin America where only emerge the alternative to development[2], the Sumak Kawsay (Good Living, Ecuador) or Suma Qamaña (Well Living, Bolivia). Among the products of such reflections arise paradigmatic directions necessary for locally managing the global crisis.

Paradigmatic transformations in the innovation process. How to think on a way of overcoming the crisis, if the way of thinking is in crisis? The "development crisis is also the crisis of its premises, promises and solutions, as well as of the productivist thought that made it viable, in spite of the proliferation of adjectives (sustainable, local, territorial, endogenous, human) that do not attain to avoid its collapse (Sachs 1996). Therefore, humanity needs alternatives to development and not "development" alternatives (Lang and Mocrani 2011).

Many of the "universal" premises that repeat the "development idea" lost validity because they revealed false (Attali *et al*. 1980 and Escobar 1998), while others are irrelevant (Capra 2003 and ALAI 2009) for managing the complexity and diversity of the reality perceived as simple and homogenous by the authors of such idea. If a false premise generates false promises and inadequate solutions, the present change of time demands the change of personal, professional, social, cultural, economic, ecological, legal, institutional premises existing in our imaginaries providing criteria for decisions, actions, policies, plans, programs, projects, in short, initiatives for interpreting and transforming the unsatisfactory reality that we want to overcome.

Among the paradigmatic transformations that we must manage for changing the dominant innovation way (interpretation way + intervention way) in the field of local development in general and in the innovation process for family animal production in particular, the followings are selected:

- From the certainties to the uncertainty in the planning and future action. The complexity studies (on natural sciences) and cultural studies (in humanities) originate critical data to extend and deepen our understanding on the complexity, diversity and constitutive differences of the world chaordic reality (chaos + order) (Wallestein 2006). In this way, the dynamics of the changeable reality is not under human control. On the one hand, the complex thought teaches that there is no linearity in the processes or monocausability in the natural phenomena. On the other hand, the cultural studies confirm that "truths" on processes depending on human interpretation and intervention are contextual/cultural truths; human groups with different social histories construct different world visions. They differ regarding the truth-premises on what it is and how reality works. In this same direction in "The end of certainties", Ilya Prigogine, Chemistry Nobel Prize in 1977, admits that nature is not "something" passive, submitted to universal "natural laws"; that is "a Western specificity", concludes Prigogine (1996:19). The uncertainty is the only certain premise on the future. The future does not exist in objective, ready and best way, waiting for us in a time corner; it is impossible to predict it. The only way of gaining access to the future is imaging and negotiating for constructing it collectively.

- From the response pedagogy to the question pedagogy. Under the classical paradigm of innovation, the "developed" conceive questions and construct responses that the "underdeveloped" must adopt to overcome their "development problems" while trying to attain the goal "being developed". However, if current responses are constitutive of an unsatisfactory reality that we wish to overcome, that reality cannot be changed with the responses that already exist, but with questions not answered still. There are no "universal responses" for "local questions (Mignolo 2000). If adults do not compromise with the responses listened, but with those participating in their construction (Freire 1986), in each context, we must negotiate new questions and construct new responses. Therefore, if the myth of "progress" (Dupas 2006) or the myth of "development" (Attali *et al*. 1980) is in crisis, it will not be with the responses of the "developed" on what it is and how this myth functions that we are going to surpass its crisis.

- From universal, mechanical and neutral to contextual, interactive and ethical. The classical innovation paradigm that made viable the "idea of progress" before and the "development idea" after Second World War, is presented as universal, mechanical and neutral

[2]On the emergent Good Living paradigm see, for example, ALAI (2011), Macas (2010)

because of accepting the existence of universal laws to explain the biophysical and human realities, because of believing that the world is -and functions as- a machine and due to assume that the positivist scientific method guarantee the neutrality of the scientific practice and the objectivity of the created knowledge from that practice. However, from its crisis (Khun 1971) that paradigm emerges valid, scarcely for physical, chemical and biological phenomena whose nature and dynamics do not depend from human perception (Prigogine 1996). For the phenomena depending on human perception as that of innovation, emerge other paradigms equally scientific, the neo-rationalism, neo-evolutionism and constructivism, among which the last one is contextual, interactive and ethical for overcoming the limitations of the classical paradigm.

- From the positivism to the constructivism for the local development innovation. While in the physical, chemical and biological processes independent of human perception is relevant to study the principles that govern their functioning, in human processes what is relevant is to understand the processes of social interaction through which different groups of actors construct their different perceptions of reality. Thus, for changing the reality having a bearing on daily life of a community we will require to transform its perception of such reality; the positivist paradigm does not offer this possibility which is a strength of the constructivist paradigm since this assume reality as socially constructed and transformed (De Souza Silva 2011). In other words, if we intend to change locally the nature and dynamics of the family animal production, we must transform the local conception that the social, economic, political and institutional actors have of this activity.

- From the sustainable development to the sustainability of the ways of life. If the "development" is a contextual process, varying with the complexity, diversity and differences of the local realities and not a universal goal, elaborated from the false premise that the global reality is homogenous or can be homogenized, it is not the development that must be sustained but our ways of life. Thus, our plans, programs and project must contribute to the construction of happy communities with sustainable ways of life (De Souza Silva 2011). Paying attention to our present requirements without compromising the needs of future generations it is not a concept, but a promise. Conceptually, the sustainability implies cultivating the relationships, significances and practices generating, sustaining and offering sense to the existence of all forms and ways of human and non-human ways of life at each territory, in each local.

- From the education/communication/cooperation/innovation for "development" to the education/communication/cooperation/innovation for life. If the prearranged world for "progress" during the imperial colonialism was reordered for "development" after Second World War and if this prearranged world for "development" is in crisis throughout the Planet, all what is ordered to serve "development" as education, communication, cooperation and innovation, must be reoriented now for life (De Souza Silva 2013a). That changes all, the values, believes, concepts, theories, models, policies, plans, programs, projects, since "development" will be understood as a process and not as a goal. In the rural world, the purpose is to build happy communities, with sustainable ways of life (Matul 2013).

- From the scientific knowledge monologue to the dialogue between the scientific and popular knowledge. If there is a cognitive diversity in the world, since all live being learns in interaction with its context (Maturana and Varela 2002) and if there is ecology of knowledge, since all knowledge is contextual (Santos 2006), there is no hardly a relevant knowledge, the scientific knowledge, but there is locally relevant knowledge. Therefore, knowledge is not universal; if scientific knowledge aspires to be relevant in different realities it will need to argue with the different local knowledge on such realities. In other words, in order to be locally relevant, the scientific knowledge will require to be interactively generated and socially appropriate in the context of its application (practical dimension) and implications (ethical dimension) (De Souza Silva, 2011).

- From the model transferring the "fish/hook" to the approach sharing the "art of making hooks". If the "fish" (the final product) originates absolute dependency and if the size and form of "hook" (model, formula, recipe) determines the type of fish that someone will have access, what is ethical is to share the "art of making hooks". Local talents -that know their waters and fishes-, who must be in capacity of constructing their hooks in the sizes, and forms that their present realities require and their future aspiration demand (De Souza Silva *et al*. 2005).

- From the production and transference of knowledge/innovations to the generation and appropriation (interchange) of knowledge/innovations. If the world-machine metaphor determined the linearity of the classical innovation paradigm, in which some create, other transfer and rest adopt, without critical interaction between these actors, and among them and other actors of the society that will impacted by such innovations and if the mechanism and linearity of such paradigm are in crisis opposite to the complexity, diversity and constitutive differences of reality, we need to change our way of innovating.

- From the productive efficiency to sufficient efficient production. If the goal of infinite accumulation of richness in a finite planet is not viable and if worldwide crisis is today on over-production and no more of shortage (the problem is of access, of distribution), we must rethink the productiveness ethos that the West instituted and decide to produce what is sufficient efficiently, following Ghandi when he told us that the Planet has sufficient to fulfill the need –but not the

avarice of all. In this sense, family animal production exists for guaranteeing the sustainability and ways of life of rural communities producing efficiently what is sufficient for these; if there are surpluses, these must be sold in other markets, but as consequence (of the surplus) and not as objective to the detriment of local feeding.

- From the "Agribusiness" for making money where there is opulence to family agriculture for feeding where there is hunger. One thing is the agri-business and another thing is agriculture. On the one hand, as the name indicates the agribusiness reduces agriculture to a simple business whose objective is barely make money (Ziegler 2012), as the agribusiness in Brazil. On the other hand, agriculture is a way of life (De Souza Silva 2009) including an economic dimension, but it is not reduced to it. Family agriculture exists for assuring life, as in Brazil where 74 % of the food produced, sold, purchased and consumed in the country has its origin in this type of agriculture. So, life must be the guiding principle of family animal production in Latin America that exists first to feed the communities of whose way of life is constitutive.

- From the feeding security to the feeding sovereignty to the feeding sustainability. If feeding security is a concept that worries about the availability of nutritive and innocuous foods for all, but is not worried about the origin of this food or with the way how this is produced, because it assumes that the international market is the source of the feeding security of the societies, the concept of feeding sovereignty that beyond food availability, demands autonomy for the communities and societies to decide what and how produce and consume, it is more appropriate to inspire and orientate the development of an agriculture engaged to the sustainability of the local ways of life. However if feeding sovereignty is necessary, but no sufficient for guaranteeing foods for all, as in Brazil, where there is hunger in abundance, the concept of feeding sustainability is more ample since it includes the fortitudes of previous concepts, but transcend them for including a cause for concern with the sustainability of the "cycle of feeding sustainability" and of the "institutional matrix" implicated in its action. For this concept, agriculture is a system that starts in society that has requirements of foods, fiber and energy coming from the rural world and ends in society, when this is fulfilled in such requirements, passing by the input/equipments, production, transformation and commercialization sub-systems. In addition, the systems includes the environment/organizational context, formed by the services (research, extension and technical assistance, credit) that support the different sub-systems of the "feeding sustainability cycle" and the environment/institutional context, made up from the group of the "rules of the game" (laws, policies, plans, programs, priorities) conditioning the performance (decisions, actions) of the social, economic, political and institutional actors implicated in that vital cycle (De Souza Silva 2013b).

In summary, the innovation organizations for the rural world, as those implicated in family animal production, require to be updated on these and other current paradigmatic transformations for thinking about their implications for the future of nature and dynamics of its mandate. If the context of such organizations are going through deep transformations, they need to understand what changes are these and which are the possible scenarios (future) for the activity to which they tribute. After this interpretational effort it can be understood which changes must be carried in its institutional coherence in order to enter in the contextual correspondence with its changing local environment, process facilitated by the institutional innovation (De Souza Silva 2013b).

Conclusions

Nothing is prior or superior to life (De Souza Silva 2013a). If life is the origin, center and end of all human thinking and acting and if life itself is menaced in the Planet, as consequence of the industrial development paradigm whose coherence of production and consumption is not in correspondence with the potentialities and limits of the Earth, it is urgent to carry out an ethical assessment of the "innovation for development" and to manage the paradigmatic transformations essential for its re-orientation to life. The emergent constructivist paradigm is a source of coherence for innovation organizations accepting the challenge of realizing such changes.

In the applied constructivism to family animal production, for example: (a) the innovation process is oriented for life and not for "development", (b) the linear equation "production-transference-adoption" of the classical innovation paradigm is replaced by the non-linear process of generation and appropriation of knowledge and technologies; (c) the action of the innovation process demands the participation of all the implicated actors from the diagnose of the problems and challenges of the context to the evaluation of the impacts of the implemented innovations; (d) the relevant innovation emerges from the processes of social interaction with the participation of the actors that they require and from those that will be shocked by it; (e) the significant knowledge is generated and appropriated in the context of its application and implications; (f) the sustainability implies cultivating the relationships, significances and practices that generate, sustain and give sense to life; (g) the agriculture is a system that starts and ends in society; (h) the performance of the "cycle of the feeding sustainability" depends on the sustainability of the "institutional matrix" implicated in that cycle; and (i) the feeding sustainability is not universal but contextual, what means that is construction is local.

Finally, both the diagnosis as the proposition articulated in this paper seem unusual for many actors

that are not participating from the debate in the field of "development" in the knowledge verge. Many still do not understand or do not accept the fact that we are living a change of historical period and that, therefore, the intellectual framework of the historical time of industrialism, derived from the "idea of progress" in the past and from the "idea of progress" in the present, are in crisis; they do not longer serve as trusty guides for inspiring decisions or orienting actions for managing emergent realities. Many organizations conceived for "development" neither perceives that the civilizatory crisis explains its institutional crisis and that, thus, its future sustainability depends on the paradigmatic transformations realized for its re-orientation for life. However, if we postpone the construction of the "day after development" in, for example, family animal production in Latin America, if we continue indifferent to the transformations in the action of the relationships between science, technology and society in the innovation process (STSI), we will reproduce the "development" crisis that we intend to surpass. How long? At what cost?

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