

# ***Un enfoque crítico a la formación del ingeniero agrónomo para el manejo animal en Cuba***

## ***A critical approach to the training of the agronomist for animal management in Cuba***

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**Resumen:** Con el objetivo de presentar algunas reflexiones sobre las problemáticas que presenta la formación del ingeniero agrónomo se realiza un estudio sobre ciertas manifestaciones que constituyen insuficiencias referentes a la orientación formativa del manejo animal. Se abordan las tendencias y enfoques que guían la formación de este ingeniero, su evolución y el reflejo de dichos problemas desde el posgrado para su desempeño en la práctica productiva. Se concluye que se precisa profundizar en el proceso pedagógico profesional con la intención de eliminar las barreras intermaterias, de modo que los ingenieros puedan asumir los actuales enfoques de agricultura sostenible.

**Palabras clave:** Formación agronómica; Ingeniero agrónomo; Manejo animal; Ganadería

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**Abstract:** In order to present some reflections on the problems presented by the training of the agronomist, a study is made on certain manifestations that constitute insufficiencies regarding the formative orientation of animal management. The trends and approaches that guide the formation of this engineer, its evolution and the reflection of these problems from the postgraduate course for their performance in productive practice are addressed. It is concluded that it is necessary to deepen the professional pedagogical process with the intention of eliminating the intermaterial barriers, so that the engineers can assume the current approaches of sustainable agriculture.

**Keywords:** Training; Agronomist; Animal management; Livestock

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## **Introduction**

Livestock farming today is not only an important economic resource for its contribution to the global social product and nutrition of the population in many countries of the world, but also for the high ecological impact it has on the use of land worldwide. (From the Hill, 2011)The Cuban cattle ranch faces

complex problems in the structural and functional order, whose solution reveals the necessity of an internal reorganization starting from the promotion of a modern, functional and sustainable infrastructure, and of having human resources with capacity for the use of cutting-edge technologies ; this was reflected in a report issued by the National Assembly of People's Power in 2016, results of the audit and control over the economic impact of compliance with the Program for the Development of Vaccine Production in the Ministry of Agriculture. (National Assembly of People's Power, 2016).

The University and Cuban agriculture are committed of working together to transform current levels of performance shown by the agri-food sphere, especially in satisfying the growing demands for the production of food of animal origin, considered one of the main problems affecting Cuban society in the economic order. In the conceptualization of the Cuban economic and social model of socialist development, and the national plan for economic and social development up to the year 2030, discussed in the 7th Congress of the PCC, the role of education in this development model, specifically, of technical and professional education as responsible for preparing the qualified workforce to meet the needs of the country, while ensuring comprehensive training of professionals. (Seventh Congress of the PCC, 2016)

The agronomist is the most integral professional of those responsible for agricultural production, their professional performance requires the knowledge and application of scientific methods and technologies, in order to solve those problems that limit reaching the maximum yield of the different cultivated species or animals that are managed in the agroproductive systems. (Ministry of Higher Education, 2006). Animal management represents an important field of action of the agronomic profession as the theoretical nucleus of animal husbandry, it constitutes the basis for the application of technologies, techniques and methods aimed at increasing animal production, however, the level of intervention and performance of Agronomists in order to solve the problems presented by livestock is still insufficient.

A factual study related to the intervention of agronomists in some agricultural production scenarios in the province of Santiago de Cuba, revealed that there is still very little the number of agronomists directly linked to animal production, there are also shortcomings in the application of techniques and technologies for the production of milk, meat and eggs, and a weak research activity of these professionals in topics related to animal production; These elements constitute manifestations of insufficiencies at different levels of agronomic training.

The causes of the problems are at different stages of the training process, from vocational training, undergraduate training, preparation for employment to postgraduate training. All of them should be identified as key areas that from the methodological work allow to move the professional motivation towards animal management, so that subjects in training internalize it and once graduates can integrate the zootechnical and agronomic contents to assume the entire order that society has assigned to the agronomic profession.

The objective of this paper is to present some reflections on the evolution, problems and challenges presented by the training of the agronomist in animal management as an indispensable element for the resuscitation and development of animal production in Cuba.

## **Devalopment**

### **Is animal management a science?**

Animal management is the application of a set of methods and techniques to reproduction, feeding, health, and animal improvement with the aim of increasing their productive performance; this, in other words, constitutes the art of animal breeding. It is from animal domestication as human activity that man, through empirical observation, gradually purifies and simplifies the best experiences for animal breeding, in the course of time these practices were configured as an art that, transmitted from generation to generation generation, and conjugated with technological development, has led to the emergence of animal husbandry as a modern science.

In 1965, at the international meeting of experts of the Food Agriculture Organization (FAO), held in Copenhagen, the term zootechnics was defined as "the science of animal husbandry, health and hygiene or animal production and health science" (Alonso, Buntinx, Campos, by Juan, Hernández, Loza, et al, 2006)

### **What are the differences between animal management and animal production?**

It is necessary to clarify the conceptual differences between management and animal production, although the first represents the methods and techniques of raising, as a theoretical basis, the second represents the productive practice, a process that, through the technical use of plants, animals, and other resources natural means, they allow to obtain useful products necessary for human subsistence (meat, milk, eggs, wool, leather, animal work, etc.)Ancestrally the animal and vegetal production are activities that have

been very closely related in the process of exploitation of the land forming what we know as agricultural activity, however, the modern man, in an attempt to perfect it, has gone to his division and specialization, which has given rise to the emergence of different agricultural professions such as animal husbandry, agronomy, forestry, etc.

### **What tendencies and approaches guide the training profiles of the agronomist for animal handling in the world?**

It could be affirmed that worldwide agricultural higher education has conceived the training of a professional for each of the specialties of the agricultural branch or the integration of them based on models of broad profile considering the needs of each regional context, however, in the last years, from the modern approaches and models of sustainable production, we observe the tendency of the integration of these professions in the same professional profile.

The training curricula of different universities in the world such as: Autonomous University of Baja California, (2006); University of Córdoba, (2012); University of Salamanca, (2014); Universidad de León, (2015), among others, give an account of the pedagogical practice that this training has followed, especially in Europe and Latin America, characterized by the formative integration of the contents related to plant and animal production. It is necessary, therefore, to specify how this integration occurs within the professional pedagogical process, because, even though the contents of both areas of knowledge of the profession are organized from the curricular design, the objective aims to remain in the agronomic and the animal in zootechnics.

In other words, we advocate the elimination of intermaterial barriers and that the agronomic training process be approached from a holistic perspective based on the interpretation of the dialectical interrelationships that occur between the different components of agricultural subsystems. Examples: animal production and coffee agroecosystems, animal production and cane production system, animal production and forest production systems, among others. It is meant that the formative systematization of the dynamic relationships established between the aforementioned systems will allow agronomists to be in a better position to incorporate the revolutionary approaches of sustainable agriculture such as integrated and diversified systems, agroecology, and agriculture-livestock integration. , among others, that are being defended from the agro-productive practice by authors such as Contino and Ojeda (2006); Iglesias, Funes, Toral, Simón and Milera (2011); Funes (2017), among others.

### **What are the professional profiles that are most related to animal management?**

Animal management as a science has several international denominations, which reflect the curricular structure and the emphasis on professional training in each country or group of countries such as: Zootechnics in Latin America and Central America (Brazil, Colombia, Argentina, Peru and Bolivia). Animal Science in North America (United States and Canada), Australia, Asia and the United Kingdom. (Delgado, Centellas and Villavicencio, 2014)

The agronomist is the professional trained to apply efficient techniques in the production of food, fodder, industrial fibers among others, taking as a raw material the plants and the soil and thereby achieve an economically profitable production in a rational manner and with respect to the environment.

The zootechnical engineer is a university professional in the area of animal production, mainly of domestic species, with the aim of supplying protein foods of animal origin and their derivatives, as well as being responsible for animal welfare and obtaining productivity in the various livestock systems.

An agronomist-zootechnician is a professional trained to apply techniques in the breeding, handling and feeding of domestic animals useful to man, and in the processing and industrialization of livestock products, the administration of productive processes of livestock companies to obtain productions profitable and innovative in a rational way and with respect for the environment.

The veterinarian-zootechnician is the professional in charge of guaranteeing the health of the animals and the production process to obtain food of animal origin with the quality required to contribute to the improvement of human health and with criteria of sustainability of animal production, applying for this is the general methods of clinical, preventive and zootechnical work according to the existing conditions.

As can be seen the zootechnical aspect appears in all these professional profiles as an expression of intentionality that the University has been paying attention to the changing demands of the agricultural sector from the curriculum; It could be affirmed that to a great extent, all of them converge today in the Cuban agricultural production scenarios, and that they received adequate initial training to assume animal management as a key element to manage animal production. Contradictorily, the task of producing animal feed to ensure development and livestock sustainability is often dispersed among these profiles.

### **How have the training profiles of the agronomist for animal management in Cuba evolved?**

In the period from 1900 to 1960 the study plans were mainly directed to the training of an agronomist to work in the production of sugarcane. In the decade of the 60s there were numerous events in our countries that significantly impacted the training of the agronomist; In this context, the creation of faculties of agronomy as part of Higher Institutes or Universities in all the provinces of the country, the foundation of the Ministry of Higher Education, the creation of the first scientific research institutions of the agricultural sector, the emergence of the Central Agricultural Commission, the elaboration of development programs of the agricultural sciences, and the design and implementation of the First National Study Plan (PE-A) to train agronomists. (Torres, González and del Pozo, 2001)

The aforementioned study plans A diversified the fields of professional action, in this way and with the intention of attending the livestock are introduced into the training program content related to animal genetics, food and animal husbandry of bovine, porcine, equine, ovine -caprina, poultry and cuniculture, taking advantage of the facilities and specialized personnel of the newly created Institute of Animal Science (ICA), which ensured a solid zootechnical base of the agronomist.

In the years 1964, 1969 and 1972 professionals were trained under the agronomist-livestock profile in the agronomy schools of the Faculties of Agricultural Sciences, of the University of Havana, Universidad de Oriente and the Central University of Las Villas (Torres, González and del Pozo, 2001), all with a solid training in animal management, an issue that allowed these generations to display an excellent performance in the transformations of Cuban livestock and a valuable contribution to the pedagogy and didactics of agricultural sciences, in which competition have been formed at different levels dozens of generations of agronomists, livestock engineers, veterinarians, among other specialties

At this stage, especially between 1972-1988, other specializations were derived from the Agronomy study plan, which, like the Livestock, were called narrow profile careers, such as irrigation and drainage, plant health, forestry, which later would function as careers independent in the Higher Institutes of Agricultural Sciences that were created in the different regions of the country (Torres, et.al, 2001)

In 1986 and 1987 the congresses of the Communist Party of Cuba and the Federation of University Students took place, which helped to mature conceptions to elevate the quality of the preparation of the agronomist, for the criticisms that were made to the narrow profile of the engineers of the agronomic branch Carracedo (2012), in this way the assimilation of the international pedagogy and the influence received from the Higher Agricultural School of the socialist countries of Europe led to the elimination of

narrow-profile careers in 1989 to make way for the training of engineers Integral agronomists (Torres, González and del Pozo, 2001)

Since then, this profile received as social commission to intervene in the agricultural production systems in order to generate products of vegetable and animal origin at the same time, however, after three decades of having started the training of the agronomist under this professional model the results are not they have materialized to the extent expected, since their level of insertion in livestock activity is still scarce and a high degree of dissatisfaction persists in the demands of products of animal origin in our population.

According to the Ministry of Higher Education (2006) and Horruitinier (2011), the training of agronomists in animal management is basically concentrated in the disciplines of Animal Husbandry and Agricultural Production, the former providing methods, techniques and scientific foundations for animal husbandry, and the Second, it constitutes the main integrating discipline, responsible for integrating the content aimed at forming the mode of action in agricultural production systems.

We consider that this formative conception has been gaining in maturity in terms of interdisciplinarity, the necessary link with the productive base and research as a training process, however, the fragmentation of contents by subject still persists to some extent, and remains to be resolved from the pedagogical practice the elimination of the space that separates the zootechnical from the agronomic.

### **What has happened to the performance of the agronomist in animal management in Cuba?**

In a general sense it is recognized that the productivity and development of the livestock sector has experienced a considerable deterioration since the beginning of the economic crisis of the 90s, discern in the essences that have led to the failure of animal production during this entire period it is extremely complex, this connotes aspects of a social, economic and formative nature, the latter being inherent to educational institutions related to the training of professionals in the agricultural sector.

In recent years the training of the agronomist has been widely studied from the pedagogy of higher education despite the fact that most of the research has been directed towards initial training, in which authors such as Carracedo, (2012) stand out; Romero, (2012); Torres, (2015); Rodríguez, Sánchez & Romero (2015), among others, nevertheless, it is notorious the few references that address from the undergraduate the training of the agronomist in aspects related to animal management.

## **How are the formative problems of the agronomist for animal management reflected from the graduate?**

A review of the academic programs aimed at postgraduate training for Agricultural Engineering developed by Cuban research centers and universities such as: National Center for Agricultural Health, (2011), Universities of Holguin, (2019), Central University of Las Villas, (2017), among others, allows to appreciate in their designs and formative projection a high degree of specialization, with a marked inclination toward the contents of plant production.

We value these practices as inadequate for the integral performance of the agronomist, since it reduces their motivation, commitment and sphere of professional action to the agronomic tasks linked to the management of vegetable production, leaving aside animal production.

From the didactic perspective, postgraduate training in Agronomy has been marked by the imparting of disciplinary contents, fragmented by subject, in many cases decontextualized, all of which provoke in the first instance rupture of the formative intentionality of the broad profile approach that characterizes the initial training, as it limits the postgraduate training and the effectiveness of the systematization of the contents of integrated animal management to the rest of the agronomic tasks that take place in the agro-productive contexts.

Consequently, there is a limited response of agronomists from the agro-productive practice for the integral and interdisciplinary application of the training contents that allow them to efficiently manage the process of animal production from the integration of the zootechnical with the agronomic, because not yet the systematization of animal management is sufficiently recognized as a component capable of articulating and invigorating the integral work performance of this professional, considering the particularities of each agricultural production scenario.

## **Conclusions**

It is necessary to deepen in the professional pedagogical process of the agronomic formation with the intention of eliminating the intermaterial barriers approaching this process from a holistic perspective, so that the agronomists are in better conditions to assume the current approaches of sustainable agriculture from the integrated systems and diversified. Graduate training for agronomists has been marked by the delivery of disciplinary contents with a high degree of specialization and with a marked inclination toward the contents of plant production, to the detriment of animal production.

The systematization of animal management as a component capable of articulating and dynamizing the integral work performance of this professional, considering the particularities of each agricultural production scenario, is still not sufficiently recognized.

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