Revista Internacional de Educação Superior [RIESup]
ISSN 446-9424

Artigo

DOI: 10.22348/riesup.v3i2.7741

THE EPISTEMOLOGICAL TURN OF THE AGRICULTURAL UNIVERSITY OF HAVANA (UNAH)

EL GIRO EPISTEMOLÓGICO EN LA UNIVERSIDAD AGRARIA DE LA HABANA (UNAH), CUBA

O GIRO EPISTEMOLÓGICO NA UNIVERSIDAD AGRARIA DE LA HABANA (UNAH), CUBA

Adolfo Ramos Lamar [1]
Eduardo Fracisco Roach [2]

ABSTRACT: Since 1990 in Cuba an Epistemological turn begins in the agricultural higher Education, conditioned by the policies in agriculture, science and technology and higher education. The objective of the present work is to analyze how in the Scientific University Complex of Havana (UNAH) an Epistemology has been developing in harmony with the course of the agrarian policy. An indicator of this Epistemological leap is the conceptions of Science and Technology that are emerging from the redesign of the plans and programs of the agricultural sciences careers. In this sense, although a favorable scenario emerges, it is no less true that in UNAH already has existed a critical mass of teachers that in their researching and teaching works announce the necessity of this Epistemological Turn.

KEYWORDS: Epistemology. Higher agrarian education. Cuba. Green revolution. Sustainable agriculture

RESUMEN: En la Epistemología articulada en la Educación Superior Agropecuaria en Cuba antes de 1990 intervienen la política agraria, la política científica y tecnológica, y la política de educación superior. El objetivo del presente trabajo consiste en abordar cómo en el Complejo Científico Docente Universidad Agraria de la Habana (UNAH) viene abriéndose paso una Epistemología en sintonía con el rumbo de la política agraria. Un indicador de ese giro epistemológico son las concepciones de la ciencia y la tecnología emergentes del rediseño de los planes y programas de las carreras de ciencias agropecuarias. En este sentido, si bien emerge un escenario favorable, no es menos cierto que ya existía en nuestro ámbito académico una masa crítica de profesores cuyos trabajos de investigación y su labor docente anuncian la necesidad de ese giro epistemológico.

PALABRAS CLAVE: Epistemología. Educación agraria superior. Cuba. Revolución verde. Agricultura sostenible.

RESUMO: Na Epistemologia existente na Educação Superior Agropecuária em Cuba antes de 1990 intervém a política agraria, a política científica e tecnológica e a política de educação superior. O objetivo do presente trabalho consiste em abordar como no Complejo Científico Docente Universidad Agraria de la Habana (UNAH), Cuba, vem ocupando espaço uma Epistemologia em sintonia com o rumo da política agrária. Um indicador desse giro epistemológico são as concepções da ciência e da tecnologia emergentes da reformulação dos planos e programas dos cursos de ciências agropecuárias. Nesse sentido, ainda que venha à tona um cenário favorável é necessário colocar que já existia no âmbito acadêmico uma massa crítica de professores que com seus trabalhos de pesquisa e seu trabalho docente anunciam a necessidade desse giro epistemológico.

PALAVRAS-CHAVE: Epistemologia. Educação agrária superior. Cuba. Revolução verde. Agricultura sustentável.

Submitted on: 18/10/2017 – **Accepted in**: 03/04/2018 – **Published**: 25/04/2018

Revista Internacional de Educação Superior [RIESup]
ISSN 446-9424
Artigo
DOI: 10.22348/riesup.v3i2.7741

INTRODUCTION

The agrarian policies establish a set of guidelines, regulations, institutional frameworks, and decisions-making related with the tenure, the agricultural use of land and the role of agricultural activity in the food, economic and cultural country's well-being. However, the projection and the achieving these purposes demand a praiseworthy construction of knowledge of agricultural reality and its transformation assisted by science and technology activities in various scenarios, especially in education (BREILH, 2005).

Certain epistemological premises operate in the activities of science, technology and education[3]. Frequently, these premises are assumed "without total clarity" (GUADARRAMA GONZÁLEZ, 2017, p.27). On the other hand, epistemological controversies are manifested in scientific communities. Several Social, economic and political circumstances condition the reluctance or reception of a certain epistemology. For example, it is not a secret that the epistemological ideals based on the Philosophy of the Enlightenment and the Positivist Philosophy have been supporting the agrarian modernization policies and the economic, political, social and cultural project of the bourgeoisie and capitalism.

Particular epistemological dynamics takes place in the projection and implementation of science, technology and education policies, addressing to agricultural development in Cuba (FREYRE ROACH, RAMOS LAMAR, 1994, RAMOS LAMAR, 1995).

In this context, the philosophical and epistemological learning is essential in order to develop "the humanistic and integral formation of the future professionals" (SEVERINO, 2012, p.21) and to achieve the short and long term planned objectives. Nowadays, it is necessary to tear down epistemological barriers that dull the sustainable development of agriculture (CAROLAN, 2009).

The objective of this paper is to explore how, starting in 1990, an epistemological change has manifested step-by- step in the Scientific Complex of the Agrarian University of Havana (UNAH, Cuba) in correspondence with the development of agrarian policy and the readjust the plans and programs of agricultural science careers. The work is the result of our teaching experience since 1980s at the UNAH, the literature review and the collection of documents from the UNAH and other institutions, and the exchange with colleagues from Cuba and other countries.

[3] "Epistemology" is not an old term, nor what it designates (BLANCHÉ, 1988). Literally refers to Theory of Science (*Wissenschaftstheorie)*. It invention is attributed to the Scottish philosopher James Frederick Ferrier who proposed it in 1854 in his proposal of the division of Philosophy into Ontology and Epistemology. This term is recurrent in bourgeois British and American philosophy, but less so in French and German (ROSENTAL, 1984). Positivism endorses it the sense of Theory of Knowledge (*Erkenntnistheorie)* or mainly Theory of Scientific Knowledge (SÁNCHEZ GAMBOA, 1987). The image of science as a paradigm of true knowledge is associated precisely with the birth of Epistemology. Following this pattern, the word Epistemology is often used to refer the philosophical inquiry about knowledge in general (broad sense) or scientific knowledge (narrow sense), including its ontological and gnoseological foundations, its demarcation in comparison with ordinary everyday knowledge, its methods , techniques, their truth and social relevance.

Revista Internacional de Educação Superior [RIESup]
ISSN 446-9424
Artigo
DOI: 10.22348/riesup.v3i2.7741

THE EPISTEMOLOGY OF THE POLITICS OF AGRARIAN EDUCATION IN CUBA BEFORE 1990

As it is well known, between the sixteenth and nineteenth centuries the Spanish metropolis had imposed on Cuba a slave or semi-feudal agrarian economy, with plantations mostly of sugar cane (*Saccharum officinarum*). In 1901 the United States abruptly intervened in the Spanish-Cuban War, usurping Spain's jurisdiction over Cuba, and imposing a regime of neocolonial economic and political domination, whose agenda contemplated the implementation of an agrarian modernization.

In 1959 the Guerrilla Movement "26 de Julio", led by Fidel Castro Ruz, Raul Castro, Ernesto Che Guevara, and Camilo Cienfuegos, took the power. Foreign monopolies (*latifundios*) were nationalized and land was given to the peasants[4]. The land is for those who work it! Such is the nationalist, anti-imperialist, anti-colonial, popular, pro-peasant and democratic, socialist slogan of the agrarian policy of the Cuban Revolution.

In 1961, with the purpose of destroying the Revolution and intercepting its influence in the region, the President of the United States, John Kennedy, approved the "Alliance for Progress" program, designed to promoted an agrarian modernization aided by the United States.

The Cuban revolutionary state concentrated of natural resources in order to push the advance and efficient application of modern sciences and technologies and, in this way, to guarantee the successful implementation of the plans. The state opted for the Green Revolution model of agriculture as a technological guideline for agricultural development policy in both the state and cooperative sectors[5]. This decision was supported by the bilateral agreements that Cuba signed with the USSR and the Council for Mutual Economic Assistance (CMEA or COMECOM).

Logically, the collapse of Euro-Soviet socialism in 1990 has been hard for Cuba. The imports of inputs and agricultural machinery were abruptly interrupted. Georg Bush, approving the Torricelli and Helms-Burton laws, intensified the 50-year-US blockade that US has imposed on Cuba since 1961[6]. As a result, agricultural development projects based on the Green Revolution approach remained halfway. Due to the reduction of imports and exports the basket of subsidized food and resources has been significant affected. However, it is fair to

[4] Between 1959 and 1961, two Agrarian Reform laws were issued; resulting in 40% of the land being owned by the State and the rest (70%) owned by agricultural workers those who worked in the large land sector.
[5] We are not talking about the Green Revolution in the sense of commitment to ecological and sustainable methods of agricultural production. We use this term in the sense that appears on the front page when you click on Google.
[6]These laws endorse the imposition of sanctions on companies that establish trade agreements with Cuba. This extraterritorial projection closes Cuba other access doors to resources and credits.

Revista Internacional de Educação Superior [RIESup] ISSN 446-9424
Artigo DOI: 10.22348/riesup.v3i2.7741

say that before the crisis of 1990 there were not internal difficulties of Cuban agriculture. For instance it has observed the progressive and severe depletion of soils and biodiversity, the insufficiency of incentives to live and work in the countryside, the inadequate diversion of resources, speculation, and rural exodus as well. With the crisis of the 90s or officially called "Special Period in Peacetime of total austerity" or "War Economy", began the decentralization of the agricultural market and the promotion of endogenous and local development. In this context the system of science and technological innovation was reorganized. The ideal of greater specialization, integration and application of achievements in science and technology (especially biotechnology) embodied in the system of Scientific-Technological Poles. The system of subsidies for the access of producers to chemical fertilizers and pesticides, and fuels was maintained. However, despite the fact that the Green Revolution ideal has not been abandoned, the approach of Sustainable Agriculture has adopted and endorsed as the fundamental technological guideline of agricultural policy[7].

It is no less true that before the crisis has already emerged a movement integrated by professors, students, researchers and extension workers and peasants, who had been working and alerting the State in that direction, and who dizzily irradiated and disseminated programs and projects for the staggering of agro-ecological practices and sustainable agriculture with state, community, local and international collaboration. There is an extensive national and international documentation on the timely, successful and perspective course of the Sustainable Agriculture in Cuba, its achievements and challenges (FUNES MONZOTE et al., 2001, FUNES MONZOTE, 2009, MACHIN SOSA et al., 2010, CASIMIRO RODRIGUEZ, 2016).

The epistemology articulated in the Agricultural higher education in Cuba before 1990 was suggested by the policies in agriculture, science and technology and higher education. These three scenarios converge in the epistemological ideal of super-specialization in science, technology, productions, and also in the curricular and learning activities. The isolation or atomization as much as possible of the object and knowledge was taken as a 'trump card' of the cognitive and scientific process. We could not say that in Cuba, saving the differences, this "perceptible phenomenon in contemporary science" found no fertile soil (NUÑEZ JOVER, 2001, p. 27).

The formation of a professional as an actor protagonist of the project of the Cuban Revolution and the policy of the Ministries of Agriculture (MINAGRI) and sugar (MINAZ) has become an epistemological premise of the Cuban educational system in the 70s. In functional correspondence, it began proliferate in Cuba diverse institutes, faculties and provincial autonomous agricultural centers[8]. Thus, on September 7, 1976, the Scientific-Teaching

[7]In correspondence with Agenda 21, Law No. 81 of the Environment, issued by the Ministry of Science, Technology and Environment (CITMA), it stipulates the promotion of Sustainable Agriculture, that is to say, economically viable and socially acceptable agricultural production, in harmony with the environment. Decree No. 259 of 2008 (on the granting of idle land) stipulates that the new holders are obliged to carry out sustainable agricultural practices in the idle lands that are granted in usufruct.

[8] This process is regulated by Law No.1307-1976 (on the establishment of the structure by specializations in correspondence with the planning of economic and social development). As a result, the agricultural education acquired an independent configuration of the universities.

Revista Internacional de Educação Superior [RIESup] ISSN 446-9424
Artigo DOI: 10.22348/riesup.v3i2.7741

Complex Superior Institute of Agricultural Sciences (ISCAH) "Fructuoso Rodríguez Pérez" emerged. To which it was granted the function of guiding center of the majority of the agricultural races in Cuba. On the one hand, isolated science and technology scenarios that contribute to agriculture have been integrated in several of faculties, departments, centers and research institutes exclusively in function of the agricultural development of the western region (RAMOS LAMAR, 1995).

The epistemological bias of the atomization of the object and the subject is manifested in the divorce not only between the agricultural specialties among themselves but also with the rest of the professional profiles. Our university was no exception. At that time, for our fellow professors of the agricultural sciences, there was no doubt about the superiority of European-Western scientific and technological knowledge and the inferiority of peasant knowledge. This would be a fundamental epistemological premise that was articulated in the politics and in the curriculum. We recall that one of the recurrent approaches in our agrarian university was that scientific knowledge gives an account of the how and why of things, and that the non-scientific knowledge of the peasants in the best of cases reaches to establish only how things happen. We transmitted this bias through our Philosophy classes.

This scientism, and with it other biases such as technocratism and bureaucracy were routed itself strongly in our agrarian university. On the other hand, it observed the reluctance of producers to introduce the proposals of the producers of scientific knowledge and transferees of new technologies. It was very common to say that new knowledge must be applied, and, therefore, resistance to it was interpreted as limiting the producers.

In the many formal and informal debates there was who explained this reluctance by appealing the lack of incentives to introduce new knowledge. Others have argued that production centers of knowledge have been responding to academic demands and not to the needs of production. And there were those who understood that the problem lies in the failures of training and the local adaptation of knowledge and technique. At that time in other contexts, anthropologists, structuralist and functionalist sociologists as well consider that there are some peasant's cognitive and sociocultural features conditioning their resistance to the advance of modern science and technology[9]. There is an epistemological message launched with this approach: the scientific and modern agricultural knowledge has a greater cognitive, technical, and practical scope than peasant knowledge.

Obviously, the training of professionals to work in the giant state agricultural enterprises has been responded to the policy of agrarian modernization of the MINAZ and MINGARI, and its replicas at the Provincial Delegations. In this monoculture and intensive livestock environment, varieties of "high" genetic potential, high productivity and high yields, and the use of high inputs, resources (chemical and fossil), and machinery are given relevance. In the light of the time it is clearer the hegemony endorsed to Agro-chemistry Department in our university. The NPK formula "Nitrogen-Phosphorus-Potassium" was so popular and it associates with the accent putting on chemical fertilization in that paradigm of industrial

[9] That is to say familialism, localism, traditionalism, conservatism, limitation of expectations, and fear of change (SEVILLA GUZMAN, 2006).

Revista Internacional de Educação Superior [RIESup] ISSN 446-9424
Artigo DOI: 10.22348/riesup.v3i2.7741

agriculture. Do not lose sight of the fact that Cuba acquired a strong capacity for agricultural inputs and equipment. Cuba even used twice as much fertilizer per hectare as the United States. The intensity of fertilizer use (kg / ha / year) reached levels comparable to European countries[10].

When one wants to inquire about the epistemological assumptions of agrarian policy and agricultural education policy, it should to consider the issue of agrarian extension. There are, however, some reservations. A rigorous and formal national system of agrarian extension did not exist in Cuba until the year 2000 (LÓPEZ, 2005). At most, the contents of agrarian extension were hardly visualized. That does not mean that this function was not existed. In fact, in our university, the extension activities focused on technical training.

THE REAJUCTING OF AGRICULTURAL POLICIES FROM THE 90s AND IT EPISTEMOLOGICAL IMPLICATIONS FOR THE POLICY OF AGRICULTURAL EDUCATION.

The change of agrarian policy in these and other mentioned directions had its epistemological repercussion in the policy of agricultural education, and above all it was manifested in the context of the redesign of curricular programs: in the 80s (Plans A and B), in the 90s (Plans C and C perfected)and after 2006 (Plan D). In this context, an intensive work was carried out on the integration and gradual reduction of disciplines and subjects, seeking more interdisciplinary and integration, and also more space for interaction between education, research, and agricultural practice. The epistemological ideal of excessive specialisation plunged into crisis. The formation of an integral and versatile professional, and capable of working collaboratively with the peasant sector, came to the fore. This would give more chance to the reception in our institution the holistic and interdisciplinary approach of local problems. Expression of this circumstance is the emphasis on local development, and the need to promote science and technology at that level. New universities appear at the municipal level, where the faculties integrate professors of the central universities with the professionals of the territories.

It is the slogan that was used for characterizing that situation: The municipality has come into a great classroom! And so, it can be found the length and breadth of the country. In such a scenario, at the end of the 1990s, and as part of the resizing of higher education, the ISCAH began to be called the Scientific-Educational Complex of the Agrarian University of Havana (UNAH) "Fructuoso Rodríguez Pérez". Behind this event we could deduce that the airs of super cognitive specialization started to blow with less intensity. Then, in 2000, the Municipal University Venues (SUM) started to name Municipal University Filters (FUM) and its integrated into Municipal University Centers (CUM) (PÉREZ ZABALLA et al, 2016). Everywhere we see airs of knowledge integration and as well as of the interdisciplinary in the

[10] At the same time, the density of tractors reached 1 per 50 hectares, similar to that of developed countries. Irrigation and mechanization infrastructure were four and two times higher, respectively, than Latin America and the Caribbean (CHAN MAY LING; FREYRE ROACH, 2012, p. 77).

curriculum, in research projects, and in extension activities. Now, the UNAH contemplates not only agrarian careers but also others such as Accounting, Law, Socio-Cultural Studies, Physical Culture and Sports, Industrial Engineering and Computer Science.

It contributed to this a change of academic attitude in favor of participatory innovation, taking into account the criteria of farmers in decision-making and evaluation of productive performance. In fact, the agrarian policy, the science and technology policy, and the environmental policy after 1990 stipulate the integration of scientific and technical achievements with the traditional local knowledge and genetic resources, fostering the direct participation of local communities in the conception, development and improvement of production systems. The Organic Agriculture Group (GAO) of UNAH is playing a great role in this crucial process[11].

With Agro-ecology it came a rethinking and a criticism of the epistemological assumptions of the Green Revolution and also the development of epistemological references of Sustainable Agriculture. Dualisms or dichotomy such as the object-subject has being strongly questioned (SERRA BORSATTO, SIMÕES DO CARMO, 2012, page 714)

It is necessary to mentioning that the Agrarian Extension and Sustainable Agriculture Group of UNAH promotes the extensionist perspective inspired by Paulo Freire's Popular Education and Agro-ecological thought (LÓPEZ, 2005). With the organization of participatory, horizontal, and dialogical extension activities, it questions the scientist, technocratic, paternalistic, transference, and 'offer-oriented' epistemology of Agrarian extension in Cuba established before 1990. However, we cannot say that in Cuba that paradigm of Agrarian Extension has disappeared altogether.

The teaching of the Human Sciences is promoting an epistemology with the agrarian, science and technology, and educational policy of the State. In the UNAH the fundamental discussion had to do with the demand that Marxism should contribute to solve concrete and practical and professional and agricultural problems. Also it was highlighted the insufficient link of our subjects with the professional agrarian profile.

In light of this resizing of programs of studies in agricultural careers, the debate intensifies. The epistemological biases of our subject emerge not only because of the complicity with the Green Revolution, but also due to the widespread opinion among our agricultural colleagues that philosophical knowledge does not contribute to their work.

[11]Under the shadow of this group, the Agro-ecology and Sustainable Agriculture Studies Group (CEAS) was created in the late 1980s. In the 1990s, Agro-ecology was approved in the National Court for the evaluation of Doctoral Theses in Agronomy. And at the same time began to offer the Master of Agro-ecology and Sustainable Agriculture at the UNAH, years later in the Faculty of Agronomy at the University of Villa Clara, and now also at the University of Pinar del Rio, and with versions in Ecuador, Bolivia, and Venezuela

Revista Internacional de Educação Superior [RIESup]
ISSN 446-9424
Artigo
DOI: 10.22348/riesup.v3i2.7741

In the context of current transformations, it emerges a criticism of scientism and technocratism. It would be interesting to explore in other works how these biases have to do with the resistance of the scientific community to the emerging paradigm of Sustainable Agriculture and the conservation of the paradigm of the Green Revolution. As already mentioned, one of the most debated questions about the teaching of Human Sciences in Cuba was its disconnection from the professional profiles of careers. In the field of agricultural education and research, this is closely associated with technocratic determinism and verticalism in the field of knowledge production and the transfer of technologies of the Green Revolution. At the end of the 90s it has approved by the Ministry of Higher Education (MES) that the teaching of Human Sciences should be addressed to the needs of professional training for each of the careers. At that time, the debate about the need for more links between Philosophy and the profile of careers became more important, but that "profil-zation"[12] will not end in the mere and forced application or banal and vulgar exemplification of philosophical contents.

It was precisely in this context that the teaching program of Marxism in the UNAH connects with the Agro-ecological movement in full swing. At that time, the apology of scientific and technological knowledge was questioned and as well the stigmatization of peasant knowledge, which implied, as one author rightly says:

> ... through the promotion of Agro-ecology we can contribute to the re-composition of a social metabolism that expresses wisdom and permanent updating in an integral society-nature relationship, which overcomes the anthropocentrism shared by capitalism and orthodox Marxism" (SEVILLA GUZMAN, 2011, P. 135).

Today in the same direction point those who are developing a conception of Environmental Economics and Sociology inspired by Eco-Marxism (LEFF, 2011). The course of Marxism in our university began to incorporate these approaches into it curricula.

In the context of this transformation of the teaching of Philosophy in Cuba, and in the discipline of Marxism-Leninism, it was introduced and approved at ministerial level the course of Social Problems of Science and Technology (PSCT).

The message that this policy launches is above all epistemological: the need to change the traditional image of science and technology. This subject of PSCT is the way in which it was concreted in Cuba the globalized reflection in matter of Epistemology, Scientology (FIGAREDO CURIEL, 2002), Philosophy of the Science, Philosophy of the Technology, Sociology of the Knowledge, the Social Studies of the Science and Technology or Science, Technology and Society (CTS Studies). In one of the fragments of the current basic text of this subject in all the university centers of Cuba, its author, Dr. Jorge Núñez Jover, main promoter of these studies, wrote:

[12] 'Perfilización', this was the term that we use a lot in Cuba, that is means the vulgar application of Philosophy in the scientific profiles or professions.

Revista Internacional de Educação Superior [RIESup] ISSN 446-9424
Artigo DOI: 10.22348/riesup.v3i2.7741

> In this book I try to hold the idea according to which scientific education cannot rely on outdated images of science and technology and by discussing the available literature I try to present alternative, more up-to-date images. For this I insist on the interrelations of science and technology and the complex they constitute (Technoscience) with society, displacing more traditional, linear and optimistic visions. I also argue the epistemological complexity of science that forces us to rethink simplified conceptions about rationality, scientific method, objectivity and truth. I hope that the discussion about the institutional, social and cultural aspects of scientific work will contribute to enrich the images of Technoscience that educational channels, formal and informal, usually convey (NÚÑEZ JOVER, 2001, p.5).

This approach put into question the optimistic, benefactor, 'artefactual', romantic, positivist, scientist, developmental, objectivist and universal images of science and technology, scientific progress, technological progress, and their relations with social progress. The epistemological status of science was rethinking. The definition of technology as mere applied science has also being questioned, as well as the supposed neutrality of both. It comes to the fore the thesis that science and technology are social enterprises and institutions, conditioned by the social, economic, political, and cultural context, and whose development is accompanied by social and environmental impacts

Operationally it meant that not everything scientifically and technically possible should be considered socially viable, and, therefore, also, the need for surveillance, monitoring, and public control of science, and not only when the discovery or new knowledge is already accomplished but also, even before being projected, and even more so, when it will applied. All these topics were promoted by the Group of Science, Technology and Society of the University of Havana (UH) and the authors of this article have put this reflection in the field of agriculture (FREYRE ROACH, RAMOS LAMAR, 1994). It is fair to say that we also had as background the work of Philosophy professor Dr. Carlos Valtuille on concepts of "biosphere" and "noosphere" elaborated by Vladimir Vernadsky biosphere (1863-1945) and Pierre Teilhard de Chardin (1881-1955).

The PSCT course has been a teaching scenario and an important channel for the epistemological discussions and controversies, for instance, related to the introduction of new technologies such as the case of Precision Agriculture, and especially the genetically modified (GM) crops and animals (FUNEZ MONZOTE; FREYRE ROACH, 2009).

The epistemological repercussion of the PSCT course in Cuban universities, and, therefore, in our institution, is also expressed in that its contents are requirements for the change of teaching categories (instructor professor, assistant and titular) and scientific (researcher aggregate, assistant and titular), and to opt for the Doctor's Scientific Degree in all scientific specialties. To date, there is no other course that has that privileged position in the field of agricultural higher education in Cuba. At the same time, we see that professors of Philosophy begin to insert themselves in projects of agricultural research, and professors of agricultural sciences participate enthusiastically in research on philosophical, ethical-professional, economic and political issues related above all with their professional and work profile.

FINAL CONSIDERATIONS

In Cuba the epistemology or the vision of science and technology that underlies the thinking and agricultural management of the Green Revolution, loses hegemony, in the midst of the circumstances of Cuban agricultural development: the crisis of the 90s, the reforms of the policy of the government, the rise of the Agro-ecology movement, and the transformations of the teaching of Human Sciences. But is not absolute because it persists among managers of agricultural policy and in our teaching staff in education centers, a romantic and nostalgic mindset regarding this outdates epistemology. Also still lingers around us the perception that the promotion of sustainable agriculture is merely tactical and circumstantial.

Several factors are combined in the epistemological turn that is being developed in our university. Certainly, these changes in agrarian policy in mentioned circumstances have brought a favorable scenario for the rethinking of the image of science and technology. Even more, redesigns of the curriculum of agricultural careers and the Philosophy course come with it.

On the other hand, in our professors staff, before those circumstances there is already a critical mass of professors whose works were announcing and indicating the need for change in the image of science and technology, and that the epistemological turn cannot be postponed.

REFERENCES

ALTIERI, Miguel; FUNES MONZOTE, Fernando Rafael. **La paradoja de la agricultura cubana**. CEPRID, [s.l.], Jueves 12 abr. 2012. Avaliable in: <http://www.nodo50.org/ceprid/spip.php?article1395 >. Access in: 11 Apr. 2015.

BLANCHÉ, Robert. **A epistemologia**. 4. ed. Lisboa: Editorial Presença, 1988. 161p.

BREILH, Jaime. **Investigación agraria: por qué la urgencia de una epistemología crítica**? Con qué tipo de ciencia queremos trabajar hacia otra realidad agraria? Ecuador: Universidad Andina "Simón Bolívar", 2005. 13p.

CASIMIRO RODRÍGUEZ, Leydi. **Bases metodológicas para la resiliencia socioecológica de fincas familiares en Cuba**. 2016. 244 f. Tesis (Doctora en Agroecología) - Universidad de Antioquia, Facultad de Ciencias Agrarias. Medellín, 2016.

CHAN, May Ling; FREYRE ROACH, Eduardo Francisco. Unfinished Puzzle: Cuban agriculture – the challenges, lessons and opportunities. Avaliable in: <https://foodfirst.org/publication/unfinished-puzzle/>. Access in: 12 Jan. 2012.

FIGAREDO CURIEL, Francisco. La tradición cienciológica en el estudio de la ciencia. **Llull**: Revista de la Sociedad Española de Historia de las Ciencias y de las Técnicas, Zaragoza, v.25, n.54, p. 621-642, 2002.

FREYRE ROACH, Eduardo Francisco; RAMOS LAMAR, Adolfo. Ciencias Agrarias y Sociedad. En: NÚÑEZ JOVER, Jorge. **Problemas sociales de las ciencias y las tecnologías**. C. Habana: Editorial Félix Varela, 1994, p. 15-28.

FUNES-MONZOTE, Fernando Rafael et al. **Transformando el campo cubano**: avances de la agricultura sostenible. La Habana: Asociación de Técnicos Agrícolas y Forestales; Editorial Asociación Cubana de Técnicos Agrícolas y Forestales, 2001.

FUNES-MONZOTE, Fernando Rafael. **Agricultura con futuro.** La alternativa agroecológica para Cuba**.** Matanzas/Cuba: Estación Experimental "Indio Hatuey" / Universidad de Matanzas, 2010 . 196p.

FUNES-MONZOTE, Fernando Rafael.; FREYRE ROACH, Eduardo Francisco. **Transgénicos:** quien gana, quien pierde. **Texto para un debate en Cuba**. Habana: Centro Félix Varela de la Habana / Editorial Acuario, 2009.

GUADARRAMA GONZÁLEZ, Pablo. **Fundamentos filosóficos y epistemológicos de la investigación**. Disponible em: <http://www.archivochile.com.> Acceso em: 20 set. 2017.

KUHN, Thomas Samuel. **A estrutura das revoluções científicas**. 5. ed. São Paulo: Perspectiva, 1997. 257 p.

LEFF, Enrique. Sustentabilidad y racionalidad ambiental: hacia "otro" programa de sociología ambiental. **Revista Mexicana de Sociología**, Mexico, v.73, n.1, p. 5-46, jan./mar. 2011.

LÓPEZ, Teodoro. Organización y estructura del sistema de extensión agraria (SEA) en Cuba. **Revista Computarizada de Producción Porcina**, La Habana, v.12, n.1, p. 22-26, 2005.

MACHÍN SOSA, Braulio et al. **Revolución agroecológica**: el Movimiento de Campesino a Campesino de la ANAP de Cuba. La Habana: ANAP, 2010.

NÚÑEZ JOVER, Jorge. **La ciencia y la tecnología como procesos sociales**. La Habana: Editorial Feliz Varela, 2001.

NÚÑEZ JOVER, Jorge. **Problemas sociales de las ciencias y las tecnologías**. La Habana: Editorial Félix Varela, 1994, p. 15-28.

PÉREZ ZABALLA, Leonor et al. Impacto de la formación en las Filiales Universitarias Municipales. Experiencias en Mayabeque y Artemisa. **Congreso Universidad**, Ciudad Habana, v. 5, n. 1, p. 159-176, 2016.

Revista Internacional de Educação Superior [RIESup] ISSN 446-9424

Artigo DOI: 10.22348/riesup.v3i2.7741

RAMOS LAMAR, Adolfo. **A crise do bloco socialista e a politica de C&T em Cuba:** o caso do Instituto Superior de Ciências Agropecuárias de Havana. 1995. 134 f. Dissertação (Mestrado) - Universidade Estadual de Campinas, Instituto de Geociências, Campinas, SP. Avaliable in: <http://www.repositorio.unicamp.br/handle/REPOSIP/286699>. Access in: 20 Sept. 2017.

ROSENTAL, Moisevich Mark; IUDIN FEDOROVICH, Pavel. **Diccionario filosófico**. La Habana: Editorial Ciencias Sociales, 1984.

SANCHEZ GAMBOA, Silvio Ancisar. **Epistemologia da pesquisa em educação:** estruturas logicas e tendencias metodologicas. 1987. 229 f. Tese (Doutorado) - Universidade Estadual de Campinas, Faculdade de Educação, Campinas, SP. Avaliable in: <http://www.repositorio.unicamp.br/handle/REPOSIP/251514>. Access in: 20 Sept. 2017.

SERRA BORSATTO, Ricardo; SIMÕES DO CARMO, Maristela. Agroecologia e sua epistemologia. **Interciencia**, Caracas, v. 37, n. 9, p. 711-71, set., 2012.

SEVERINO, Antônio Joaquim. Integrar cultura e humanismo: desafio pedagógico da Filosofia no Ensino Superior. **Educar em Revista**, Curitiba, n. 46, p. 21-35, out./dez. 2012.

SEVILLA GUZMÁN, Eduardo. **Sobre los orígenes de la agroecología en el pensamiento marxista y libertario**. La Paz: Plural editores, 2011.

SEVILLA GUZMÁN, Eduardo**. De la sociología rural a la Agroecología.** Barcelona: Icaria Editorial-Junta deAndalucía, 2006.

Sobre los autores

[1] ***Adolfo Ramos Lamar***
E-mail: ajemabra@yahoo.com.br / ORCID: http://orcid.org/0000-0003-1164-1172
Universidade Regional de Blumenau – Brasil
Doutor em Educação em Política Científica e Tecnológica pela Universidade Estadual de Campinas [UNICAMP].

[2] ***Eduardo Francisco Roach***
E-mail: freyre.roach2016@gmail.com / ORCID: http://orcid.org/0000-0002-2267-1564
Universidade Regional de Blumenau – Brasil
Pós-doutor em Educação pela Universidade Estadual de Campinas [UNICAMP].