

## Perception of Circular Economy Approach in Agricultural Cooperatives of Argentina

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### Abstract

Circular Economy approach is imposing as a framework for changing the current environmental-socio-economic constrains as well as building a new paradigm where citizens in all their society roles has a key participation on its principles such as to design out waste and pollution, to keep products and material in use and to regenerate natural systems. However, implementation in Argentina is very slow and only applied at some companies' level, as some agricultural cooperatives, or at urban residues recycling at certain cities. The objective of this paper is to explore the awareness, current state and expectations of the transition towards a circular economy approach within agricultural cooperatives based on opinion and perception/awareness consultation. This paper communicate the results obtained from a wider Project, which analyzed others activity sectors of Argentina. An anonymous questionnaire was designed and implemented in order to obtain the objective, and it was structured into three sections: i) demographic characterization, ii) general awareness about transition towards circular economy (concept, current state, features, advantages, drivers, barriers and governance) and iii) specific issues within the cooperative sector. Results explore the perception/awareness about the transition towards applications, barriers, governance of circular economic mechanisms providing an interpretative framework of current state, expectations and possibilities of action to both researchers and policy makers.

**Keywords:** circularity, perception, region.

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### 1. Introduction

CE approach (Ghisellini, et al. 2016) is imposing as an alternative model, which seeks to solve the unbalanced functioning of the current socio-economic system, lineal oriented, that is impacting to the environment since some decades ago (Andrade 2017, Earth.org, 2021). Circular economy concept was born from different ideas and emerged in the 1990s (Su et al., 2013; McDowall et al., 2017). Since then, it has been increasingly promoted. In this study, we adopt the idea exposed by Ghisellini et al. (2016) in order to consider CE a way to design an economic pattern aimed at optimizing production and consumption by using, reusing and exchanging resources appropriately. Therefore, CE concept embraces a challenging and systemic approach promoting a framework that integrate environmental, economic and social issues, dimensions of sustainable development (Dong et al., 2021; van Krutchen, 2020; PWC, 2019; Schroeder et al., 2018).

Circular economy has been implemented in cities and regions (OECD, 2020), in agriculture (de Boer and van Ittersum, 2018), companies (EMF, 2021; WEF, 2021) and in urban residues (SEI, 2021; EEA, 2015). Moreover, a program has recently been launched to help take action in the transition towards circularity (The Circulars, 2021). The shift towards a circularity approach is challenging, however, its adoption could be more feasible within a multiphase framework (Moric et al., 2020).

Argentina, has been characterized by its agricultural sector and therefore its relevant position on grain production and trading, by usually applying a lineal concept of the socio-economic system. It occupies

the 3<sup>o</sup> for soybean (*Glycine max L.*), the 4<sup>o</sup> place for maize (*Zea maiz L.*) and the 10<sup>o</sup> for wheat (*Triticum aestivum*) in a global production ranking. About exporting these same grains, they occupy the first 6 places in the trading world ranking and the first one in relation with soybean oil (FAOSTAT 2019). Farmers, usually uses agricultural cooperatives and private storages for storing and trading their products. Cooperatives of first grade, conformed by a group of farmers, receives their annual production and sell it on their behalf, through cooperatives of second grade (Calzada and Frattini, 2015). The cooperative sector is very important in the grain business of Argentina (Calzada and Frattini, 2015). ACA<sup>1</sup> (Asociación de Cooperativas Argentinas) is one of the largest Cooperatives of second grade that gather 140 Cooperatives of first grade. ACA exports represent around 20% of total grain and oil exported by Argentina (MAGyP, 2020). Due to the Cooperatives role in the agricultural sector, own organization and regional scope, they are a key point for transitioning towards a circular approach within the agricultural sector.

In Argentina, there have been isolated legislations about management of specific residues and urban wastes (Martinez and Porcelli, 2018). Just recently, as a result of policies aimed at decreasing imports and increasing local inputs production, a technical circular economy Roundtable was created (MAyDS, 2019). It seems that the implementation of CE criteria are starting to be applied at industries, cooperatives, and for recycling solid urban residues as national strategy and applied in certain cities (Secretaría Ambiente y Desarrollo Sustentable, 2005; CEADS, 2019; Becerra et al, 2020; USE, 2021) as well as in some of the agricultural practices such as crop-animal rotation (Mohler and Johnson, 2009), among others.

We found very few Cooperatives of second and first grade, such as ACA and Cooperativa de Monje<sup>2</sup> respectively that are implementing circularity practices. In a globalized trade world with many competitors, Argentina needs to increase its competitiveness moving towards a more sustainable production system. Moreover, Argentina can be favored by this production paradigm from the economic, social and logistic point of view as well as of the know how initiatives. Therefore, it is necessary to know the reasons of this low implementation. In this sense a consultation about the actors' perception could help us to promote some actions. Perception is a process of highly cognitive selecting, organizing, storing and interpreting information where the five senses have participation (Solso et al., 2007). Ou (2017) mentioned it as a process of attaining awareness or understanding from sensory information, and the perception process involves selection, organization and interpretation of environmental stimuli (information). Authors explored the public perception, attitudes and behaviors in relation to different topics or aspects of circular economy such as investigating the transition towards circular fashion consumption from textile waste (Kim et al. 2021), exploring the repair criteria as a consumer option and as potential employment (Rogers et al. 2021) among others, but we have not found one related to agricultural cooperatives.

Therefore, the objective of this paper is to explore the awareness, current state and expectations of the transition towards a circular economy approach of Agricultural Cooperative based on opinion and perception/awareness consultation. The research behind this paper is part of a wider project aimed at the establishment of an understanding baseline of state and expectations and to contribute with an interpretative framework to researchers and policy makers to integrate actions to promote the implementation of circular economy criteria in specific sectors.

## 2. Method

### 2.1. Consultation Design and Study System

CE approach involves the three dimensions of sustainable development since, for example, it protects renewable resources by dematerialization processes, and reusing or recycling material and energy, by

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<sup>1</sup> ACA ( <https://www.acacoop.com.ar/comercioexterior.html>)

<sup>2</sup> Cooperativa de Monje ( <http://www.coopmonje.com.ar/>)

encouraging innovation and businesses integration, which leads not only to job creation, but also to quality jobs, as well as a call for governance intervention.

Therefore, in order to address the objective of this project we elaborate a survey to explore the concept and current state of CE within different Argentina's sectors. We also investigate the transitioning to the implementation of CE mechanisms (reasons, aspects, advantages, drivers and barriers) and its governance to focus on the wiliness and possibilities to achieve steps towards circular features. However, in this paper, we will only focus on Agricultural Cooperatives. The questions were organized in three parts as follows:

- A) Part (A) includes six questions on the respondents' demographic characteristics such as age, gender, working area, education level, area of education and job position.
- B) Part (B), composed by thirteen questions involving different aspects towards circularity and its relation with sustainable development dimensions. This part is related to the region where the respondents develop their activities covering five items:
  - a. **Basement to start CE:** the notion of circular economy and its current state (two questions),
  - b. **Implementation of CE approach:** reasons of successful, aspects to focus, advantages to start and drivers (tools/attitude) required (four questions),
  - c. **Barriers for implementing:** causes of frustrating transition and obstacles that can be found- (two questions),
  - d. **Governance for facilitating the transition:** area of investment, key persons and tools/behavior required to accelerate or initiate the change within the ongoing production models (three questions), and
- C) Part (C) addresses specific issues within the cooperative sector and has 4 questions.

## 2.2. Data Collection and Analysis Method

A google form was used to collect answers. Once the questionnaire was performed a pilot survey was done in order to calibrate the questions. After that the questionnaire was accessible online during one month and ten days (March and April 2021). The consultation was spread via e-mail, WhatsApp, Twitter and Instagram. In the case of the Cooperative, a telephone call invitation was done also.

The information collected was automatically saved in an Excel spreadsheet. After debugging, coding and cleaning the data, a descriptive analysis was performed. This analysis includes descriptive statistics and frequency tables. Given that most of the questions have qualitative responses and the participants could choose more than one response, the sum of the percentages of responses for some questions exceeds 100%. The presentation of the results is mainly done by graphs and tables.

## 3. Results and Discussion

The survey gathered 17 cooperative respondents and 76% of them were from the agricultural sector, focus of this paper. The low number of consultation respondents can be attributed to the stress imposed by the abundance of different surveys spreads associated to different sectors' activities realized under the coronavirus pandemic restrictions.

Looking at the demographic characterization, most of the respondents (69%) were between 30 and 50 years old, prevailing the fraction of 30-40 years old (38%). The province of Santa Fe was the most represented by 46% followed by Córdoba (23%). Regarding to the education level, 69% had bachelor or a higher degree, from that percentage 46% correspond to bachelor, 16% achieved a specialization and 8% a master degree. Agrarian Sciences was the study area more represented (69%). Regarding the type of job, 92% were employees.

Even though the low number of respondents could represent a limitation, the respondents' educational level, and the usual role within the Cooperative by interacting with farmers and other actors of the sector could overpass this barrier. These exchanges provide the possibility to obtain a wider scope of the sector needs, indicating that their answers could provide a foundation for having a baseline of this sector opinion

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about the transition towards CE and for deepening in future researches. Moreover, the frequency obtained by the type of job indicates that the respondents' job is stable reinforcing the knowledge about the sector needs. This reasoning makes that each answer has its specific weight that is valid to show a difference on the statistics frequency accounted.

Table 1: Respondents' highest frequencies answers about the different issues of transitioning towards circularity consulted.

		<b>COOPERATIVES</b>
<b>STARTING POINT</b>	<b>Concept</b>	R: CE is a more sustainable production and consumption model
	<b>State</b>	R1: Not initiated
		R2: At the initial stage
		S1: Yes, has developed some actions related to circularity
	<b>Reasons</b>	R: Promotes a more sustainable development of the supply and logistics chain
	<b>Advantages</b>	R1: Availability of secondary raw material (i.e. materials that after wear can be used repeatedly as starting material for production)
		R2: Reduction of emissions and environmental impacts
<b>IMPLEMENTATION</b>	<b>Aspects/actions to focus</b>	S: A valorization system for waste, by-products and raw materials
	<b>Drivers</b>	R1: Show that the waste from each process can be inputs for new development models and new materials for daily use
		R2: Promote a strong sense of belonging to the territory by encouraging interactions and active participation of the actors
<b>LIMITATIONS</b>	<b>Frustrate</b>	R: Lack of economic resources to reorganize existing economic systems in a circular manner
	<b>Obstacles</b>	R: Lack of adequate policies / legislation
		S: Lack of funds
<b>GOVERNANCE</b>	<b>Investment</b>	R: Research and innovation in processes
	<b>Key person</b>	R: Science and Technology Bodies
	<b>Tools to implement</b>	R: Incentive system for those production models that initiate transition

**Note:** R: regional, S specific sector. R1 and R2 when there are answers with the same frequency. Relative frequencies are mentioned in the text.

Table 1 shows that the respondents saw CE as a more sustainable production and consumption model (65%), showing an integral point of view, which is important as a starting point of a systemic approach, where the integration among many actors of the society is required to contribute to a circular flow of resources and to a regional sustainable development. This frame of reference coincides with their perceptions about the promotion of a strong sense of belonging to the territory by encouraging actors' interactions and active participation (23%) as a driver that can boost the transition towards a CE approach. Moreover, it also corresponds with their viewpoint about the mechanisms to be implemented since they have chosen the integration between productive units in the area (82%), the valorization system for waste, by-products and raw materials within their own sector (15%).

The respondents also perceived important to generate an incentive system for those production models that start transition (18%), in order of backing it. The limitations they perceived are related with the economic availability (22-23%) and lack of adequate. polices/legislations (23%).

Some of the key issues of CE approach such as the system design, the consumers targets and their behavior, the possible uses of residues, minimum waste as well as the economic-environmental efficiency and evaluation (EMF, 2021), are reflected directly or indirectly within the respondent's perception. Therefore, these results provide to the decision makers with a fertile ground to set the foundations for specific actions plans towards promoting circularity.

In order to implement the concepts of CE approach, there is a need for: a) a call for polices and legislations adequation, issue that was also wielded by the respondents (23%), in order to provide a basis/support and an umbrella where the transition towards circularity could be developed including the three dimensions of sustainability; and b) for research and innovation investments, which was also

perceived by respondents (77%). Moreover, they have chosen the bodies of Science and Technology (27%) as the key actors to make the change.

Therefore, these results also showed that there could be a conceptual foundation for starting to build an integral national framework as well as policies/legislations (with the participation of different stakeholders), where a sectorial (i.e., Cooperatives) structured plan could be referenced and detailed.

#### 4. Conclusion

CE approach appears to be imposing. There is a reflection and internalization of the respondents' ideas to change towards a different paradigm that reviews and advances on the components of a new model. This was evidenced by the respondents' opinion on the current state and expectations of the transition towards a circular economy approach within the agricultural cooperative of Argentina. Even though it is necessary to expand the size of the sample the present study lays the foundations and open the way to future in-depth analytical and explanatory research to capture a wider plurality of perspectives within the sector. This research focused on the concept, current state, aspects for implementing CE approach, barriers and issues of governance for facilitation the transition towards a circular economy. Respondents' perception about CE concepts and some of the implementation issues embraces an integral idea for bringing up the subject. They also highlight the need for investing on processes research and innovation, the lack of economic resources to reorganize existing economic systems in a circular manner and the need of adequate polices/legislations. Agricultural cooperatives are relevant stakeholders not only because of their role in grain storage and trade but also because of their influence and scope within the region (farmers and towns) where they are located. Therefore, they can be focus for starting the transition and to integrate the stakeholders for building national and regional CE educational and policy framework.

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