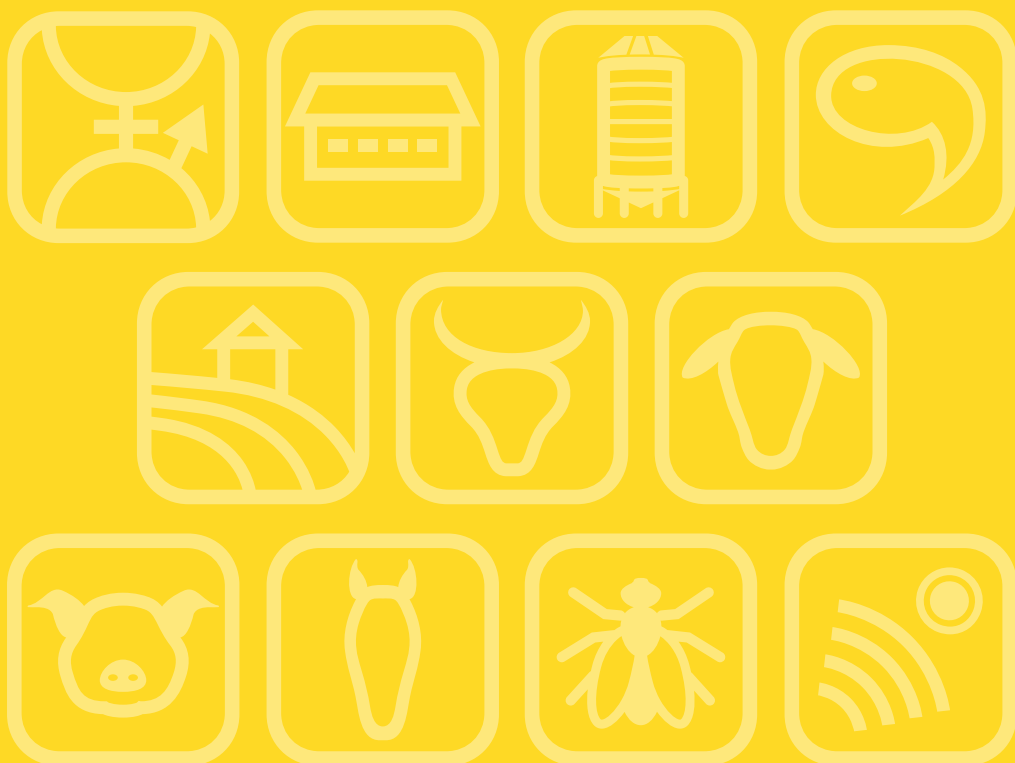


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Combining serious games in a process to support sustainable livestock farming systemsR. Etienne¹, S. Derna¹, C. Rigolot¹ and S. Ingrand²¹INRAE, ACT, UMR Territoires, campus des Cezeaux, 63000 Aubiere, France, ²INRAE, PHASE, Theix, 63000 Saint Genès Champanelle, France; rebecca.etienne@inrae.fr

Farmers have to articulate individual and collective objectives, to face global challenges but need support to address these issues. The objective of this study is to propose a methodological approach to support this process, based on a combination of serious games. This method was proposed to a group of farmers involved in a French cheese PDO area ('Fourme de Montbrison'), in order to improve their fodder autonomy in the context of climate change. Three serious games were combined at different scales in order to (1) choose levers of adaptation (Lauracle); (2) simulate and design their effects on the farm systems (Forage Rummy); (3) enhance collective decision at territorial scale (Dynamix). These serious games were chosen because they address forage system adaptation and help to collaboratively apprehend the trade-offs between individual and collective scales. Other forms of interventions are also set up (farmers lead on-farm experiments, trainings, farm visits). The support method is evaluated along the way and *a posteriori* with an evaluation model adapted for the case study. It allows to follow four levels of evaluation (reactions, learning, behaviours and results) which are detailed in the presentation. Different tools are combined before, during and after game sessions such as participant observation; in-game observations and debriefings of game sessions; interviews and technical diagnosis. The results highlight contributions of the serious games on future changes of practices, at individual and collective level, either technical or organizational innovations. We could observe that farmers decide the levers of adaptation, then simulate some of them and finally, set up on-farm experiments (long-lasting multi-species grasslands adapted to drought) but also impulse the creation of a machine to brush grassland seeds. These learnings and changes on behaviours consider the articulation of individual and collective objectives. Those results will ensure the development of an operational method for agricultural extension services to articulate both farm and territorial scales towards sustainable livestock farming systems.

Assessing how farm features and farmers' profile contribute to farm resilienceA. Prat-Benhamou¹, B. Soriano², D. Ondé³, J. Lizarralde⁴, J.M. Mancilla-Leyton⁵, N. Mandaluniz⁴, P. Gaspar-García⁶, Y. Mena-Guerrero⁵ and D. Martín-Collado¹¹AgriFood Research and Technology Centre, Animal Science, Avda. Montañana 930, 50059 Zaragoza, Spain, ²Polytechnic University of Madrid, C/ Senda del Rey 13, 28040 Madrid, Spain, ³Complutense University of Madrid, Campus de Somosaguas, s/n, 28223 Madrid, Spain, ⁴Basque Institute for Agricultural Research and Development, Berreaga Kalea 1, 48160 Bizkaia, Spain, ⁵University of Sevilla, Ctra. de Utrera 1, 41013 Sevilla, Spain, ⁶University of Extremadura, Av. de Adolfo Suárez, 06007 Badajoz, Spain; abenhamou@cita-aragon.es

Under current global change situation, strengthening farming systems' resilience is an aim of agricultural policy institutions. Resilience is defined as 'the ability to ensure the provision of the system functions in the face of increasingly complex and accumulating shocks and stresses, through capacities of robustness, adaptability and transformability'. In this sense, we test the hypothesis that farms' features (farm attributes) and farmers' profile (personal attributes) influence the resilience capacities in different manner. Based on this hypothesis, we used farmer's resilience self-assessments to evaluate resilience drivers. We conducted face-to-face surveys to farmers of 4 different small ruminant farming systems in Spain, that resulted in 160 questionnaires. Data analyses were based on multiple regression models. Results showed that farmer's optimism and the availability of different management options enhance the three resilience capacities. However, most attributes influenced differently to each capacity. Farmers' who are proud of their achievements and bounded to local traditions, lead more robust farms, farms with a higher autonomy and better farm infrastructures are more adaptable, and proactiveness and cooperation with other economic sectors are positive for transformability. Finally, some attributes showed trade-offs for the resilience capacities. We found the use of natural resources influenced positively farm robustness but negatively adaptability due to the complexity of natural processes. In conclusion, we argue that both farm features and farmer personal attributes are key for the understanding of farm resilience and should be considered in resilience assessments.