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Status of the Investigation and Teachers Perception, in Autonomous University of Guerrero, Mexico

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Abstract **– The persistent changes that scientific and technological progress has in which society is submerged, demand to the teachers base of universities, through schools, teach students to link theory with practice, to explore, transform or change it to scenes of daily life, with the whole intention to promote enthusiasm for investigation. This research is a quantitative type with a cross-sectional design, using: Cronbach's Alpha method to determine the reliability of the instruments, the X^2 statistic, and the Kendall´s Tau- b and c statistics. 10 variables were studied. Results: 55% full-time teachers do investigation; 42% of them have an emphasis on their discipline with a practice and social orientation, 55% make 1 to 5 publications in 3 years, published in arbitrated journals, national and international collaboration is low, 93% do not receive funding to carry out investigation, a scarce 12% is in the National System of Researchers (SNI by its initials in Spanish), 62% full-time teachers are convinced that their training in methodology is scarce and they urgently need training in this area, where economic remuneration is a motivation to do this activity.**

Keywords **– Situation of Research in the University, Academic Production, Perception Related to Investigation by University Professors.**

I. INTRODUCTION

Industrial revolution started in the last third of the XVIII century, was the starting point to give way to capitalism and a new technique, which was mechanized industry, which immensely developed scientific study. The application of chemistry to agriculture and industry, laid the scientific base for the rational revolution of the economy and creation of new branches of production, based on science, causing the excessive concentration of the urban population, devastating regions dedicated to rural and craft activity (Gortari, 2016, p.376) [1].

This reference indicates that scientific research was not born together with universities, it was added in European institutions as a response to the demands posed by the industrial revolution in the second half of the XVIII century (Ibarrola, 1992) [2] . As a result of this need, European universities in the XIX century, until the beginning of the XX century, were leading institutes in research and education. They recruited leading investigators, teachers, and students from around the world to conduct advanced investigators and learn from the leading scientists of the day. At the same time, France and Russia universities also formed new investigation centers and institutes (Retana, 2009) [3].

In the United States, universities like Harvard and Yale followed the European research model; But at the end of the Second World War, the educational context changed, with the majority of the American universities leading in education and investigation in the world (ARAI et al, 2007) [4], by merging the university academic

system, education and research as the axis of progress ; while Europe continues to maintain its traditional model by focusing investigation in specialized institutes and barely in universities (ASSOCIATION ..., 2011) [5].

The way of doing research in both models have been guiding axes that have developed manufacturing-based economies, than in economies based on knowledge, which obey scientific study and trained workforce. At this time, competition is not linked to industrial capacity or directly to the availability of natural resources, but rather to intellectual property, to the skilled labor base, and to the knowledge (ARAI et al., 2007) [6].

This appreciation suggests that research should be recognized as the greatest wealth of humanity of great benefit to society; because through it, is possible to contribute improving the quality of life, which humanity is currently facing.

The Economics Nobel Prize, Gary Becker, 1992 (in Sierra, 2004) [7], highlighted that: "the economic success or failure of a nation no longer depends on technology or the machinery it possesses, but on what do with its people". This same author considers that:

We can apply thought to our university world: Let's make the student a researcher, critic, self-manager, generator of development, able to interact as a team with people of other knowledge and to propose alternatives with argumentation and a spirit of help towards the human being and the environment. Aiming to this purpose implies policies and strategies to form the trainers, think in terms of a country project so that among all the living forces, especially the universities, decrease the gap of the few Latin American participations in these knowledge struggles (p. 1).

II. INVESTIGATION AT UNIVERSITY

In the past, it was thought and continues to be thought that the university has an ideal field to promote research; a valuable place to do this activity, transform, develop the creative spirit and understand who we are, what world we live in. Has the social culture, the education of every one and the history of the past and present influenced in our way of thinking?

Through investigation, universities are the space, which empowers teachers and students to contribute new information and ideas to solve problems and the essential. To generate and strengthen knowledge in favor of a society that is in economic development.

Working in this way, training is enriched and practicing the knowledge acquired means more. Meanwhile, the teaching-learning process becomes more dynamic, and not a rote memory and indifferent learning that is limited to the mere repetition of theories. With research, there is the opportunity to continue with the significant contributions of other authors who have enriched scientific knowledge, since world development and progress are based on Higher Education and investigation (Pena, 2016) [8].

It should be said, then, that scientific research is the fundamental engine in all branches of knowledge and the proper use of this scientific knowledge can considerably improve the standard living of societies. In this direction, universities are anatomasia spaces for doing research, their main task is to produce new knowledge that supports the transformation of their environment (Blanco, 2004) [9].

For this reason, Rip (2011) [10] establishes that: "the challenge of science is its recontextualization in society. It also states that universities are places where we have to recontextualize science". This perception of

recontextualization is based on certain tendencies of a system derived from strategic science, from production of knowledge, and from the visible reflective modernization of science in institutions. The emergence of this new model in strategic science has been the alternative of research and changes in universities during the last 3 decades (Rip, 2011) [11].

In order to comply with the intended investigation of recent times, universities now require their teachers to be the main protagonists, who seek for specific answers to the demanded problems by the educational, social, cultural and economic environment, such in a city, state or country in which they are performing. Such responsibility demands universities to consider being centers of intellectual production and productivity that transcends inside and outside the classrooms, occupying the academic environment and research, as a generator of knowledge by university teachers, who are qualified to produce, review, and apply the results (Casanova and Pino, 2017) [12]. "The objective is for universities to be the centers of highest intellectual productivity, taking into account that in the academic field, investigation generates knowledge, while it must be considered a production process" Farci (2007) [13].

Jimenez "(1994) [14]considers that "productivity is the relationship between the quantity of visible products and the activity, linked to the investigation carried out by university teachers, that is, production is part of productivity". Albornoz (cited in Briceno and Chacin, 1997) [15] specifies productivity as "the performance of the professional role in teaching (undergraduate, postgraduate and extension) and in research, under criteria of quality, efficiency and effectiveness as dimensions of academic productivity". Bain (cited by Toro (1992) [16] considered efficacy and efficiency, he believes that "investigation productivity is the relation of efficacy (taken into account as the calculated products by the total obtained between the total of reference) and efficiency, thus being the expression of the inputs used to obtain the products".

However, although there are many conceptualizations regarding productivity and production, the difference is clear, as Farci (2007) [17] mentions productivity:

Is the relationship between inputs and products, while production is the quantity of a researcher's products (scientific articles, theses, memories, publications in scientific journals, books, essays, patents and participation in scientific events, among others), which is part of the productivity; both taken into account in a given period.

Investigation productivity in higher education institutions of universities is a very important indicator, for two factors, which according to Ruiz (2001) [18]:

The first is clearly related to its quality; and the second, because its evaluation allows to verify the achievement of the anticipated goals, identifying strengths and weaknesses of the investigation procedure, taking measures for the continuous improvement of the system and establishing the degrees of equivalent effectiveness and efficiency.

For this reason it is necessary to constantly evaluate the research productivity of an educational center (Farci, 2007) [19]. The reason that investigation in universities is an indicator of quality, requires an increase in productivity, greater links with the productive sectors, social relevance and services, being more participatory in diverse areas: local, state, national and international.

For the fulfillment of the universities with the delegated work in the field of investigation, it represents a first-rate activity; therefore, it is necessary for their higher education institutions to self-evaluate, value and on that

bases, plan, organize and within them, promote interest in research among their teachers, who contribute with the training processes in their daily life and give them make it possible to generate new knowledge to improve the regional development conditions, always in search of specific solutions to their environment needs (Casanova and Pino, 2017) [20].

And with the purpose of evaluating to what extent this productivity indicator is being achieved at the Autonomous University of Guerrero (UAGro), the objective of this study was: Identify the research situation, problems, motivations and perspectives that full-time teachers have in higher university schools (undergraduate level), to develop the investigation activity.

III. MATERIALS AND METHODS

The investigation is quantitative, because through it data was collected and analyzed to study the association or correlation between variables. Qualitative, because explain each of the results in terms of perspective and problems that full-time teachers have to do examinations, as well as the setting for research at the university, through data collection. There was a transversal design.

To determine the sample, The Statistical Yearbook of the UAGro (2018-2019) [21] was consulted, it was found that the institution, has 48 Schools of University Higher Education (Undergraduate), with 34,592, students and 1,226 teachers of whom 821 are with fulltime; 185 have a doctorate degree and 437 with master degree. For the purpose of this investigation, only full time teachers were considered, the sample was 29.23% (240) from 25% of the higher university schools undergraduate.

Two questionnaires were used to compile the information, conventionally applied. The first instrument was from Valencia et al. (2017) [22], evaluates 5 major aspects that are: Knowledge, promotion, perception, expectation, motivation; supplemented with items from Domingos and Martínez questionnaire (2016) [23], to identify the variables: Perception of the full time teachers of the UAGro, on the analysis; problems for the development of research in the full time teachers; economic remuneration as motivation to realize investigation and the association between variables that may influence to the good development of research in university institutions.

Table 1. Weighting of items for each investigation variable of investigation perspectives.

Variables	Code	Items	Number of Items	%
Perception of the investigation by the FTT (Full Time Teachers).	P I	1, 3, 5, 8, 9, 11, 12, 13, 19, 20, 21, 23	12	48
Problems for the development of investigation in the FTT.	PDI	2, 7, 14, 15, 16, 17, 18, 22, 24, 25	10	40
Financial remuneration as motivation to perform investigation.	FRI or REI (*by its initials in Spanish*)	4, 6, 10	3	12
TOTAL			**25**	**100**

The second instrument used was from the project: The Reconfiguration of the Academic Profession. Academic Research Network de la UNESCO (2010) [24] to evaluate: the investigation situation at UAGro, the variables were: research activities during the last three years; investigation emphasis, research activities,

academic contributions, number of publications, actions that the institution offers for its full time teachers to im--plement investigation and the main sources of financing.

To analyze the reliability of the instruments, the Cronbach's Alpha method was used, obtaining a level of reliability of .750%. (Good reliability of the survey) This measure assumes that the items (measured in the Likert scale type) measure the same construct and that they are highly correlated (welch & corner, 1988) [25]. Since the alpha value is closer to 1, the internal consistency of the analyzed items is greater.

The chi-square X2 statistic was used to determine if one variable influences the other. Kendall's Tau- b and c statistics were also used to determine the association between variables.

IV. Results of the Situation of the Research in the University

Table 2. General data of the full time teachers of the UAGro higher schools.

Age			**Antiquity**		
	Freq.	**%**	**Range**	**Freq.**	**%**
Under 35 years	30	13	5-15	71	30
Between 35 to 55 years	128	53	16-25	53	22
Over 55 years	82	34	26-35	54	23
Total	240	100	36-45	39	16
Gender			46-55	5	8
			Didn´t answer	21	9
Female	88	37	Total	240	100
Male	152	63	Academic grade		
Total	240	100			
Category			**Bachelor's degree**	9	4
Headlines	93	39	Master degree	134	57
Associates	139	58	Doctorate degree	94	38
Didn´t answer	8	3	Didn´t answer	3	1
Total	240	100	Total	240	100
Teachers in quality programs			SIN (*by its initials in Spanish*) National Research System	29	12
			PRODEP (*by its initials in Spanish*) Desirable Profile of the Program for Teacher Professional Development	82	34
			None	129	54
			Total	240	100

Source: Own elaboration.

Table 3. Status of investigation at the Autonomous University of Guerrero, Mexico.

Full Time Teachers (FTT) do research in %			**FTT that investigate with researchers from other countries in %**		**Emphasis of the research activities carried out by the FTT in the 2016-2019 school years in %**					
Yes	55	Total %	None	81		Nothing %	Little %	Regular %	Much %	Total %
No	45	100 %	Other	9	Theoretical base	21	12	34	33	
Research activities that have FTT in 2016-2019 in %			Spain	6	Based on discipline	20	8	30	42	
	Yes %	No %	United States	4	Social orientation	22	11	25	42	
Individual research work without collaborators	38	62	Total	100 %	Practice oriented	20	8	31	41	
Research work with collaborators	60	40	Academic contributions that have been completed 2016-2019 %		Multi / inter-disciplinary	20	14	28	38	
Research work in collaboration with the country's institute	42	58	1-5	55	Commercial orientation	41	21	23	15	
			6-10	11						
			None	34	Total	24	12	29	35	100 %
			Total	100 %						
FTT publications 2016-2019 co-authored with Mexican colleagues in %			1 a 5	46	Publications of FTT abroad in refereed journals 2016-2019 in %		1 a 5		**50**	
			6 a 10	**5**			6 a 10		3	
			None	49			None		47	
			Total	100 %	Total				100 %	

Source: Own elaboration.

Table 3 describes the situation in which the study is at UAGro, it was found that only 55% of FTT do research, of this percentage, 60% work with collaborators, of this percentage 42% do it in collaboration with institutions of the country, 81% do not work with any country internationally, only 19% in countries such as: Spain, the United States and others. Related to the investigation activities they achieve, 42% have a strong emphasis on their discipline, oriented towards practice and social issues; 36% have a theoretical and multi / inter-disciplinary bases. Regarding the production of the PTC in the period 2016 -2019, 55% have 1 to 5 and 11% from 6 to 10; 51% have co-authored with Mexican colleagues. The production of 53% has been published in refereed magazines and abroad.

Table 4. General results related to restrictions and financing that the FTT have to carry out investigation.

FTT restrictions to investigate in 2016-2019			FTT that received funding to do research 2016-2019		
	Freq.	%		Freq.	%
Strongly disagree	36	15	Didn´t recieve	223	93
In disagreement	63	26			
Agree	110	46	Yes, they recieve	17	7
Totally agree	31	13	Total	240	100 %
Total	240	100			

Source: Own elaboration.

Table 4 shows 2 important items to realize the research, the first refers to the restrictions that FTT have in the investigation, it was found that 59% are agree and totally agree that there are restrictions to implement the research, among the most important they are: Pressure to obtain external funds and when they are obtained, either public or private, they are delivered to the institution and not to the investigators, which delays the investigation or is not done, because they were not provided. The institution has rules on how to conduct the investigation but those responsible, largely do not respect them; the low productivity that is done is with own resources and with the support of students, while with these limitations productivity is insufficient and results are poor. Related to financing, 93% didn´t receive resources to do their investigations. X^2 was applied to cross variables and identify if one variable determines the other, it was found:

Table 5. Relationship between number of publications and sources of financing.

Chi-square tests			
	Value	gl	Sig. Asymptotic (bilateral)
Pearson's Chi-square	1,370[a]	3	,713
Verisimilitude ratio	1,429	3	,699
N of valid cases	211		

a. 3 sections (37.5%) have an expected frequency less than 5. The minimum expected frequency is 1.49.

The result presented in table 5 where x^2 = .713, shows that the number of publications don´t influence the sources of financing.

Table 6. Variables association, teacher investigation perception and economic remuneration for doing research.

Symmetrical measurements				
	Value	Error tip. asint.[a]	T approximate[b]	Sig. approximate
Kendall's Tau-b	-,061	,060	-,997	,319
Ordinal by ordinal				
Kendall's Tau-c	-,037	,037	-,997	,319

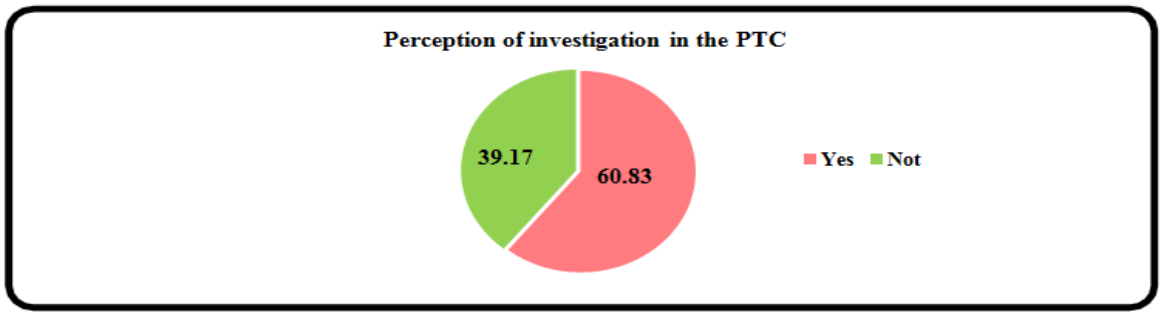
Symmetrical measurements				
	Value	Error tip. asint.[a]	T approximate[b]	Sig. approximate
N of valid cases	211			

a. Assuming the alternative hypothesis. b. Using the asymptotic standard error based on the null hypothesis.

Source: Own elaboration.

The result of Kendall's Tau-c = -.037 shows that there is a null association between the number of publications with sources of funding.

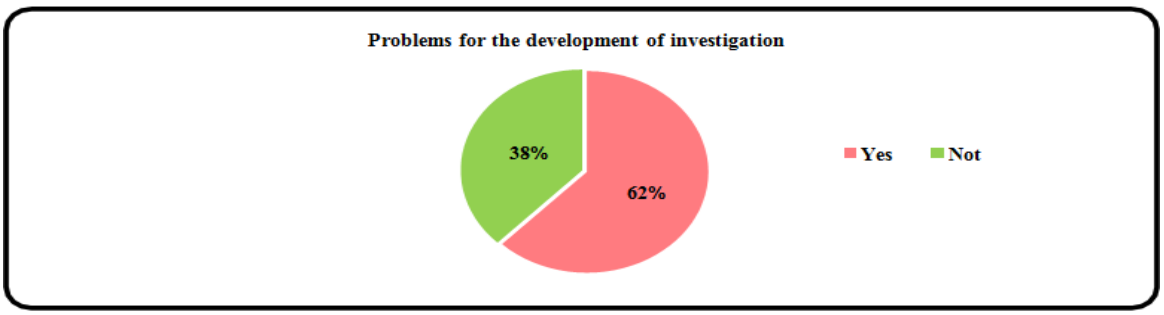
V. Results of the Perception of the FTT Regarding the Investigation



Graphic 1. General result of the perception of the FTT of the UAGro, about the research.

Source: Own elaboration.

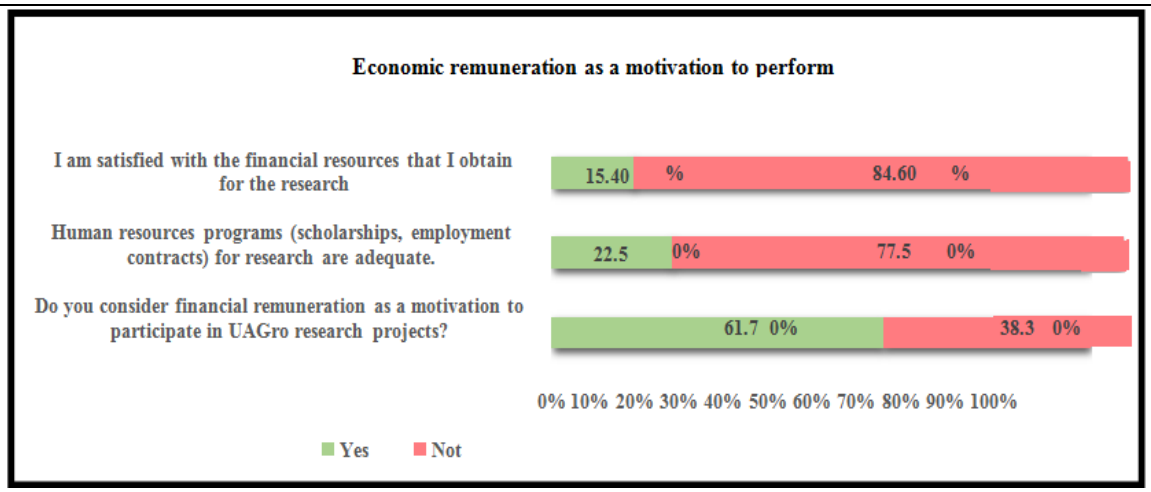
Graphic 1, describes that 61% of the FTT that perceive research in the institution in a positive way, they affirm that their research contributes to their teaching activity, promote investigation activities, 39% perceive it negatively because they are not satisfied with the institution's measures and policies, because their achievements are not recognized and the experience they have in the elaboration of projects is scarce, as they have no disposition to perform the investigation.



Graphic 2. General results that the FTT have regarding the problems to develop investigation.

Source: Own elaboration.

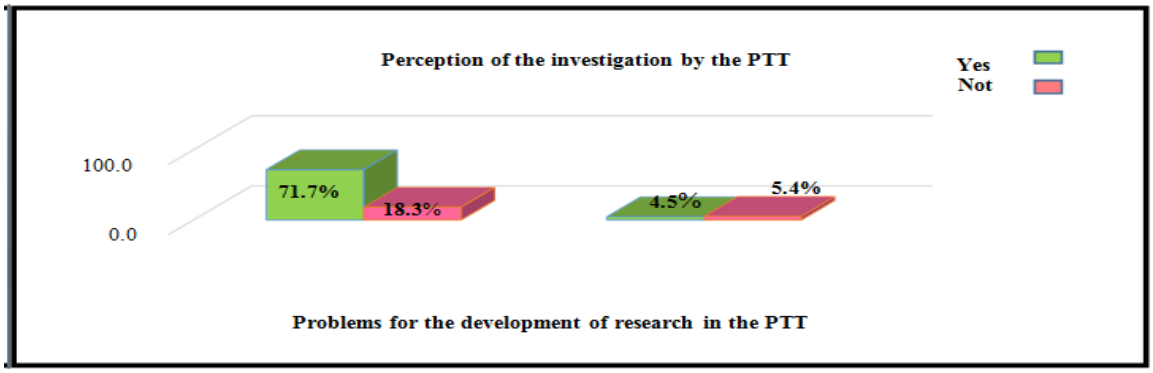
Graphic 2, points out that 62% of the FTT have problems to achieve the research, because there are no facilities in the schools, while the students are not motivated to participate in projects, they consider that training in teacher methodology is scarce, they have an excessive load of substantive functions, little recognition in the teaching work, generating lack of motivation to do investigation. 37.7% consider that they don't have problems to do research, the school provides them with supports, their teaching activity and work is recognized and they are in the promotion and merit value systems.



Graphic 3. Economic remuneration as a stimulus to carry out investigation.

Source: Own elaboration.

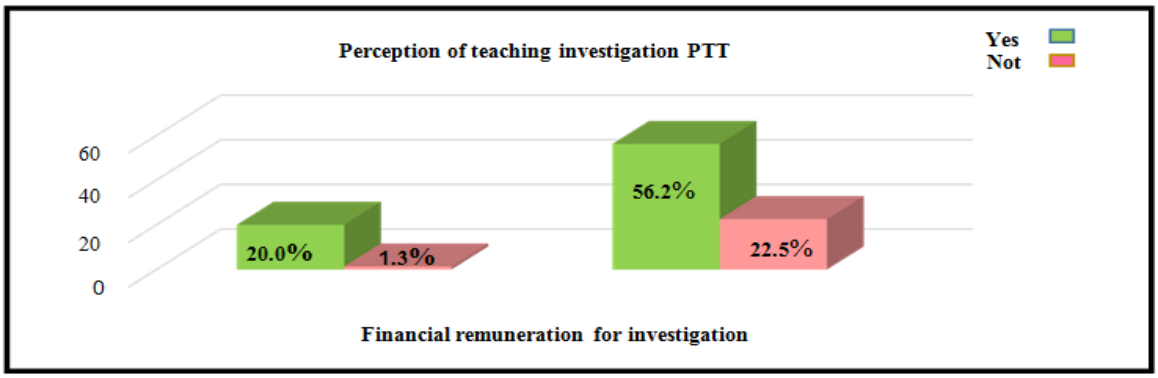
The graphic 3 shows that 85% are not satisfied with the financial resources available for research, 78% stated that human resources programs (teacher ships, incentives for academic performance and collective investigation contracts are not adequate; 62% consider that financial remuneration is a motivation to participate in research projects.



Graphic 4. Perception of teacher research and problems to develop investigation, association of variables.

Source: Own elaboration.

Graphic 4 presents the correspondence of the variables, teacher research perception and the problems to develop the investigation, $x^2 = .000$. We found that these variables have a null association Tau-b .238.



Graphic 5. Perception of teacher research and financial remuneration for doing investigation, variables association.

Source: Own elaboration.

Graphic number 5 shows that there is a relationship between the variables perception of teacher research and financial remuneration, because it is a motivation to realize investigation, X^2 = .001, it is observed that the aforementioned variables have a null association, Tau -b .218.

VI. Discussion

The importance of scientific and technological investigation in universities is justified to the extent of its contribution to scientific production and its quality. In Mexico, the low budget that has been allocated to research has always been insufficient, consequently low scientific production, due to limited and sometimes non-existent financial support, scarce infrastructure, overload of substantive functions to the Full Time Teachers (FTT), little time to implement investigation and as a result disinterest in executing this activity. Research in universities is an orderly function of teaching, while undertaking this study at UAGro, is to recognize a problem or a general situation and identify whether the entrusted objective is being met. It is found that 95% of FTT have postgraduate studies, either master or doctorate degree, of which only 55% do investigation, of which 34% are in the Program for Teacher Professional Development (PRODEP) and a scarce 12% in the Investigators National System (SNI), looking also that a considerable percentage doesn´t fulfill with this important substantive function. Related to scientific production at the university, it is scarce, on average each researcher conducts one investigation a year; results similar to those found by Pereyra (2014) [26] in Peru, Narvaez, J. and Burgos, J. (2011) [27] in Venezuela and Lozoya, E. (2017) [28] in Mexico when he points out that only 2% of teachers do research and that the number of investigators in the Investigators National System (SNI) is extremely small.

About the perception that teachers have, they appreciate investigation favorably, but they agree that the preparation they have in this area is scarce with null investigative experience, because they only know what they acquired when they obtained an academic degree and that they need a deep preparation in this field, to have an effective contact with investigation; similar problem detected in the investigations of: Blanco et al. (2016) [29] and Valencia et al. (2017) [30] when finding that the professors expressed that their potentialities are not being exploited, due to having investigative deficiencies and they propose as a way to mitigate these deficiencies, preparation in this field. Demuth et al. (2016) [31] when encountering this same problem, “he suggests to strengthen institutional policies regarding research, teacher training initiatives with teaching teams, where the most experienced are also trained to accompany the learning processes of beginners”.

Teachers who carry out this activity emphasize that investigation is scarce due to the lack of financial support, as it is considered an important component to produce, because through the development of investigation it is possible to improve the academic aspect and it is also a motivation to continue working, how specify: Gonzalez (1979) [32] and Medina (2009) [33] based on the results of their investigation that: “that money is part of the decision factors for dedicate to investigation.”

VII. Conclusions

The questionnaires and applied methods proved effective in identifying the investigation situation at UAGro, as well as the teachers' perception of it, where reliable information was evidenced, which allowed achieving the planned objective and each of the questions of the investigation.

The investigation carried out by university teachers is based on the needs of their discipline and with a practi-

-cal and social orientation.

The participation of UAGro researchers with Mexican colleagues is low and minimal with foreign countries. 55% of teachers do investigation and 45% do not.

The publication made by teachers at UAGro is scarce; on average it is one publication per year per investigador. Although it should be noted that the product of these investigations have been disclosed in peer-reviewed journals and abroad.

The number of UAGro investigators, in the National System of Investigators (SNI), until 2019 is minimal perceive investigation as important and necessary knowledge for their profession.

The FTT demand urgent training in investigation and scientific writing from the institution, for being a tool that helps to identify practical solutions to specific problems. As well as to monitor their performance from a more self-critical posture.

The FTT emphasized that the time allocated to carry out investigation at the institution is limited, due to the excess workload assigned to them each semester.

The scarce financing resources, which are obtained to carry out projects, reach the university administration, these are not delivered in time, nor correctly to the researchers, thereby generating demotivation and lack of interest to do investigation 93% of the investigation carried out by teachers at UAGro is financed with the scarce resources of investigator teachers and with the support of students.

The investigators expressed that they need technical advice to compete in national and international investigation projects.

Strong relationship in the crossing of variables: number of publications and sources of financing, as well as perception of teaching investigation and financial remuneration, for teachers to do investigation.

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