



Scenarios of the Historical Development of Scientific Research in Nicaragua, period from 1950 to 2021, Genesis and Perspectives

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ABSTRACT

The modern world is very dynamic and complex, with accelerated evolutionary changes that lead to new challenges and challenges every day. The human being is facing every day emerging problems of greater dimensions, of multicausal origin and multidimensional effects. Therefore, it is very important to reflect on this development of human research in Nicaragua, in order to know better where we come from and where we are going, its genesis and perspectives.

1. INTRODUCTION

The modern world is very dynamic and complex, with accelerated evolutionary changes that lead to new challenges and challenges every day. The human being is facing every day

emerging problems of greater dimensions, of multicausal origin and multidimensional effects. Therefore, it is very important to reflect on this development of human research in Nicaragua, in order to know better where we come from and where we are going, its genesis and perspectives.

In the current context, pre, during and post-pandemic context of COVID 19, the words of Ph.D. José de Souza Silva become more topical: “Humanity is witnessing the dawn of a new era, ... there is a time of change that is changing the time we live in.... change of epoch, institutional change and change of paradigms (De Souza Silva, 1999).

In this global context, a set of processes of educational, technological, socio-economic transformations, etc. Occurs in Nicaragua. These are aimed at the continuous improvement of the quality of education at all levels in Nicaragua, with special importance to the quality of university education and research at the undergraduate and postgraduate levels. In this sense, the legacy of the Rector Magnificent Elmer Cisneros (R.I.P.) takes on special validity: “*Let us ensure that every day what we do is of the highest quality, but quality not only goes through the high scientific domain that is important, it also goes through the human quality of those of us who are in this alma mater*”.

In Nicaragua, there is a context of very dynamic institutional change, which makes it necessary to conceptualize in an appropriate way the meaning of institutional innovation, which from the contextual vision is a different idea that moves away from the classic way of innovating, which establishes a new way, where it is necessary to understand the *change of epoch* and the emergence of new paradigms. In this sense, institutional innovation from the contextual vision differs in a classic way from innovation, universal, mechanical, neutral, being the institutional innovation necessary in the study of localities, from a sociocultural perspective, consistent and committed to the context and social interaction that is needed (De Sousa Silva & et al., 2014).

In this context of the change of epoch experienced by humanity, De Sousa Silva (2000) highlights:

The importance of constructing indigenous frameworks of reference that support the (i) interpretation of the genesis and contradictions of the change of epoch; (ii) projection of the implications for us of the characteristics and contradictions of the emerging epoch; and, (iii) development of strategies that allow us to build a new foundation for sustainability (p. 3).

According to De Sousa Silva (2000), “These indigenous guiding frameworks must include, in their construction, history and contexts that bring meaning to the future needs, realities, and aspirations of each nation and organization” (p. 3).

The historical development of the scientific research in Nicaragua, has *its genesis* in the mid-twentieth century with the creation of the Agricultural Technical Service (ATSN) in the Nicaraguan agricultural sector. The NATS created the scientific and technological bases from

1954 in the Experimental Center “La Calera” to the rest of the Experimental Substations in the country until 1965. In its genesis, scientific research in Nicaragua arose as a need to improve the production of basic grains, with direct support from CIMMYT and this allowed to contribute to the technological development that was later promoted by the Ministry of Agriculture (MA) and the Central Bank of Nicaragua in the 60s and 70s, thus creating the experimental centers of the country.¹

The ATSN emerged as an “Agricultural Cooperative Program between the Government of the United States of America and the Government of the Republic of Nicaragua (Managua, 1950)”, being approved on June 30, 1953 and Published in La Gaceta, Official Gazette No. 169 of July 23, 1953 (LaGaceta, 1953).

In its historical development, the in research in Nicaragua has evolved from the in ATSN 1954, to reach today *the Network of Technological Development Centers of Nicaragua, initiated the year 2020 to date and that continue to operate in the INTA 2021.*

An important part of the genesis of scientific research in Nicaragua was at the beginning of the 80s, when the Medical-Surgical Specialties of UNAN-Managua began. The relevant facts that stimulated this genesis are highlighted by Fisher Chavarría (2021), as follows:

“The foundation of the Faculty of Medicine in Managua, with students transferred from the Faculty of Medicine of León, in the early 1980s, the beginning of the medical-surgical specialization programs, in 1982, and the foundation of the National Autonomous University of Nicaragua (UNAN-Managua), as an independent institution, also in 1982” (p. 8).

Since its genesis, the historical development of the Scientific Research in Nicaragua has occurred with many ups and downs and ruptures of paradigms, thus marking *different scenarios that go hand in hand with the context of institutional changes in the life of the country.* Different contexts and profound institutional changes marked by the heroism of the Nicaraguan people, their creativity and resilience, which have made possible the historical development of indigenous research in Nicaragua.

In this article, a first approach is presented from the perspective of the author and that, surely it will be necessary to enrich it with the participation of many other relevant actors, academics, researchers, producers, historians, sociologists, anthropologists and other social actors, who undoubtedly have been an important part of this historic development, to contribute and enrich this first approach presented here.

It is evident that between mace the different historical epochs that have existed throughout the history of the country, A lot better be the knowledge of the *current reality, very*

1. Interview with Eng. Laureano Pineda, founding researcher of the Agricultural Technical Service from Nicaragua (ATSN).

dynamic and Complex, own of the Information, Knowledge and Learning Society of the XXI century, now bequeath to propose various strategies for the perspective development of the research scientist of the country, based on the R&D&I Model of the UNAN-Managua, as technical support to contribute to the sustainable human development of the family Nicaraguan with vision, identity and commitment to the people Nicaraguan (Pedroza M. E. The R&D&I Model of the UNAN-Managua, 2015).

This article is presented, with the general objective of analyzing *the Scenarios of the Historical Development of Scientific Research in Nicaragua period from 1950 to 2021, Genesis and Perspectives*, highlighting the achievements in the last five years, in education and postgraduate research developed in the Faculty of Medical Sciences of the UNAN-Managua.

2. DEVELOPMENT

2.1. Scenarios of the Historical Development of Scientific Research in Nicaragua period From 1950 to 2021.

The concept of historical epoch of Manuel Castells, quoted by De Souza Silva J. (2000), in his book *The Rise of the Network Society* states that: “a historical epoch changes when the relations of production, power relations, human experience and culture are transformed qualitatively and simultaneously” (p. 3).

Precisely, *the different historical epochs in the life of the country, have marked socio-economic conditions and significant institutional changes*. Institutional areas that were provoked first by the context of domination inherited from the time of the Spanish colony and then given by the socio-economic context of backwardness, poverty and secular domination, product of the military interventions of the United States, until the liberation of the Nicaraguan people with the overthrow of the Somoza dictatorship on July 19, 1979.

The scenarios of the historical development of scientific research in Nicaragua can be classified *into five major historical scenarios*, which are described as follows, according to (Pedroza M. E., Organizational Innovation of UNAN-Managua, 2016).

Scenario I: The Beginning: Period from 1950-1960 to 1979, scientific research begins without having the minimum conditions as a country, rather they were efforts of foreign projects in Nicaragua, the ATSN and the NIAT of the 70s.

Scenario II: A Dream and Struggle: Period from 1979 to 1990, scientific research begins as a challenge and challenge, in conditions of a country devastated by the war of liberation against the Somoza dictatorship. In this period 1979-1990, the initial impulse was given for the development of scientific research in the country, with the creation in 1982 of:

(a) Nicaraguan Council of Higher Education(**CNES**), (b) the **UNAN-Managua**,(c) the Research and Postgraduate Directorates (**DIP**)in all the universities of the CNES, (d) The University Day of Scientific Development(**UDSD**) and (e) in the agricultural sector, the strengthening of the network of experimental centers of the country.

According to Fisher (2014),cited by (Fisher Chavarría, 2021), the Governing Board of National Reconstruction (JGRN), headed by the Commander of the Revolution Daniel Ortega Saavedra, decided to start the Specialization of Nicaraguan doctors in our own country, for which the Ministry of Health and the National Autonomous University of Nicaragua, based in León, had to be coordinated, at a time when a large number of professionals and technicians had gone abroad, among which, an important part, were specialist doctors.

In this period, three historical events have special importance for the development of the historical of Scientific Research in Nicaragua: a) At the beginning of the 1980s, the foundation of the Faculty of Medicine in Managua, b) the beginning of the Programs of medical-surgical specialization, in 1982, and c) the foundation of the National Autonomous University of Nicaragua (UNAN-Managua) in 1982 (FisherChavarría, 2021).

Scenario III: Survival and Stagnation: Period from 1990 to 2001, efforts for scientific research are continued in a context of greater challenges, in conditions of a country devastated by the post-war aggression of the United States government against the Nicaraguan people. A period characterized rather by *the survival and stagnation of scientific research began*, in which the main struggle of the universities was rather for the 6%, which the right-wing governments of the day refused to recognize the universities. In the agricultural sector, scientific research was guided by the agenda of international research centers such as CIMMYT in Mexico, CIAT in Colombia, IRRI, ICRISAT, ICVRD, etc.

This period was characterized by many turbulences and uncertainties, it is noteworthy that, in 1992, the Postgraduate Directorate and the Research Directorate of UNAN-Managua were created separately.

On the other hand, in the agricultural sector there were institutional changes that came from outside, given the context of socio-economic domination of the structural adjustments promoted by the International Monetary Fund (IMF), the Inter-American Development Bank (IDB) and the World Bank (WB) throughout Latin America and the Caribbean. In this institutional context in the Nicaraguan agricultural sector led by NIAT, special efforts were made to advance in the midst of adversity, achieving the development of scientific research oriented towards technological innovation with relevant advances expressed in the NIAT Technology Catalogs 1996 and 1977, through which a total of 185 new technologies available to Nicaraguan agricultural producers are released.

In this period, the Catalogue of Technologies of 1996 and 1997 were created (Pedroza M. E., Catalogue of Technologies, 1996 and Pedroza M. E., Catalogue of Technologies 1997, 1997). Likewise, *the Methodological Guides of the Areas of Experimentation and Technological Validation (AET and AVT) and their Field Books*, which by their nature and very original content are a milestone for the development for scientific research in Nicaraguan agriculture (Pedroza, Oporta Tellez, Pineda, & Obando, 1998).

In August 1999, *the concept and institutional document of the NIAT Technological Development Centers was created*, replacing the initial CONCEPT of THE NIAT of the Experimental Centers, which were characterized by having little or no link with the actors of local and territorial agricultural development (Pedroza, Oporta Tellez, Pineda, & Obando, 1998).²

In the second half of the 1990s, ADESO “Las Segovias” was founded, a Nicaraguan NGO with funding from the Dutch SNV. ADESO “Las Segovias” was, until 2005, a very successful scientific research organization. All the research funded by ADESO “Las Segovias” was of a competitive nature, it was fulfilled through a Competitive Fund that oriented its results to the sustainable development of the Segovian region, with an agenda whose critical route specified the application of *the mixed approach* of the research processes, applying the integration of qualitative-quantitative methods and techniques.

The Polytechnic University created the “Master in Qualitative Methods of Scientific Research”, operating successfully so far. The UNA in 1994, began to teach the subject of Scientific Research Methodology.

Scenario IV: Technocracy and Survival: Period from 2001 to 2006, efforts for scientific research are continued *in a context of a country facing enormous challenges, full of uncertainties, unemployment, hopelessness and institutional instability*. This period is the dawn of the XXI century and the advent of the “Society of Knowledge, Computerization and Learning”, which frames at the global, regional and local level the evolutionary dialectic *of changes focused on the paradigm of technological innovation and entrepreneurship*. There was a period characterized by the survival of public sector universities and the stagnation of scientific research, in which the main struggle of the universities was for survival and for the 6%, which the right-wing governments of the day refused to recognize the universities.

At the dawn of the twenty-first century, on November 1, 2000, the Foundation for Agricultural and Forestry Development (FUNFD) was created as an organization -NGO- that promoted public-private partnerships and technological innovation in the Agricultural and

2. On the NIAT website (<https://inta.gob.ni/#>), you can consult the library section, where you can find technological information from recent years that is presented in numerous Manuals, Technical Guides and 15 documents of Strategies for Production. However, documentary references prior to 2006 are not available.

Forestry sector. FUNFD administered in its first five years of life, the Competitive Research Fund (CFR) and the Competitive Fund for Technical Assistance (CFTA).

It stands out in this period, the realization of the course on “*Management of Technological and Institutional Innovation under the Strategic Approach*”, taught by Dr. José De Souza Silva, in February 2002, as well as the constitution of the *Agricultural Technological Innovation Network of Nicaragua*, as well as the first organizational innovation effort carried out in Nicaragua (De Souza Silva J., *Innovation Management*, 2002).

Scenario V: The Take-Off of Research towards Sustainable Human Development:

Period from 2007 to date. With the electoral triumph of the FSLN on November 6, 2006 and its return to government, in a context of new and greater challenges and challenges, the socio-economic and technological conditions of a stable country, the safest in the Central American region, with more and better employability rates, with greater foreign investment, with greater support for the universities organized in the Nicaraguan Council of Universities (NCU), etc. have been created. In short, a country that, if it has a future and a great hope for the restitution of social and human rights of the Nicaraguan family, a government that, if it is giving greater priority / attention to education, scientific research, innovation and entrepreneurship, at all levels.

In this period of the take-off of research towards sustainable human development, there is already a National Plan for Sustainable Human Development oriented by the Nicaraguan Council of Science and Technology (NCST), in which, unlike the previous period, the universities organized in the NCU, are the leading actor of Science, Technology, Innovation, Entrepreneurship and Society (STIES), to promote and support sustainable human development of the Nicaraguan family.

Thus, an institutional policy of STIES very clear in Nicaragua, for the sustainable human development of the Nicaraguan DHS family is implemented. This means the ethical commitment to maintain the indissoluble bonds of science and technology for the development of the Nicaraguan family.

2.2. The Take-off of Scientific Research in Nicaragua towards Sustainable Human Development

In Nicaragua, in the period from 2007 to date, institutional support and the development of scientific research are best. It is a period characterized by the universities, together with the GRNU are in full growth of the scientific knowledge base to improve the level and quality of life of the Nicaraguan family. The main struggle of universities is to develop quality in scientific education and research, to modernize in science, technology, innovation and entrepreneurship. Currently, it is betting on institutional innovation for sustainable human development and this leads to the

accelerated modernization of the higher education system, both undergraduate and graduate (Pedroza M. E., Institutional and Organizational Innovation of Research at UNAN-Managua, 2018).

In the period from 2007 to date, it is the takeoff of *research towards sustainable human development, in Nicaragua excellent actions have been promoted that have allowed a significant advance in the processes of research, innovation and entrepreneurship in the country*, efforts that have been guided by initiatives from SCST, the NCU and the human talents of each university in each territory of the country.

Among others, advances are unleashed:

1. The Conference on Science and Technology and the Territorial ExpoCiencia. Promoted with the NCU and the SCST, which are developed as inter-institutional spaces to share and disseminate the advances in Science, Technology and Innovation, which universities have to facilitate the integration of academia with different communities and the (Pedroza, Report of the JUDC 2016, of the UNAN-Managua, 2016)
2. Latindex in Nicaragua: August 3, 2009, the CNU, through M.A Ruth Velia Gómez Centeno of the ANU, assumed the Coordination of LATINDEX in Nicaragua. This was a great step for the modernization of scientific research processes, since it made visible the present and future advances of Nicaraguan scientific publications. Gómez (2015), highlights that the current state of Nicaraguan journals, based on the different Latindex products (the Directory, the Catalog and the Electronic Journals), refers to the editorial quality criteria that have been difficult to meet in Nicaraguan journals, *mentions the advances in the first six years of integration into the system (2009-2015)* among which stand out in addition to the training activities for editors, the visibility in the Nicaraguan journal platform, the Latin American Journal On Line (LAMJOL) magazine portal.

By the year 2015, the situation of Latindex journals and advances in Nicaragua was as follows:

- (a) In 2009 Nicaragua registered eleven journals in the Directory and one journal in the Catalog, (b) In 2011 and increase of 61 journals identified and entered in the Directory could be observed, (c) In 2015 168 journals were available in the Directory, 11 in the Catalog and 88 Electronic Journals. (d) Of the total number of journals in the Directory, 59.5% (100 journals) are scientific and cultural journals, 28.5% (48 journals) are technical and professional journals *and only 11.90% (20) are*

scientific research journals. The topics that stand out in the journals in *the first place* are those of Social Sciences, *second place* the Multidisciplinary and *in third place* the Agricultural Sciences (Gómez, 2015).

3. *In March 2010: A New Model of Technological Innovation for Nicaraguan agriculture emerges*. In this publication presents an effort to analyze the relationship between Science, Technology and Technological Innovation, in the context of the agricultural and forestry sector of Nicaragua. The paper outlines the historical evolution of the technological model that has prevailed in Nicaraguan agriculture.

Likewise, the path for the adoption of a systemic and contemporary approach to undertake an organizational and institutional innovation in the Nicaraguan agricultural and forestry field is highlighted, given the process of globalization and competition focused on technological innovation, as a catalytic process that prepares us to face climate changes, new institutional challenges and overcome global technological and social gaps, all to contribute to the alleviation of rural and urban poverty in Nicaragua (Pedroza, A New Model of Technological Innovation, 2010).

4. *In April 2011: The Knowledge Management Network of Matagalpa and Jinotega (GESCON) emerges*.

Organized and directed by Dr. Jairo Rojas Meza. This Network is a pioneer and an example of Organizational Innovation in Nicaragua. The Network (GESCON), is constituted as an instance that since its birth promulgates as a principle the creation of a space where the experiences, knowledge and commitments of the different sectors of the region are combined, to promote sustainable rural development. The network promotes the consultation of actors to put knowledge, expectations and sincere approaches at a broad table, under a logic of constructive criticism and a true commitment to the development of the territory (Rojas & Espinoza, 2013).

5. *In 2011: The creation of the Vice-Rectorcy for Research, Postgraduate and University Extension (VRIPEU) and the historic fact of initiating the efforts of a Research Directorate of UNAN-Managua (DIRINVES), based on the UNAN-Managua R&D model*, which implies a multidimensional vision of scientific research processes, *one vision Holistic, Systemic and Anthropocentric* which leads to integration of the Research, Innovation and Entrepreneurship processes. The R&D Model was approved in November 2011 by the Research, Postgraduate and Extension Commission University of the UNAN-Managua. Nevertheless, for several reasons was published and presented until June 10, 2015 (Pedroza M. E., El Modelo I+D+i

de la UNAN-Managua, 2015). The updated image of the UNAN-Managua R&D model, Was presented in October 2020, on page 6 of the article "Achievements and advances of the Diploma, Master's and Doctorate Program in Biomedical Research of the Faculty of Medical Sciences, First Cohort period 2017-2019" (Pedroza, Achievements and Advances of PROMIB 2017-2019, 2020).

The new context institutional created from of the model UNAN-Managua R&D&I, allowed to implement a new *Organizational and Institutional Innovation of Research at UNAN-Managua, which prevails since 2011 to this date, highlighting the operation current of Of PMaster's and two Programs of PhD in Scientific Research.*

6. February 13, 2015 : *The Nicaraguan System of Agricultural Research and Innovation is created (NSARI-)*. The NSARI was organized and directed by Dr. Jairo Rojas, in his capacity as Co-Director of INTA. Since its creation, the NSARI has taken up the conceptual and methodological basis contained in the book "A New Model of Technological Innovation for Nicaraguan Agriculture". The NSARI was conceived as a system of institutional actors, which brings together the plurality of actors of research, innovation, education, promoted by the new NIAT, Producing Families, Universities, Private Sector, NGOs and International Cooperation, etc. This organizational innovation aims to generate synergy and complementarity between the different institutional actors.

The SNIA promotes horizontal coordination, mutual cooperation, Multi, Inter and Trans disciplinary approaches and the joint action of territorial development actors, through a model of alliances, dialogue and consensus among local development actors. From the beginning of the SNIA in November 2014 to date, UNAN-Managua stood out for its full participation and institutional support to INTA in the national effort of the installation and development of the *Nicaraguan Agricultural Research and Innovation System -SNIA-* (UNAN-Managua. Research Directorate, 2015).

7. **The Strengthening of the National Council of Universities (NCU).**

In the period from August 2018 to date, *with the election of our Rector of UNAN Managua as Rector of the NCU, M.A. Ramona Rodríguez Pérez and in January 2021 with the appointment of M.A.. Jaime López Lowery who goes from Vice General Dean of UNAN Managua to Technical Secretary of the NCU.* In this way, with the contribution of these two talents, the NCU is strengthened in the field of undergraduate and postgraduate education, as well as research and technological innovation, towards the sustainable human development of Nicaraguan society, with better institutional STI policies in place and better resources provided by the central government for

universities. In this period, the Nicaraguan universities organized in the NCU, *are leaded by UNAN-Managua*.

At the level of the NCU, the participation of the UNAN-Managua in the *XV Meeting of Research, Postgraduate and University Extension*, held on September 5, 2015 at the UNAN-León under the slogan “*Challenges and challenges for Research, Postgraduate and University Extension*”, where UNAN-Managua presented the central conference of the XV Meeting, *the Research Management Model: R + D + i Model of the UNAN-Managua* (UNAN-Managua. Research Directorate, 2015).

Again, the participation of UNAN-Managua in the *National Meeting of Research, Postgraduate and University Extension*, convened by the NCU and , made the 13 of November 2020 in el Olof Palme Convention Center. This event that was inaugurated by our Rector of UNAN Managua and Rector of the CNU, Cra. Ramona Rodríguez Pérez, as well as retired General Omar Hallesleven, Minister Advisor of our GRUN Presidency. In this event was presented the R&D model and *his Transformative Role for the DHS family Nicaraguan* (Pedroza, *The R&D&I Process and its Transformative Role*, 2020).

In the period of development from 2011 to 2021, it is a period marked by a context of very important institutional changes in the UNAN-Managua and the search to improve every day its own conceptual, philosophical, pedagogical, methodological and technological references. UNAN-Managua has been continuously evolving to achieve the highest level of continuous improvement and quality of education, research and university innovation, which is needed for the human development of Nicaraguans, according to its five functions: *Education, Research, Extension, Internalization and Management and Administration*.

Due to its importance, some institutional changes that have occurred from 2011 to this date are outlined, *in a set of rigorous academic processes, very reflective, detailed and deep, methodological and scientific*, processes that have modernized the institution, demonstrating that UNAN-Managua is capable of reinventing itself, of transforming itself, to contribute to the social and technological transformation of Nicaraguan society.

In the field of research and innovation, some relevant institutional changes for the Sustainable Human Development of the Nicaraguan family are the following:

1. Educational Model, Regulations and Methodology for Curriculum Planning 2011 (UNAN-Managua, 2011). The General Regulations of the University Conference on Scientific Development (JUDC) of the year 2014 (UNAN-Managua, 2014). Aswell as the recent process of currilar transformation by competences from the year 2019.

2. The creation of the Master's Program in Scientific Research "*Master in Scientific Research Methods (MEDINV)*" of FAREM Carazo, UNAN-Managua, proposal created by the Research Directorate of UNAN-Managua and approved by the University Council of the UNAN-Managua on December 6, 2013 (Pedroza, Master MEDINV, 2013).
3. The creation of the Doctoral Program "*Management and Quality of Scientific Research (DOGCINV)*" of FAREM Estelí, UNAN-Managua, a proposal created by the Research Directorate of UNAN-Managua and approved by the University Council of the UNAN-Managua on January 19, 2016 (Pedroza, Report of the First Anniversary DOGCINV, 2017). In 2021, the DOGCINV Doctoral Program of the UNAN-Managua is strengthened, implementing the II Cohort in the FAREM Estelí, the III Cohort in the Faculty of Medical Sciences and the IV Cohort in the FAREM Carazo.
4. The creation of the Master's Program in "*Biomedical Research (PROMIB)*" of the Faculty of Medical Sciences, First Cohort period 2017-2020. Approved by the University Council of the UNAN-Managua on June 19, 2020 (Pedroza, Achievements and Advances of PROMIB 2017-2019, 2020).
5. The creation of the Doctoral Program in "*Biomedical Research (PRODIB)*" of the Faculty of Medical Sciences, First Cohort period 2017-2020. Approved by the University Council of the UNAN-Managua on December 19, 2015.
6. The implementation of the Institutional Agreement between the Faculty of Medical Sciences UNAN-Managua-MINSA, with the fulfillment of the *Online Postgraduate Courses*, aimed at resident doctors of the medical specialties in the hospitals of MINSA and non-MINSA, during the years 2018, 2019, 2020 and 2021 (Pedroza, Achievements and Advances of PROMIB 2017-2019, 2020).
7. The development of the Moodle Platform to support these Master's and Doctorate programs of the Faculty of Medical Sciences, constituting the technical support for the development of the *Processes of Postgraduate Virtual Education*. URL: msceducav.edu.ni.

In the period of 2011 to date, in particular, the UNAN-Managua has been strengthened with the implementation of twelve Doctoral Programs, mainly financed with its own resources and with the cooperation of different sister universities among others, the University of Zulia of Venezuela, the University of Havana and the Central University of the Villas of Cuba, the Autonomous University of Barcelona, Carlos Tercero of Spain, the Graduate College of Puebla

Mexico, the University of Guadalajara Mexico, the University of Calagry of Canada, the University of California, Los Angeles Campus, etc.

In the period of 2016-2020, within the strengthening brought by the Doctoral Programs of UNAN-Managua, it is staked for its relevance *for research as a transversal axis to the different areas of knowledge*, with the implementation of the Doctoral Program “Management and Quality of Scientific Research DOGCINV” in FAREM Estelí, UNAN-Managua, First Cohort. The DOGCINV, is a successful Program of the UNAN-Managua, which showed that it worked very well despite the difficult years 2018 year marked by the failed and defeated coup d’état, the 2019 year marked by the Dengue epidemic and the year 2020 year marked by the Coronavirus pandemic. Despite so many adversities, the DOGCINV First Cohort 2016 to 2020 was carried out at the Faculty of Estelí, *graduating 94.12% of its doctoral students* (Pedroza, DOGCINV First Cohort Program, 2020).

The Doctoral Program “Management and Quality of Scientific Research” DOGCINV III Cohort of the Faculty of Medical Sciences, was inaugurated on Saturday, March 6, 2021, is a Doctoral Program aimed at Professionals of different careers and specialties, who work at the UNAN-Managua or at other universities of the CNU and the institutions of our GRUN government.

The graduation of the “Doctoral Program in Management and Quality of Scientific Research” DOGCINV III Cohort, *is a professional who has the competences to carry out original scientific research of high level*, guided by the Holistic, Systemic and Anthropocentric vision of the R + D + i Model of the UNAN Managua, as a strategy for the good life of the Nicaraguan family.

The doctoral students of the DOGCINV III Cohort, of the Faculty of Medical Sciences, UNAN-Managua, are professors-researchers from different institutions in Nicaragua. 75% of men and 25% are women, with an average age of 34.95 years, representing a 95% confidence interval (95% CI) of: *L.I. = 30.89 and L.S. = 39.00*. 85% of them are from UNAN-Managua, 5% of them are from the Polytecnic University, from Private Company of the Commerce Sector, Private Company of the Health Sector, respectively, which sum up 15% (Pedroza, DOGCINV III Cohort, 2021)

The DOGCINV III Cohort of the Faculty of Medical Sciences, has seven relevant modernization elements, which allow it to develop the competencies required by the program itself, in shorter times than the traditional pre-established, such as:

1. Developed its own Moodle Platform, so it has all its courses online.
2. Developed its own Communication Platform through go to meeting, so it has the ability to hold teleconferences with national and international experts.

3. Developed the Quarterly Monitoring and Evaluation System, to guarantee the quality and relevance in the fulfillment of its objectives.
4. Developed a New Curricular Design *in seven modules*, which allow you to guarantee the fulfillment of your objectives in shorter times than the traditional pre-established ones.
5. Developed a New Institutional Management Model based on the financial self-sustainability of the DOGCINV program.
6. Availability of the founding Teaching Team of the DOGCINV First Cohort.
7. Availability of the Team of Scientific Tutors that guarantees the personalized attention of the DOGCINV III Cohort doctoral students.

2.3. Perspective of the historical Development H of the Scientific Research in Nicaragua

At the *perspective development of Scientific Research in Nicaragua*, according to the new strengthened institutional context of UNAN-Managua, CNU y CONICYT, the proposal of *Seven Transformations Proposals short, medium and long term, always thinking of research as a culture institutional for the good living, for the human development of the Nicaraguan family* (Pedroza, The R&D&I Process and its Transformative Role, 2020).

1. Contribute to the Development of the SNIIA, SIIMINSA, CNU, INATEC, MEFCCA, for its impact on productivity and socio-productive innovation for the Human Development of the Nicaraguan family. Responsible institutions: UNAN-Managua-CNU-CONICYT.
2. Develop the Nicaraguan System of STI Indicators, based on the scientific contributions of Dr. Bonilla (Bonilla Anduray, 2020). Responsible institutions: CNU-CONICYT,
3. Develop the Nicaraguan System of Researchers. Responsible institutions: CNU-CONICYT.
4. Develop the Nicaraguan Subsystem of Postgraduate Education and Research. Responsible institutions: UNAN-Managua-CNU.
5. The creation of the Bottom Nicaraguan for the Development of Competences in R&D&I. Responsible institutions: CNU-CONICYT.
6. The creation of the Fund of Academic Excellence in R + D + i “Ricardo Morales Aviles”. Responsible institutions: UNAN-Managua- CNU-CONICYT.

7. The creation of the Institute of Biomedical Research (INVBIOM). Responsible institution: Facultad de Ciencias Médicas-UNAN-Managua (Pedroza, INVBIOM, 2019).

3. CONCLUSIONS

1. *The Genesis* of the historical development of the investigation in Nicaragua was shown, which began with the foundation of the ATSN in 1954, evolved from that year until reaching the Network of Technological Development Centers of Nicaragua, initiated in 2020 and which continue to function in NIAT today. An important part of *the genesis* of scientific research in Nicaragua was the historical fact of having started the Medical-Surgical Specialties of UNAN-Managua in the early 80s.
2. *The Scenarios* of the historical development of scientific research in Nicaragua, period from 1950 to 2021, were examined and supported, which are based on five major scenarios, they are: *Scenario I: The Beginning: Period from 1950-1960 to 1979. Scenario II: A Dream and Struggle: Period from 1979 to 1990. Scenario III: Survival and Stagnation: Period from 1990 to 2001. Scenario IV: Technocracy and Survival: Period from 2001 to 2006. Scenario V: The Take-Off of Research towards Sustainable Human Development: Period from 2007 to date.*

Scenario V stands out, with the strengthening of the National Council of Universities (CNU). In the period from August 2018 to date, with the election of our Rector of UNAN Managua as Rector of the CNU, M.A. Ramona Rodríguez Pérez and in January 2021 with the appointment of MA Jaime López Lowery who goes from Vice-Rector General of UNAN Managua to Technical Secretary of the CNU.

Likewise, in the period from 2016 to 2021, it stands out *for its relevance for research as a transversal axis to the different areas of knowledge*, the implementation of the *Doctoral Program "Management and Quality of Scientific Research DOGCINV" I Cohort 2016 to 2020 in FAREM Estelí. In 2021, the DOGCINV Doctorate of the UNAN-Managua is strengthened, implementing the II Cohort in the FAREM Estelí, the III Cohort in the Faculty of Medical Sciences and the IV Cohort in the FAREM Carazo.*

3. It was based on *the Perspective* of the historical development of scientific research in Nicaragua, which is presented in *Seven Transformations proposed in the short, medium and long-term.*

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