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Research Article

PASTINNOVA Project, Sustainable Pastoral Mobility Living Laboratory: Case Study Turkey

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ABSTRACT
PASTINNOVA is one of the approved projects by the PRIMA (Partnership for Research and Innovation in the Mediterranean) foundation of the European Union HORIZON 2020 program. The general target of PASTINNOVA is to increase the resilience of small-scale farms producing in rural areas under the pressure of changing climatic conditions, to improve production and marketing opportunities with innovative approaches, and to create sustainable business and organizational models for the economic empowerment of rural women. Living Laboratory (LL) is an open, user-oriented system whose overall scope is principle-based, based on the discovery and discovery of tangible objects in living communities. Within the scope of the project, we are also starting our efforts to establish the first Regional Living Laboratory, which is highly preferred in the international disciplines, which will adapt to Mediterranean animal husbandry. Living Laboratories are application-oriented networks where all relevant stakeholders are involved, where problems are identified, new solutions are developed, and which facilitate and encourage the implementation of open, collaborative, innovative practices in pastoral livestock production. In this study the contributions of stakeholders, Identification of problems and first meeting outputs of the 1st RLL meeting in Adana-Turkey will be presented.
Key words: PASTINNOVA Project, Living Lab, Pastoral Mobility, Rural Life, Turkey

PASTINNOVA Projesi, Sürdürülebilir Pastoral Hareketlilik Yaşam Laboratuvarı: Türkiye Vaka Çalışması

ÖZ
PASTINNOVA, Avrupa Birliği HORIZON 2020 programının PRIMA vakfı tarafından onaylanan projelerinden biridir. PASTINNOVA'nın genel hedefi, değişen iklim koşullarının baskısı altında kırsal alanlarda üretim yapan küçük ölçekli çiftliklerin dayanıklılığını artırmak, yenilikçi yaklaşımlarla üretim ve pazarlama olanaklarını geliştirmek ve kırsal kesimdeki kadınların ekonomik olarak güçlendirilmesi için sürdürülebilir iş ve organizasyon modelleri oluşturmaktır. Yaşayan Laboratuvarlar (LL), genel kapsamı ilke temelli, yaşayan topluluklarda somut nesnelerin keşfedilmesi ve ortaya çıkarılmasına dayanan açık, kullanıcı odaklı bir sistemdir. Proje kapsamında Akdeniz hayvancılığına uyum sağlayacak, uluslararası disiplinlerde çok tercih edilen ilk Bölgesel Yaşayan Laboratuvarı kurmak için çalışmalarımıza da başlıyoruz. Yaşayan Laboratuvarlar, ilgili tüm paydaşların dahil olduğu, sorunların tespit edildiği, yeni çözümlerin geliştirildiği, pastoral hayvancılıkta açık, işbirliğine dayalı, yenilikçi uygulamaların hayata geçirilmesini kolaylaştıran ve teşvik eden uygulama odaklı ağlardır. Bu çalışmada, paydaşların katkıları, sorunların tanımlanması ve Adana-Türkiye'deki 1. Yaşayan Laboratuvar toplantısının ilk toplantı çıktıları sunulacaktır.
Anahtar kelimeler: PASTINNOVA Projesi, Living Lab, Pastoral Hareketlilik, Kırsal Yaşam, Türkiye
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Introduction

The pastoral system is a complex structure in which breeders produce livestock using natural resources within their cultural values derived from traditions (Caballero et al., 2009). Livestock activities carried out in the context of pastoralism are characterized by extensive grazing on natural pastures, but also use of pastures and cultivated lands, the variety of species and native breeds, livestock husbandry systems (López-i-Gelats et al, 2016), and different degrees of use of labour. Pastoral systems provide a wide range of ecosystem services (ES) and play multiple roles towards sustainable and inclusive development (D'Ottavio et al., 2018). The socio-economic role of pastoralists is related to the sustainability of livelihoods in mountain/marginal/island areas for centuries and is still an important source of income and employment, even in combination with other activities (Ragkos et al., 2020). Environmental roles result from being adapted to local conditions and thus making efficient use of natural resources. Good grazing practices in pastoral systems play an important role in grassland management, biodiversity, landscape structure and climate change mitigation (Caballero et al., 2009; Vagnoni and Franca, 2018). The cultural heritage of pastoralism characterizes the regions: Traditional ecological knowledge, farm and land management; customs, traditions and norms; processing. Pastoralism is included in the Representative List of the Intangible Cultural Heritage of Humanity (Greece, Italy, Austria, Turkey). Last but not least, pastoral food has many of the characteristics that the EU Circular Economy Action Plan calls for (high-quality, functional, safe, efficient and affordable) (Budimir et al., 2018). The general target of PASTINNOVA is to increase the resilience of small-scale farms producing in rural areas under the pressure of changing climatic conditions, to improve production and marketing opportunities with innovative approaches, and to create sustainable business and organizational models for the economic empowerment of rural women. Living Labs (LL) is an open, user-oriented system whose overall scope is principle-based, based on the discovery and discovery of tangible objects in living communities. Within the scope of the project, we are also starting our efforts to establish the first Regional Living Lab, which is highly preferred in the international disciplines, which will adapt to Mediterranean animal husbandry.

When the literature on living laboratories is examined; Folstad (2008) conducted a study to determine the theoretical foundations, processes, methods and perspectives of living laboratories. While Franz (2015) offers a more social-centered perspective on living laboratories, Schuurman et al. (2015) concluded that research and applications related to living laboratories are still at a nascent stage. Leminen et al. (2017) conducted a study to understand the emergence of the living laboratory concept. McLoughlin et al. (2018) bibliometric analysis of living laboratories, Westerlund et al. (2018) modeled living laboratories.

Based on the theory of 'Living Laboratories' (www.enoll.org), a joint network on "Pastoral actors and Value Chains of Pastoral products (VCP)" will be established with the aim of co-creating innovative solutions for farmer organizations, farm management and VCP through the integration of the needs, capacities and experiences of actors (e.g. farmers, entrepreneurs, producers, retailers, policy makers, researchers, consumers). Therefore, PASTINNOVA lies in the core of sustainable rural development. In this study the contributions of stakeholders, identification of problems and first meeting outputs of the 1st RLL meeting in Adana-Turkey will be presented.

Material and Methods

In this study, a living laboratory application will be organized and the results will be discussed with the aim of introducing innovative solutions in farm management in farmer organizations through the integration of the needs, capacities

and experiences of farmers, entrepreneurs, producers, retailers, policy makers, researchers and consumers.

In terms of the complex challenges that exist in real life, it is very difficult for a single actor to find the right solution.

By co-operating with end-users and other actors and finding common solutions, complexity and uncertainty can be reduced and the chances of finding a solution can be increased.

Research has shown that LLs with network structures based on extensive knowledge, information exchange and collaboration between multiple actors lead to radical innovation, whereas LLs with centralized network structures achieve more marginal innovative developments (Leminen, 2017).

The concept of LL was first proposed by Prof. William Mitchell of the MIT Media Lab as "a research methodology for sensing, sampling, validating and refining complex solutions in multiple and emerging real-life contexts".

Living Lab (LL) is a new approach that aims to produce innovative solutions with the participation of users in the real-life environment of scientific or technological research, experiments and measurements.

Unlike conventional laboratories, a Living Lab (LL) operates in real-life, user-orientated conditions. The physical and/or organizational boundaries of a Living Lab are defined according to its purpose, scope and content.

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The Living Lab is still used for the development of IT and design related products and services by testing them with real users in a real life environment.

Some basic features of how a living laboratory should be are as follows:

The living laboratory should work with real users in a real life environment. In this way, user needs and expectations can be accurately determined and solutions can be designed accordingly.

The living laboratory should work with a multidisciplinary approach. In this way, different perspectives, knowledge and skills can be brought together and more creative and effective solutions can be produced.

The living laboratory should ensure the participation of stakeholders. In this way, the views, experiences and contributions of stakeholders can be obtained and the applicability and sustainability of solutions can be increased.

The living laboratory should be in a continuous learning and development process. In this way, solutions are tested, evaluated and improved. In addition, new needs, opportunities and problems are identified and new solutions are developed accordingly.

The Lab aims to ensure the participation of a large number of participants and all stakeholders in all stages of the development and innovation life cycle by sharing ideas and experiences in an effective and efficient manner

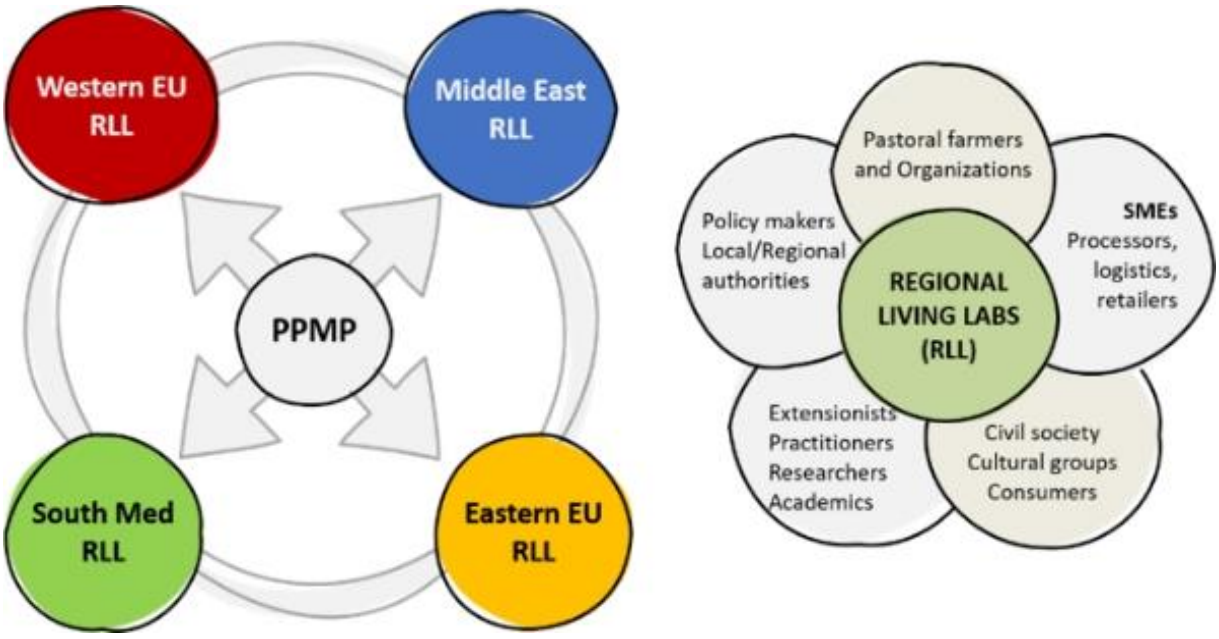

Figure 1. Participatory Platform for Mediterranean Pastoralism" (PPMP) and four Regional LLs (RLLs)

The joint network on "Pastoral actors and VCP" will be expressed through a "Participatory Platform for Mediterranean Pastoralism" (PPMP) and four Regional LLs (RLLs) (Figure 1), grouping countries from regions with common economic, socio-political, cultural and environmental challenges and geo-climatic affinities in their pastoral systems. The PPMP will coordinate the pooling of existing knowledge and other pastoral resources; serve as a nexus enabling connectivity, communication, co-learning and information flow between RLLs; and monitor the progress of RLL activities. RLLs will undertake a co-creation approach by co-designing the implementation, evaluation and characterization of innovative solutions, while contributing to the validation of results, outputs and strategies. Selected solutions will be tested and implemented in small-scale real-life applications and evaluated for their sustainability (economic, social, environmental). There will be a particular focus on the inclusion of vulnerable groups (e.g. women, young farmers and migrant workers).

The following steps were followed in the living laboratory implementation;

1. The roles, responsibilities and expectations of stakeholders (farmer organizations through the integration of the needs, capacities and experiences of farmers, entrepreneurs, producers, retailers, policy makers, researchers and consumers) and stakeholders were clarified.

2. The purpose, scope and methodology of the living laboratory study were explained to the participants. The living laboratory was defined with its subject, target group, research questions and hypotheses. In addition, necessary information was given about the compliance of the living laboratory study with ethical rules and legal legislation

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3.The tools, methods, data and analyses to be used during the living laboratory study were planned.

4. In addition, during the living laboratory study, the needs, expectations and experiences of the participants were observed and their opinions were recorded. The solutions produced as a result of the living laboratory study were discussed with other participants, evaluated and tried to be improved.

5.The opinions, suggestions, data and analyses obtained in the living laboratory study were systematically reported and the findings, results and suggestions were shared with the stakeholders.

A total of 16 stakeholders attended the first meeting. Cukurova University was the management unit and project stakeholders, Adana Provincial Directorate of Agriculture and Forestry, Sarıçam Directorate of Agriculture and Forestry, Adana Breeding Sheep and Goat Breeders' Association, entrepreneurs on related IBM, Animal breeders, Women's Cooperatives producing products for related IBM and the press attended the meeting. A survey was organized to identify the problems and outputs of the Regional Living Lab of Turkey.

Result and Discussions

Animal proteins such as meat, milk and their products have a very important place in the healthy nutrition of humans. People need nutrition every day. The strategic importance of food supply all over the world has once again come to the fore with the Covid outbreak. During the Covid restrictions, apart from health services, food production and shipment provided uninterrupted service. However, producing these in healthy and nature-friendly conditions is another important aspect of the issue. Sustainable and nature-friendly production models are much more questionable. Sheep and goat breeding is important in a wide range of products such as meat, milk and dairy products such as yogurt, ice cream etc, wool, hair and leather, and textile sector products. Foods obtained from sheep and goats have a vital importance in human nutrition. This sector is extremely important in terms of cheap and accessible supply of animal protein and balanced and adequate nutrition of societies. Sheep and goat husbandry, which is known as one of the first sources of livelihood for mankind on earth, has maintained its place in the agricultural economy to a great extent throughout history and today it provides job opportunities for millions of people worldwide. For this reason, small ruminant breeding is more prominent. However, this branch of animal husbandry, which is carried out in the form of small-scale and nomadic animal husbandry and mostly based on pasture, also has various difficulties.

In accordance with the working principle of the living lab, a one-day meeting was held based on bringing together different segments that are involved in sheep and goat breeding or involved in this issue in one way or another, each group expressing their own problems and seeking solutions to the problems.

Participants who took the floor at the meeting first of all expressed the problems of the sector they represent. Accordingly, the problems of women's cooperatives are listed below;

- Organizational problems; It is very difficult to find the right teammate to build a cooperative, cooperative members leave the president alone, the partners entering the cooperative are not interested in any other line of business and live a life solely dependent on the income of the cooperative, which will increase productivity

- Qualified personnel are required to maintain the traditional taste in traditional product production
- Volatile input prices have a negative impact on price policy
- High tax policies
- High labor costs
- Marketing problems
- Legal procedures for the produced product are difficult, time consuming and costly.

The problems encountered by the participants attending the meeting and representing the breeders during breeding are listed below;

- Animal health issues; Veterinary, vaccination and medicine costs are too high
- Input prices are very high and access to quality inputs is very difficult
- Roads leading to pastures have been closed by Forestry Enterprises, we cannot go out of villages
- The younger generation is not interested in animal husbandry and are migrating to the cities,
- We have problems in reaching the market, but when we can reach it, we have no problem in selling our products
- When we go up to the springs, we have problems with storing what we produce, there used to be colder and snowier areas, but not anymore
- We used to walk while migrating to the highlands, but now our roads are closed so we have to hire vehicles and the cost is very high.

-The support provided is insufficient

- Small scale producer competition of chain markets.

The sector representative, who processes and markets animal products and owns a brand in this field, stated the problems related to him as follows;

- Quality problems in goat milk supply (hand milking errors, lack of cold chain, transportation losses, mixed milk usage problems, seasonal changes in goat milk production)
- High input costs; fuel, energy etc.
- Lack of hygiene and record keeping in farm
- Exportation problems to EU

Provincial and district representatives of the Ministry of Agriculture and Forestry participated in the meeting and expressed the problems related to the administrative and official part of the sector. These are;

-Small producers have very limited market possibilities

-Organization, product diversity and branding problems in women's cooperatives

-Lack of know-how and new technology (cost etc.)

-Subsidies are not used correctly

-Unable to produce healthy data due to lack of record keeping

-Low interest in training and extension activities

-Not enough interest in support to encourage the younger generation.

After the meeting, an 8-question questionnaire on the views of the participants about RLL was

administered to collect data on the effectiveness of the study.

Considering Turkey's geographical structure and extensive pastures, it is seen that Turkey has a significant potential for low-cost and high quality animal husbandry. Most of the pastures in the country have low productivity and are more suitable for small ruminant husbandry (Alkan ve ark. 2013; Daşkıran et al., 2018). Especially sheep and goat breeding is the most cost-effective animal husbandry in the country. Small ruminant breeding has a special importance in the Turkish economy. Sheep and goats account for 24.75 per cent of total meat production, 12.35 per cent of milk production and 63.18 per cent of leather production.

Although Turkey is one of the leading countries in the world in terms of ovine livestock, it is far from meeting the expectations in terms of yield per animal. However, the ecological conditions of our country are suitable for ovine breeding (Bingöl et al., 2013; Daşkıran et al., 2018). Revenues from ovine husbandry include the sale of livestock, fleece and hair, raw milk, butter and cheese (Karaca et al., 1990; Aydın and Keskin, 2018; Bebek and Keskin, 2018). Small ruminant farming in Turkey has an extensive structure with a population consisting mostly of low-yielding indigenous breeds, feeding conditions mainly based on grazing and production with limited inputs (Ertuğrul et al., 2010; Karagöl and Keskin, 2018; Gül et al., 2022). These characteristics of the sector can be added to the fact that the enterprises are small and undersized, input supply, product marketing and evaluation opportunities are inadequate, accordingly, the producers receive a low share from the market price, and production is largely carried out on a subsistence basis (Karaca and Kaymakçı, 1994; Aydın and Keskin, 2018).

Living Labs offer important opportunities to different segments working in this field by providing learning experiences for processes ranging from farm conditions to marketing in animal husbandry for problem identification and solution seeking. In addition to the results of the living lab study organized in this study, questions were asked to evaluate the study and the results obtained were summarized in the table. The principles of "user focus" and "co-production" lie at the basis of Living Laboratory's governance approach (Memiş and Küçük Bayraktar, 2020).

Feedback of stakeholders about the organized RLL is given Table 1.

Table 1. Feedback of stakeholders about the organized RLL

Questions	**Frequency (%)**	
	Yes	**No**
Do you know about LL before	18	82
Do you learn about LL after this meeting	82	18
Is this meeting useful for you?*	82	18
Do you like the meeting hall?	100	0
Do you like promotional materials ?	100	0
Was it difficult for you to participate this meeting	40	60

As seen in Table 1, many participants stated that they were not aware of the living laboratory and only learned about it after the meeting. At the end of the RLL meeting in Turkey, the participants expressed that they were looking forward to sharing our experiences with other partners,

finding solutions to our difficulties and learning more about innovative methods for milk processing.

Conclusions

The point reached in recent years requires the inclusion of all stakeholders in the solution process for the solution in animal husbandry. The most important tool in this regard is living laboratory studies. Although living laboratories are suitable for involving stakeholders in the process, the interaction between animal husbandry and living laboratories has not been sufficiently emphasized in the literature. This paper discusses the necessity of adopting a living labs approach as a solution to the challenges of stakeholder engagement in smart city governance. In this way, the study is expected to contribute to the ongoing debate on what living laboratories should be.

Çukurova University proposed two Innovative Business Models (IBMs) for the goat breeding sector as part of the PASTINNOVA project. In this study, sector representatives gathered to discuss current problems and potential solutions, compare their own experiences with those of other partners, and exchange knowledge. During the meetings, sector representatives thoroughly addressed the challenges they face in goat breeding, examined best practices implemented in different geographical regions, and engaged in intensive discussions on sustainability, efficiency, and innovation. Through this collaborative effort, participants gained a broader perspective on the sector's issues, equipping them with the knowledge and experience to play a more active role in the upcoming Regional Living Laboratories' meetings, organized as clusters. This engagement is expected to contribute to the development of more effective and targeted solutions within the goat breeding sector.

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