

# Sustainability in Agricultural Activities Developed in the Western Mesoregion of Santa Catarina State, Brazil, From the Viewpoint of Rural Extensionists

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The perception of rural extensionists from the Santa Catarina State Agricultural Research and Rural Extension Agency (EPAGRI) and Micro Basins 2 Project—as regards the sustainability of agricultural activities in the Western Mesoregion of Santa Catarina State, Brazil—was assessed by means of a structured questionnaire (open and closed questions) used to interview professionals of the EPAGRI Regional Management Boards of Chapecó, Maravilha, Palmitos, São Lourenço do Oeste and Xanxerê, all within the mentioned Mesoregion. A total of 116 rural extensionists participated in the survey. Respondents believe that the degree of sustainability of regional primary production is low/medium and, for the majority of them, the degree of concern or attention of farmers with the sustainability of agriculture is low, negligible or null. Environmental degradation, lack of knowledge and economic factors appear as the main problems concerning this issue. For two thirds of the technicians, only 30% or less of the farms under their supervision adopted sustainable practices in agricultural activities. Results lead to the conclusion that the Western Mesoregion faces a “syndrome of unsustainability of the agricultural model”. Most respondents agree with the implementation of differentiated payment for farmers who produce in a sustainable way, but a quarter of the respondents do not have a general opinion on this subject.

*Keywords:* rural extension, sustainability, sustainable agriculture, Western Mesoregion of Santa Catarina State

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## Introduction

According to Van Bellen (2008), the renowned expression “sustainable development” appeared for the first time in 1980 in a report entitled *World Conservation Strategy*. Its formalization, however, only occurred seven years later, when the Brundtland Report defined sustainable development as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (Van Bellen, 2008). Thirty years later today, the relevance of this concept is practically unanimous. A certain level of agreement on its meaning and on the possibility of its effective implementation, paradoxically, has not yet been achieved. During this period, despite having gained new perspectives and concepts from its three original dimensions (economic, environmental and social), sustainability seems increasingly removed from the day-to-day reality. Sachs (2008, p. 10) argued that the adjective sustainable should encompass the “socially inclusive, environmentally sustainable and economically viable over time”. However, in this definition, the most wonderful utopia of simply being “realizable for human beings” would still be missing.

There is no doubt that a significant part of the global environmental crisis is the result of misguided and intensive agricultural practices. Stahel (2003) believed that the most unequivocal example of unsustainability is to be found in modern commercial agriculture. For Altieri, Yurjevic, Von der Weid, and Sanchez (1996), even though the Brazilian macroeconomic model may seem successful, environmental problems, such as deforestation, soil erosion, industrial pollution, pesticide contamination, and loss of biodiversity (including genetic erosion), have reached alarming levels and, yet, are not reflected in the country’s economic indicators. From this perspective, the Western Mesoregion of Santa Catarina State, Brazil (see Figure 1) deserves special attention, given the weight of its agricultural production—the foundation of the regional economy, to which it has been accorded the title “the Granary of the State”. Hence, it is within this context that this study is grounded. The research aims to present the perceptions of the rural extensionists of the Santa Catarina State Agricultural Research and Rural Extension Agency (Empresa de Pesquisa Agropecuária e Extensão Rural de Santa Catarina—EPAGRI), an official, public corporation, and of the Micro Basins 2 Project (MB2) on the degree of sustainability of the agriculture of the state and, in particular, of the specific region.



Figure 1. Location of Santa Catarina State within Brazil (left) and the Western Mesoregion within Santa Catarina State (right). Source: Elaboration by the authors.

### **Sustainable Agriculture and Agroecosystems**

Florit (2004) emphasized that modern agriculture has brought forth three closely tied levels of risks: environmental risks, social risks and health risks. These hazards, mostly determined by the so-called “Green Revolution”, have led to the emergence and expansion of “alternative”, “unconventional”, or “postmodern” technical and ideological movements (Jesus, 2005). Such movements have sought for the establishment of new models of primary production to reduce impacts on the environment and on sustainability. This is, generally speaking, what has been denominated “sustainable agriculture”. This “new” agriculture is not, however, something perfectly dimensioned and defined; on the contrary, it involves various theoretical and practical dilemmas (Veiga, 2008). There is no conceptual or operational consensus about it. Notwithstanding many studies that have tried to define and delimit the concept, it is still surrounded by a series of doubts and challenges (Ehlers, 1996).

Altieri et al. (1996) said that a definition of sustainability for Latin America should encompass four criteria: (1) maintenance of the productive capacity of the agroecosystem (productive capacity); (2) preservation of the natural resource base and functional biodiversity (ecological integrity); (3) social organization and reduction of poverty (social health); and (4) empowerment of local communities, maintenance of tradition and popular participation in the development process (cultural identity). Soto (2002) argued that, alongside environmental (long-term maintenance of the characteristics of the ecosystem) and strictly economic guidelines (enough income to keep the system attractive), sustainable agriculture should also aspire for social justice (the distribution of benefits and costs).

Ehlers (1996) and Veiga (2008) stressed that for agriculture to be considered sustainable, it should assure: (1) long-term maintenance of natural resources and agricultural productivity; (2) minimal adverse impacts to the environment; (3) adequate returns to producers; (4) optimization of production with minimal utilization of chemical or external inputs; (5) fulfillment of human needs of food and income; and (6) compliance with the social demands of rural families and communities. Given this, Farshad and Zinck (2001) understood that a sustainable agricultural system is politically and socially acceptable, economically viable, agrotechnically adaptable, institutionally manageable and environmentally sound. Leroy (2004, p. 335) cited the “Sustainable Agriculture Treaty”, formulated in 1992, to present a similar concept: agriculture is sustainable when it is “ecologically sound, economically viable, socially just, culturally adapted, and evolves as a democratic, participative process”.

For Lanna (2002, p. 9), the objective of sustainable agriculture is “the management and use of agroecosystems in order to maintain biological diversity, productivity, regenerative capacity, vitality and ability to function in a manner that can attend—both today and tomorrow—to significant ecological, economic and social functions at local, national and global levels, without endangering other ecosystems”.

As one can note, definitions abound, all quite complex and comprehensive, but, at the same time, extremely diffuse and vague, giving way to interpretations and subjectivities. Conway (1998) summarized this matter in a quite appropriate manner:

The Brundtland definition in the context of agriculture is valuable as a policy statement, but it is too abstract for the farmers, research scientists and extension workers who are trying to design new agricultural systems and develop new agricultural practices. For them a definition is needed which is scientific, is open to hypothesis-testing and experimentation, and is practicable. (p. 164)

### **Sustainability as Policy and Praxis of Rural Extension**

In order to reach the farmer and positively transform agricultural systems, the paradigm of sustainability needs to be adequately accepted and incorporated by rural technicians beforehand. Therefore, it is imperative that it cease to be a mere paradigm to become an effective political action of funding, technical assistance and rural extension agencies and that it integrate the basis of programs and projects of the primary sector throughout the various production chains. For Flores (2007), sustainability will be more and more an integral part of any agricultural research project or development action.

Caporal and Ramos (2006) believed that the “new” rural extension and technical assistance should aim at strengthening family farming and preserving the environment. They hold that it must commit to strategies that lead to sustainable development and to forms of agriculture that respect nature and cause less impact. Caporal and Costabeber (2000) argued that this new rural extension—which they call “Agroecological Rural Extension”—should adopt agroecological principles and be based on the heed to the specific conditions of each agroecosystem, as well as to the preservation of the biodiversity and cultural diversity of the communities. In this same perspective, Silva (2004) observed that the extensionist praxis should aim for the improvement of the levels of environmental sustainability of the agroecosystems, the conservation and recovery of natural resources, and, at the same time, the guaranteed supply of clean, biologically qualitative and accessible foods to the population.

In Santa Catarina State, agricultural sustainability has acquired the status of an institutionalized public policy, not only expressed in the mission statement of EPAGRI (“knowledge, technology and extension for the sustainable development of rural areas, for the benefit of society”) but in one of its final goals as well—“to promote preservation, recovery, conservation and sustainable utilization of the natural resources” (EPAGRI, 2008). As such, the Agency has generated more and more actions in the environmental area, with special emphasis, among other aspects, to deeds in the fields of agroecology and organic certification (Tagliari, 2006).

Simon, Scheibe, and Pompêo (2005) highlighted that since 2002 rural extension in Santa Catarina State has been directed towards ecodevelopment. It was during this period that MB2, with the clear-cut objective of rural sustainability, was launched. The MB2—an initiative of the State Government, in partnership with the World Bank—was a project that aspired for the improvement of the quality of life of the rural populations, with a particular interest in the preservation, recovery and conservation of natural resources. To meet this challenge, MB2 counted with a significant number of rural extensionists (hired on a temporary basis), under the coordination and supervision of EPAGRI. MB2 was concluded in 2010. At this moment, a third stage of the project, denominated Micro Basins 3 or “SC Rural”, is being executed.

### **Methodology**

The research was conducted in the form of a survey applied to rural extensionists of the EPAGRI Regional Management Boards of Chapecó, Maravilha, Palmitos, São Lourenço do Oeste and Xanxerê, involving 58 municipalities, all within the Western Mesoregion of Santa Catarina State. Within the second half of July and the first half of August 2009, 116 rural extension agents of effective fieldwork (74 permanent employees of the EPAGRI and 42 temporary employees of the MB2) answered a structured questionnaire of both open and closed questions. The research tool did not allow for individual identification. Before application, technicians were informed about the objectives and procedures of the research. A “Statement of Free and Informed Consent”

was handed to them in order to highlight the voluntary nature of participation. Only after completing and signing the Statement were they allowed to filling out the questionnaire. No time limit was established. The study did not part from any ready-made or predefined concept of sustainability, and the individual construction of this concept was yet one of the objectives of the research.

### Results and Discussion

The age of participants varied from 20 to 60 years, with an average of  $40.7 \pm 9.2$  years (mean  $\pm$  standard deviation) for EPAGRI technicians and  $29.8 \pm 7.7$  years for technicians of MB2. Males were predominant, making up for approximately two thirds (67.2%) of the total. In terms of schooling, 19 completed high school, 16 were undergraduate students, 36 were undergraduates, four were graduate students of non-degree specializations, 35 were non-degree graduates and six had master degrees. Of the 81 university-formed participants, 74.1% were agronomists and 11.1% were pedagogues.

A summary of the technicians' perceptions on the sustainability of the primary production of the Santa Catarina State is shown in Table 1. Half of the interviewees believe that the agriculture in which they take part in is either a little or not at all sustainable. When extending the analysis to the State level, this is the opinion of 62.1% of the extensionists; that is, the view is even more pessimistic. In both contexts, merely 5.2% and 1.7%, respectively, consider the system very sustainable. In this respect, Denardin and Sulzbach (2005) understood that while the intensive agriculture developed in the Western Region of the State generates wealth, it also occasions various socio-economic and environmental problems, with negative impacts on living beings. The authors conclude that the activity in question affects the welfare of the regional population, to the point of unsustainability. For Mello and Marques (2007), studies have demonstrated that the region is facing a crisis, which is, at the same time, an economic, social and environmental one. Its effects are felt system-wide but fall most heavily upon the impoverishment of the rural population, the rural flight, soil and water pollution and upon the difficulties of socially reproducing family farming.

Table 1

*Evaluation of the Technicians of EPAGRI and of the Micro Basins 2 Project on the Sustainability of Agriculture, on the Farmers Positions on the Matter and on the Utilization of Concepts of Sustainability in the Process of Technical Assistance and Rural Extension*

Question	N*	Alternatives and percentages of choice
Level of sustainability of agriculture in Santa Catarina State	116	Totally sustainable (0%); very sustainable (1.7%); moderately sustainable (36.2%); a little sustainable (56.1%); not at all sustainable (6.0%)
Level of sustainability of the agricultural activity technicians take part of	115	Totally sustainable (0%); very sustainable (5.2%); moderately sustainable (44.8%); a little sustainable (46.6%); not at all sustainable (3.4%)
Degree of concern of farmers about the sustainability of their agricultural activities	114	Very high (0%); high (5.2%); moderate (31.6%); low (50.9%); negligible (8.8%); none (3.5%)
Position of farmers during technical guidance regarding the sustainability of recommended techniques and practices	115	Require and only adopt sustainable practices (0%); prefer sustainable techniques but do not require utilization (40.9%); are indifferent to the sustainability of the practices (49.6%); prefer non-sustainable techniques (7.8%); do not know (1.7%)
How often technicians use concepts of sustainability in their job	116	Always (13.8%); most of the time (75.9%); sometimes (10.3%); rarely (0%); never (0%)
How often technicians have managed to pass concepts of sustainability on to farmers	116	Always (2.6%); most of the time (35.4%); approximately half of the time (21.5%); a few times (37.9%); have not managed (1.7%); have not tried (0.9%)

Note. \* means the number of respondents to the question.

Nottar (2004) observed that the Western Mesoregion was colonized and developed by means of extractivist activities, without any concern for the preservation of natural resources. The author also notes that the local agriculture now faces a crisis of sustainability, with socio-environmental impacts that impede full development. On the other hand, Testa, Nadal, Mior, Baldissera, and Cortina (1996) emphasized that this region is agriculturally dependent and has been affected by the depletion of its natural resources of water and soil, due to the utilization of inadequate monocultural technologies. These authors pointed out many further indications of unsustainability of the local agricultural model.

For 63.2% of the respondents, the degree of concern or attention of farmers with the sustainability of agriculture is low, negligible or null. A significant number of interviewees (57.4%) believe that, during the processes of technical guidance, farmers of the Western Mesoregion of Santa Catarina State are indifferent to the utilization of sustainable techniques or even prefer non-sustainable ones. It is worth noting, however, that, in the case of sustainable practices or activities, priorities of technicians and producers do not always coincide (Mirani, Narejo, & Oad, 2002).

Rural extension technicians were also inquired about the approximate percentage of rural producers under their supervision that adopted sustainable practices on their farms. The results are presented in Figure 2. For two thirds of the technicians, this condition is thought to occur in 30% or less of the farms. Note that this proportion is not related with farms that are considered sustainable as a whole, but with those that perform merely some sustainable actions. The results of this survey differ from those presented by Barni and Silva (2004). These authors interviewed 287 farmers of 100 municipalities of Santa Catarina State and asked what qualitative characteristic farmers considered to be the most wanted for an agricultural technology. The most relevant attribute, with 24.6% of indications, was non-aggression to the environment. One can thus notice that in a self-report study, farmers appeared to be quite aware of environmental issues, however, that was not the impression they gave to extension technicians on a day-to-day basis. It is possible that when being questioned, farmers opted for a “politically correct” response, which, however, may not be true. The perceptions of the technicians, in this case, seem more credible.

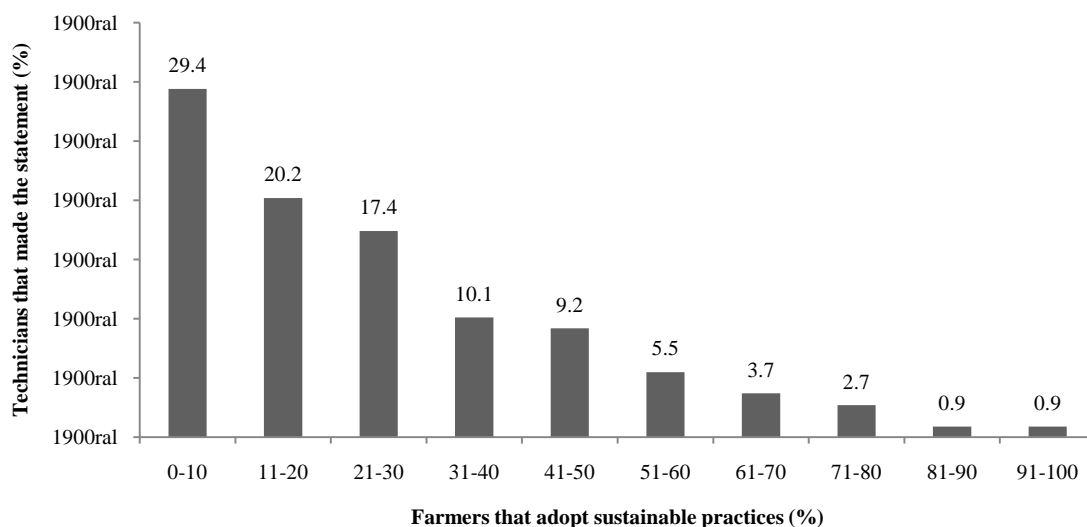


Figure 2. Evaluation of technicians on the estimated percentage of assisted farmers that adopt sustainable practices on their farms. Base: 109 respondents.

Although extension agents sought to use concepts of sustainability during guidance, merely 13.8% always and constantly did so, whereas 75.9% choose to utilize such concepts most of the time, but not always. In any case, their success in passing the concepts on did not follow in intensity. Approximately 35% of the technicians managed to pass concepts of sustainability on to farmers most of the time. However, a similar proportion (37.9%) only managed a few times. These results lead us to question to what extent rural extension has been fulfilling its role and to what extent an effective and successful dialogue on sustainability has been established. In this sense, Brügger (2004, p. 79) stated: “More than ever, we must give small farmers their due value, reflect on what is truly needed to produce, make sure that technical innovations are directed towards basic needs and that production limits are socially, ethically and environmentally established”.

Table 2 presents the opinion of the interviewees on what they believe to be the major sustainability-related problem of the rural Western Region of the State. Environmental degradation, cited by 27 technicians (23.3%), appears as the issue of most concern. In this sense, Testa et al. (1996) observed that the natural resources (soil, water and forests) of the Region are in an advanced state of exhaustion, having been exploited in just three decades. Two other issues, mentioned by 19.8% of the interviewees concerning major problems in terms of sustainability, were the lack or loss of knowledge (both of farmers and extensionists) and the economic factor, which exerts pressure on farmers for greater volumes of production, regardless of impacts on the environment.

Table 2

*Major Problem Concerning Sustainability in the Rural Western Region of Santa Catarina State in the Opinion of the Technicians of EPAGRI and of the Micro Basins 2 Project*

Problem cited *	% **
Environmental degradation: excessive utilization of natural resources; lack of concern with the environment; pollution; deforestation; wastes; contamination of water and soil	23.3
Knowledge: lack of knowledge (of capacitation) of farmers and/or technicians; loss of traditional knowledge of farmer; low educational degree	19.8
Economic factor: need of income/ greater production; valorization of income above environmental and social factors; economic immediacy; profit “culture”	19.8
“Macro” conjuncture: prices; globalization; agricultural policies; domain of private companies; depreciation of products; lack of manpower	12.1
Dependence: dependent on external inputs and financial entities	9.5
Psychosocial issues of farmers: low self-esteem and motivation; accommodation; individualism; discouragement; lack of ambition; lack of conscience	9.5
Management: flaws in planning, organization and administration of farm	6.9
Agrochemicals: indiscriminate use of chemical fertilizers and pesticides	6.0
Technical guidance: wrong perspective of rural extension; lack of direction or guidance to sustainability; low demand of farmers for technical guidance	6.0
Technology: technological packages; inadequate or badly utilized technology; pressure from input-selling companies; agribusiness imposed systems	5.2
Other aspects	15.5

Notes. \* “open question”: some interviewees listed more than one factor; \*\* percentage of the total of respondents.

The data presented allow us to affirm that the Western Region of Santa Catarina State is undergoing an authentic “syndrome of unsustainability of the agricultural model”, consequences of which are as drastic as they are predictable. The severe prognosis made by Testa et al. (1996) has been not only confirmed but noticeably expanded. Because of this, effective public policies and individual and collective actions, including awareness programs, for the establishment of a minimum standard of sustainability in agricultural systems of the region are urgent.

Altmann, Mior, and Zoldan (2008) believed that, in a near future (2015), farmers of Santa Catarina State

will be environmentally more aware and adopt principles of sustainability. In order to assure such a projection, one matter that deserves scrutiny is the possibility of sustainable agricultural production becoming a category or kind of environmental service so that it may be not only valued but also rewarded. Rodrigues et al. (2006) proclaimed that society must adequately compensate farmers who responsibly handle their environment and natural resources as a form of compensation and incentive for conservation and as a recompense for investments in management practices that require more manpower, planning, organization and time. When questioned if farmers should receive differentiated pay in accordance to the level of sustainability of their productive systems, 57.8% of the extensionists were in favor, a large advantage to the 16.4% that were in opposition to the measure. This is, however, a controversial proposal requiring further debate, as can be noted by the fact that approximately one fourth of the interviewees (25.8%) declared no opinion on the matter. In face of a merely productivity focus of the traditional institutional apparatus, Carmo (1998) emphasized the lack in mechanisms of financial incentive to extend and expand the adoption of sustainable practices by farmers, which, consequently, diminishes the possibilities of developing a new agriculture.

### Conclusions

The perceptions of the rural extensionists of EPAGRI and MB2 demonstrate that the level of sustainability of the agriculture of the Western Mesoregion of Santa Catarina State, Brazil, is much lower than that which is desired. The majority of interviewees express little attention and preoccupation of farmers with the sustainability of their activities and adopted technical measures. Thus, even though technicians use sustainable concepts in their interventions, the frequency of success in the knowledge transfer process is unsatisfactory.

Environmental degradation, lack of knowledge (of farmers and technicians alike) and economic pressures were appointed as the major issues for the sustainability of agriculture of the region. The opinion of the extensionists, corroborated by the perceptions and views of various authors, characterizes a so-called “syndrome of unsustainability of the agricultural model”. One of the mechanisms that may lead to the mitigation of this scenario, differentiated payment for products of sustainable systems or farms, is supported by the majority of the technicians, although one fourth of the interviewees have no opinion on this matter.

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