MOVING
MOUNTAIN VALORIZATION THROUGH INTERCONNECTEDNESS AND GREEN GROWTH

MOVING Conceptual Framework

DRAFT

Authors: Michele Moretti (UNIPI), Gianluca Brunori (UNIPI), Stefano Grando (UNIPI), Francesco Felici (UNIPI), Ivano Scotti (UNIPI), Corrado Ievoli (UNIMOL), Angelo Belliggiano (UNIMOL).

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Authors	Michele Moretti (UNIPI), Gianluca Brunori (UNIPI), Stefano Grando (UNIPI), Francesco Felici (UNIPI), Ivano Scotti (UNIPI), Corrado Ievoli (UNIMOL), Angelo Belliggiano (UNIMOL).
Work Package Leader	WP2 - UNIPI
Project Coordinator	University of Cordoba

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1. Introduction

The EU Horizon 2020 Framework, and more particularly the work programme of food security, sustainable agriculture and forestry, marine, maritime, and inland water research and the bioeconomy, developed a call for proposals under the name of Rural Renaissance. Within this call there was a theme on Building resilient mountain value chains delivering private and public goods which ultimately led to the MOVING (Mountain Valorization through Interconnectedness and Green Growth) project. The aim of MOVING is "to build capacities and co-develop - in a bottom-up participatory process with value chain actors, stakeholders and policy makers- relevant policy frameworks across Europe for the establishment of new or upgraded/upscaled Value Chains that contribute to resilience and sustainability of mountain areas". To achieve this goal, the project is going to develop, test and validate "a new collaborative methodology based on science-society-policy interfaces to assess multi-scale changing scenarios and define new demand-side policy options to overcome expected threads and enhance new opportunities" for the resilience and sustainable development of mountain areas".

The conceptual and analytical framework (CAF) presented here is a key milestone of the project. In fact, it will help to develop a shared language among consortium members, who are characterised by different background and expertise, and will provide the theoretical underpinning for all other activities.
In MOVING, the CAF has been conceived of as a living document. In a first phase, the CAF has been based on a review of the relevant scientific literature, putting together different literature bodies. A sequence of feedback events with the consortium members has allowed a first refinement. During the project, partners will be encouraged to test the validity of the framework, to provide examples that validate or that limit the validity of the assumptions and of the statements and contribute to its refinement. Reflection on the empirical material will then help to finalise CAF.
One of the key aspects of the CAF is to link the value chain literature to socio-ecological systems approaches: the main assumption of MOVING is that value chains connect different socio-ecological systems, and the governance systems and the practices they promote contribute to its vulnerability, resilience, and sustainability of mountain socio-ecological systems.
The report proceeds as follows: after the illustration of the most relevant concepts, the connections between the different concepts are outlined. A section identifying implications for empirical analysis follows. This section contains a set of questions which will make the linkages between the various concepts and provide an operationalisation of the concepts. In the annex, a 'glossary' of the most relevant concepts is provided to make the report a tool for reference.

2. Value chains and Socio-Ecological Systems vulnerability and resilience

2.1. Value Chains

Value chain (VC), is an expression generally attributed to Porter (1985), that has spread in several cultural contexts concerning a "meso" level of investigation, i.e. an intermediate level between firm and macro level (i.e. economic system). The concept is used to address several questions: "vertical" links among firms, forms of coordination among firms other than market and hierarchy, vertical trade among areas of the world (trading tasks, offshoring, and outsourcing, etc.). VC represents a key concept in management disciplines (strategic or operational management of chains aimed at obtaining competitive advantages, etc.) but also in development theory and practice (structural or geographical changes, development policies, etc.).

Having regard to the diversity of backgrounds it is not possible to provide a unique definition of value chain. Two definitions are proposed below: the first taken from managerial context (more precisely referred to "supply chain"), and the second considered in a development approach:

1) "*the network of organizations that are involved, through upstream and downstream linkages, in the different processes and activities that produce value in the form of products and services in the hands of the ultimate consumer*" (Christopher & Peck, 2004);

2) "*series of steps from the initial production to the final consumption and the actors involved at each stage. The activities/operations of these agents are geographically localised. They identify products, financial and information flows between actors and areas*" (European Commission, 2018).

Together the two definitions consider the most relevant characteristics of a VC. Basic units of VC are both actors (not only firms but organizations in general) and activities (steps), but key elements are also linkages among them (inputs, outputs, financial flows, information, etc.) that "transform" the set of units in the object (network) under investigation. The main purpose of these networks is to produce (obtain) value for (from) the final consumer. This is the characteristic "vertical" dimension of the VC, that cannot be intended as a single direct path, but as the "tangle of roads" that flow from the initial resources and productions to final users or, conversely, from the latter to the former (from downstream to upstream). Since MOVING focuses on specific geographical areas - mountain areas - where specific actors and resources are localised, the correct direction is from local resources and productions to the final use of the products.

In literature, several concepts can be considered precursors or evolutions of the VC concept:

- **Filière (1960s)**, the flow of physical inputs and services in the production of a final product (filière of production, i.e., from input to output, or filière of product i.e. from output to input) (Lauret, 1983; Malassis, 1973);
- **Commodity Chain (1970s)**, similar, derived by dependence theories (Wallerstein, 1974);

- **Supply Chain (1980s)**, similar, more in a logistic management sense (Hugos, 2003);
- **Global Commodity Chain (1990s)**, describing the shift in the organization of global production toward external networks (the so called "outsourcing wave") (Gereffi & Korzeniewicz, 1994);
- **Global Value Chains (GVC 2000s)**, similar to the previous replacing commodity (that basically means raw undifferentiated material) with value intended as "value added" (Sturgeon, 2008);
- **Netchains (2001)**, Integrating supply chain and network analyses (Lazzarini et al., 2001).

In the last decades, the VC, and the GVC, perspective has gained significant influence in development studies, leading to standardized analytical procedure known as Value Chain Analysis (VCA). The key elements of a VCA approach can be summarized as follows: input-output structure; geographical (spatial) characters; governance structure; institutional contexts (Gereffi & Fernandez-Stark, 2011).

With the growth of empirical studies, more "structured" methodologies of investigation have been developed. Here we can mention three methodologies of VCA used in a development perspective: (i) the FAO procedure (Bellù, 2013); (ii) the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) technique (Springer-Heinze, 2018); (iii) the Value Chain Analysis for Development of European Commission / DEVCO implemented in partnership with Agrinatura (European Commission, 2018).

2.2. Socio-Ecological Systems

A Socio-Ecological System (SES) - also termed coupled human–environment systems (Turner, Matson, et al., 2003) or coupled human and natural systems (Liu et al., 2007) are complex, interdependent and linked systems of people and nature which are nested across scales (Berkes & Folke, 1998). They are complex systems comprised of nested components (subsystems) which are related with each other at different levels (McGinnis & Ostrom, 2014; Ostrom, 2009). The SES concept reflects the notion that people (*the social system*) are part of ecosystems (*the ecological system*) and shape them according to sets of norms and rules (Ostrom, 1990) and are at the same time dependent on the capacity of ecosystems to provide services for human wellbeing and societal development such as supply of food, fibre, energy, and drinking water.

SES are structured in different subsystems which are independent of each other in the accomplishment of many functions but eventually affect each other's performance. In a SES, the resource units (RU), the resource system (RS), the governance system (GS) and the users (U) deliver outcomes (O) as result of interactions within them and with the social, economic, and political settings (PS) and the related ecosystems (ECO) (McGinnis & Ostrom, 2014; Ostrom, 2007; Ostrom, 2009).

The concept of SES appeared in ecological anthropology in the 1960s and the 1970s, in the attempt to move beyond the Cartesian nature/culture, environment/society dichotomies through a focus on the relations between social and ecological systems. First, cultural ecology approach

pushed the focus toward the relationship between the environment and the cultural features and how change emerged out of the relationship over time; emphasising the role of human perception of the environment in shaping the relationships between nature and society (Steward, 1955). Ecological anthropology emerged as a logical extension aiming to achieve an exact specification of nature-society relationships by including both biological and social entities as well as the processes connecting them into a single analytical system, the ecosystem (Geertz, 1963). This system approach was taken up by political ecology which included the cultural and political activity within the analysis of ecosystems (Greenberg & Park, 1994). Within this domain, the Socio-Ecological System concept was originally designed for application to common-pool resource management through the interlinked analysis of social and ecological systems (Berkes & Folke, 1998).

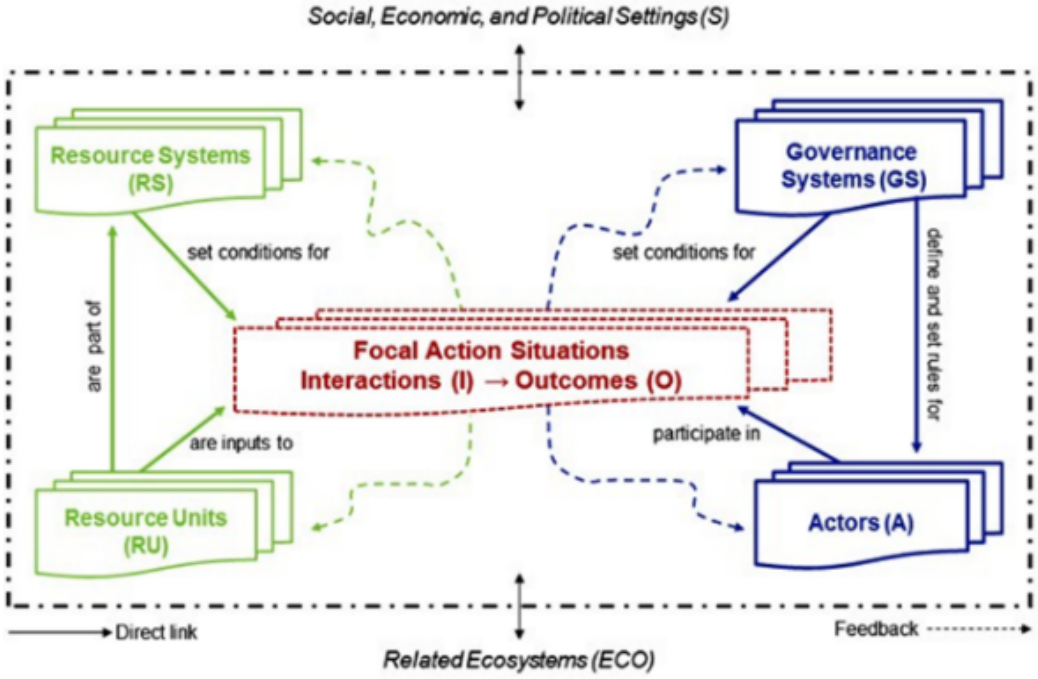

Figure 1 Socio-Ecological Systems. Source: McGinnis and Ostrom (2014)

To provide a common framework for analysing SESs, Ostrom (2009) proposed a conceptual model organized into a multitier hierarchy of variables which are relevant to understand the complex interactions within the different components and scales in a SES. The SES framework considers the ecological system as provider of services that increase human well-being (anthropocentric perspective), while considering the social system at both its micro and macro levels (actors and governance structures) as the driver of positive or negative transformation in the ecological system (Binder et al., 2013). The original framework proposed by Ostrom (2009) has been revised to extend its applicability to complex SESs in which multiple sets of actors,

resource systems, and overlapping governance systems interact with each other (McGinnis & Ostrom, 2014), and adaptations of its structure have been proposed to include knowledge from natural sciences (Epstein et al., 2013) and local stakeholders (Delgado-Serrano & Ramos, 2015).

2.3. Vulnerability and resilience

Vulnerability, adaptive capacity, and resilience are integrated concepts characterizing SES (Lei et al., 2014). Vulnerability refers to the propensity of exposed elements such as human beings, their livelihoods and assets to suffer adverse effects when impacted by hazard events (Cardona et al., 2012), and it is defined as "the state of susceptibility to harm from exposure to stresses associated with environmental and social change and from the absence of capacity to adapt" (Adger, 2006). Building upon this definition, vulnerability can be conceptualized in term of three components: exposure to a hazard, susceptibility to it, and adaptive capacity to the shock or the stress generated by the hazard (Adger, 2006; Eakin & Luers, 2006). Vulnerability can be referred to a system as a whole, and as a general condition of the people (or specific vulnerable groups or individuals), or to specific subsystems, for example supply chains, sectors, functions (Paloviita et al., 2016). Different subsystems or groups can have different degrees of vulnerability, and this is true also for the single components: exposure, susceptibility, and adaptation capacity.

For example, households can have different exposure to price volatility, in relation to the possibility of self-provisioning and to their dietary habits. As for exposure, the potential for and the probable magnitude of change within a physical system in response to external effects – susceptibility - can be unequally distributed among individuals and groups, depending on specific conditions (e.g., being young, elder, pregnant), availability of suitable alternatives and capability to manage different entitlements, cultural and personal habits, and individual perceptions. Depending on the criteria of the assessment, a system can be considered having a low degree of vulnerability even when some groups are heavily hurt. Indeed, hazards are not mechanical events hitting equally or randomly (Brunori et al., 2020) and might affect some groups, or systems components and functions more than to others. Considering together these two different aspects of vulnerability (of people, of systems) can help to explain why some groups are ultimately vulnerable (exposed, sensitive, adaptive) and some other are not, as well as to highlight interdependence between human and non-human subsystems (Brunori et al., 2020).

Factors affecting vulnerability can be divided into endogenous and exogenous to the system. Exogenous are the external factors to which the system is exposed, whereas endogenous factors relate to the system properties and characteristics, influencing its sensitivity and adaptive capacity, and thus the potential damage resulting from exposure (Brunori et al., 2020). Therefore, the effects of exogenous factors are mediated by some properties and characteristics, that influence the natural tendency of the system to experience negative outcomes in face of hazards, in other words to be vulnerable. Hazards can be of different nature: ecological, socio-cultural, economic, technological, and political (Adger et al., 2004; Preston & Stafford-Smith, 2009), and can have mild or severe consequences on the system (e.g., human beings, geographical area,

ecosystem) due to intrinsic conditions (sensitivity and adaptive capacity) which determine its propensity to be affected by a hazard, (Birkmann, 2006; Cardona et al., 2012).

Fundamental linkages and interdependencies exist between the vulnerability and resilience approaches (Miller et al., 2010; Turner, Kasperson, et al., 2003) since both relate to the capacity of a system (or of people) to adapt in response to changing conditions (Engle, 2011). Indeed, Adger (2006) defined adaptive capacity as "the ability of a system to evolve in order to accommodate environmental hazards or policy change and to expand the range of variability with which it can cope", while according to Holling (1973), Gunderson and Holling (2002), and Walker et al. (2004), the concept of resilience describes the degree to which the system is capable of self-organization, learning and adaptation, aiming at absorbing the changes without shifting to an altered state with different properties (Adger, 2006; Gunderson, 2003; Turner, Kasperson, et al., 2003). Moreover, the resilience concept - the capacity of a SES to absorb or withstand perturbations such that the system remains within the same regime, essentially maintaining its structure and functions (Resilience Alliance, 2021) - implies the consideration of social and ecological systems as interdependent since social adaptability of a society must be coupled with the sustainability of the adaptation from an ecological perspective (Nelson et al., 2007).

2.4. How are vulnerability and resilience linked to sustainability?

The concepts of vulnerability and resilience, as well as the related concept of adaptive capacity, are essential to explain the interrelated dynamics associated with the systemic approach to socio-ecological change and sustainability (Miller et al., 2010). In socio-ecological systems, the normative concept of sustainability and the descriptive concept of resilience can be conceived as intertwined (Common & Perrings, 1992; Levin et al., 1998; Perrings, 2006), or intertwined into relationships of different nature. In fact, they describe the ability of systems to adjust and maintain themselves in the face of change. However, a resilient system is not necessarily a sustainable system. When we consider open systems - that is, systems where there is a flow of resources inside and outside the system - the resilience of a system (for example, a mountain socio-ecological system) can depend on the capacity to attract resources from the outside to face system hazards. But as resources come from the outside, this may mean that the resilience of a system may be obtained at the expense of other socio-ecological systems. Derissen et al. (2011) suggested that resilience is neither sufficient for sustainability nor desirable by itself when the stable state is unsustainable. In light of this perspective, Prosperi et al. (2014) suggested that vulnerability and resilience provide the elements to understand the factors and mechanisms affecting the sustainability of a socio-ecological system.

3. The contribution of value chains to sustainability and resilience of Socio-Ecological Systems.

From an epistemological point of view, the MOVING conceptual framework hinges on the representation of a Socio-Ecological System (SES) developed by McGinnis and Ostrom (2014) on the base of Ostrom (2009).

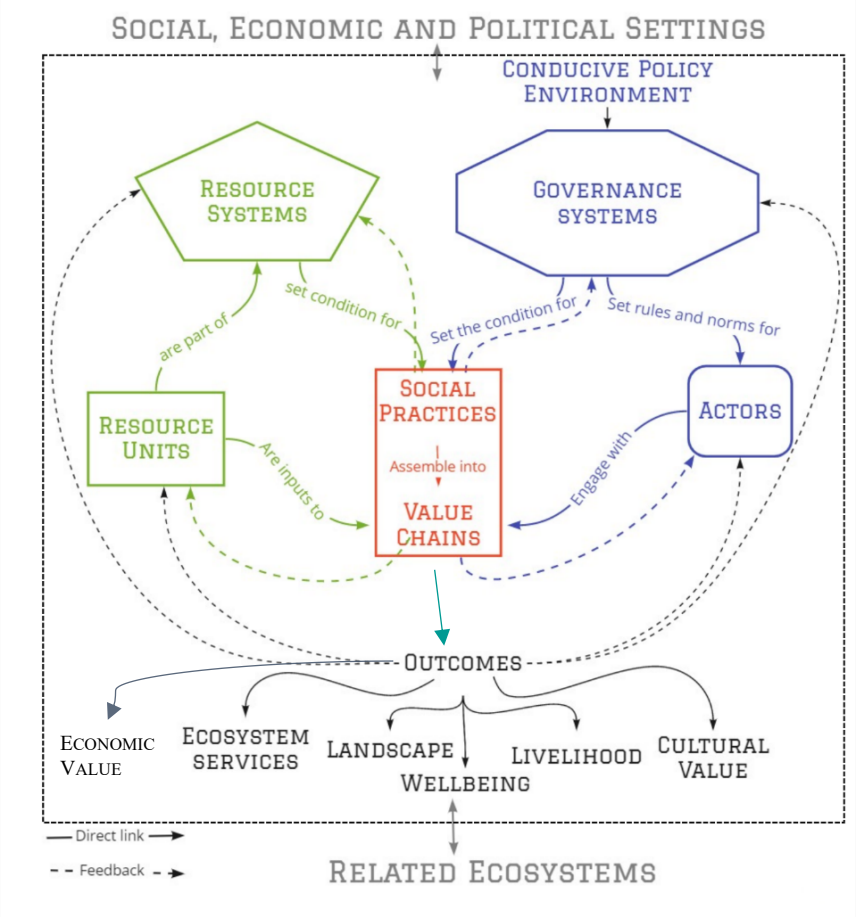

Figure 2: The MOVING Conceptual Framework

Fundamental elements of the framework are the four first-level core subsystems of a SES. These core subsystems interact with each other, and these interactions generate the outcomes of the SES: economic value, as well as ecosystem services, landscape, wellbeing, livelihoods, cultural value. The outcomes of a systems may be also assessed in terms of vulnerability and resilience to exogenous factors (e.g., climate change, pressures from other systems).

The nature of these four core subsystems ranges from material (resource units, resource systems and actors) to immaterial (governance systems) linking the social, economic, and political settings and characterising the SES. Resource units (i) (e.g., grass fields) interact with other resource units determining a resource system (ii) (e.g., grassland habitat), which are regulated by governance systems (iii). Governance systems are sources of rules that regulate the activities of actors (iv), shaping their actions and behaviours in relation to the other material component of the SES (resource units and resource system).

The proposed CF highlights the importance of social practices which are routine interactions between actors and their environment including resource units and other actors. Local production techniques, for example, are practices based on knowledge, rules, resources available in a place and consolidated through social interaction. Actors operate as individuals and/or groups in a defined social context through social practices, that are based on culturally shaped norms, habits, beliefs and expectations.

Practices are aimed at creating and distributing value. The amount of value actors can create is affected by the resource systems of the area, which constitute the territorial capital. The territorial capital provides opportunities and constraints to practices. When a practice creates pressures on resource units, these may compromise resource systems' capacity to regenerate resources, and therefore their sustainability. On the other hand, the territorial capital provides resources specific of a given socio-ecological system, creating the conditions for the creation of value when these resources are exchanged with outside actors.

Social practices are developed within actors' relational space and are affected by normative, cognitive, and technical systems of rules, those for example that characterize social norms or local techniques. Among the rules that regulate practices, there are the ones generated by the governance system. Governance systems may affect the evolution of social norms as well as local techniques, fostering new technological pathways. The governance sub-system is a multi-level system, where "territorial" governance systems are directly affected by local actors and their normative, cognitive, and cultural norms with a straight effect on the other SES's subsystems, while larger scale governance systems (e.g., national, European, global value chains governance systems) are outside local actors' control and might collide with "territorial" governance systems. In many cases, unsustainable resource use can occur when outside governance systems replace local governance systems and alter the equilibrium between population and resources.

As business activities are continuous flows of connection/disconnection of (production-distribution-consumption) practices, value chains can be seen as assemblages of practices. To generate a value chain, actors performing different practices need to be connected: for example, a given quality of cheese is linked to grazing, and grazing is connected to grass management. Practices are connected to value chains through material and immaterial processes (production is connected to selling activities and this generates flows of products, money, information), and the modes of connection are influenced by the resource and the governance systems. By assembling social practices, actors interact with other actors to connect to existing value chains or to establish new value chains.

Looking at value chains as assemblages underlines their dynamic evolution, the possibility for actors to engage, through their practices, in different assemblages at the same time, and the fact that practices (and related human and non-human actors) assume specific properties in relation to each value chain they participate in. In a value chain, practices (e.g., in relation to production, processing, transport) evolve in relation to the connections with other practices, aligning around the development of objects of exchange (outputs for the producers/input for the processor).

Also Business models can be seen as assemblages of practices made by entrepreneurs. Innovative business models - that is, original ways of assembling practices - contribute to innovate value chains. Differentiated products - based on place, variety, or method of production - create value when they are channelled into differentiated value chains.

As Value Chains generate - through assemblages of practices - material and immaterial flows, they also create value. However, the composition of the value crated (economic value, ecosystem services, landscape, wellbeing) may affect the resilience and the vulnerability of a socio-ecological system. Different assemblages may have different composition of value created and different distribution of value between local actors and outside actors.

Policy environments, that define the set of norms and regulations present in each social context and the capacity of socio-ecological systems to implement these norms, influence the way business models and value chains evolve. Conducive policy environments are capable to support local actors in their innovation practices and give a direction to assemblages of practices to improve sustainability and resilience performance of mountain areas.

Table 1: Scale of pertinence of key concepts and factors.

Exogenous factors	Socio-Ecological System	Value chain	Interactions	Outcomes
Social, Economic and Political Settings (S)	Territorial Capital	Business Model	Practices	Value and valorisation
Related Ecosystems and Climate Factors (ECO + CC)	Relational Space		Assemblage	Vulnerability and Resilience
	Technology pathway			
	Conducive Policy Environment			
	Telecoupling			

Table 1 reports the concepts in this framework according to the scale at which they can most appropriately be referred to, measured, and assessed.

3.1. Ten propositions for the MOVING CF

These concepts are connected to each other in a frame based on a series of statements, whose starting point is the conceptualisation of our Socio-Ecological Systems approach (Figure 2). These statements, taken together, describe the conceptual pathway that brings from the observation of the case-studies to the assessment of the MOVING main hypotheses, by using the concepts above underlined.

1. **Local actors engage in social practices,** that is routine interactions with resource units and with other actors.

2 **Practices are aimed at creating and distributing value**. The amount of value actors are able to create is affected by the resource systems of the area and their **specificity**, which constitute the territorial capital.

3. Social practices are developed within actors' **relational space and are affected by normative, cognitive, and technical systems of rules**, those for example that characterize social norms or technology pathways**.** Among the rules that regulate practices, there are the ones generated by governance systems.

4. **Actors interact with other actors to connect to existing value chains or to establish new value chains**.

5. **Business activities are continuous flow of connection/disconnection of practices. Value chains can thus be perceived as assemblages of practices**. Looking at value chains as assemblages underlines their dynamic evolution, the possibility for actors to engage, through their practices, in different assemblages at the same time, and the fact that practices (and related human and non-human actors) assume specific properties in relation to each value chain they participate in.

6 In a value chain, **practices** (e.g., in relation to production, processing, transport) **evolve in relation to the connections with other practices**, aligning around the development of objects of exchange (outputs for the producers/input for the processor).

7. **Business models are different modes of assemblage**: what to assemble? with whom to assemble? for what purposes?

8**. Connections among practices can extend beyond borders, across different SESs,** connecting them through a range of interactions and outcomes (Figure 3). This means that many value chains (resulting from those practices) connect different SES, depending on the specific conditions of each SES.

9. **Through these connections (in the form of Interactions and Outcomes) a value chain can influence different SESs**, with regard first to the value created and distributed in each SES, but also to the effects on vulnerability and resilience of the various SESs that are connected by the value chain.

10. **Strengthening (new) value chains capable of creating value while enhancing SES sustainability and resilience in mountain areas**, is the goal to be pursued. It can be achieved thanks to the presence of a conducive policy environment capable to support local actors in their practices.

3.2. Telecoupling Socio-Ecological Systems through social practices and value chains

Connections among social practices and value chains can extend beyond the borders of a SES and develop into socioeconomic and environmental interactions between distant coupled SESs (Figure 3). Through these connections value chains can affect different SESs, regarding both the value created and distributed within each SES and the vulnerability and resilience of the interconnected SESs. In this perspective, value chains (and the social practices they are built upon) are conceived as instruments for telecoupling distant or neighbouring SESs. The telecoupling of SESs is made possible by actors which engage in social practices to generate new or connect to existing value chains facilitating or hindering the flows of material/energy and/or information which generate socioeconomic and environmental effects that are manifested in coupled SESs. (Liu et al., 2013). Telecoupled SESs interact through unidirectional or bidirectional flows of materials and information that are transferred by actors engaged in social practices which are connected through assemblages to form value chains.

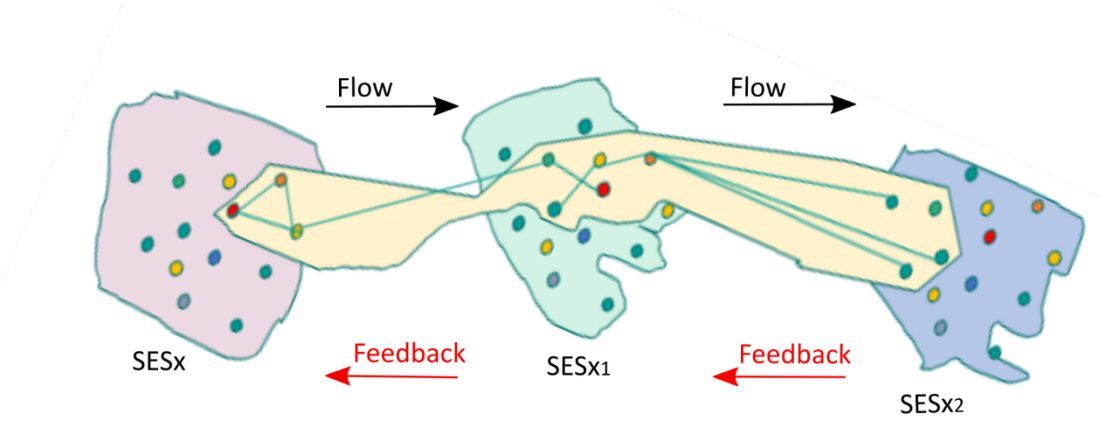

Figure 3: Telecoupled SESs through value chains

Each SES, in a telecoupling can behave as sending (SES_x), receiving (SES_{x2}), or spillover system (SES_{x1}) according to the flows being analysed. The material and information flows between SESs in a telecoupling generates socio-economic and environmental consequences that can promote or prevent the transition towards more sustainable and resilient SES (Eakin et al., 2017; Hull & Liu, 2018; Zimmerer et al., 2018). Therefore, any political, economic, cultural, technological,

governance and ecological change affecting the SES(s), can generate new dynamics in the flows and impacts in the telecoupled system.

Alike SESs, also value chains are not isolated from "Related Ecosystems" (ECO), which are all subject to the overall climate conditions and evolution and to the Social, Economic and Political Settings (S). A rule or norm established at large governance scale (e.g., Europe, Word Trade Organization) or a technological trajectory (e.g., renewable energy) inevitably also influence the governance and the practices shaping the value chains within a SES. Figure 4 shows different SESs, as represented in McGinnis and Ostrom (2014), telecoupled through flows of social practices and the outcomes resulting from the functioning of a value chain. In the first SES (SES_1), resource units (RU), resource systems (RS), governance systems (GS), and Actors (A) interact through social practice to assemble a value chain which generates a range of outcomes (e.g., commodities, ecosystem services, cultural and social values). If these interactions (I) and outcomes (O) remain within SES_1 (green arrows), we face a short value chain (where the shortness relates to geographical proximity). Otherwise, some of these interactions and outcomes might cross SES_1 boundaries, affecting other SESs (red; light and dark blue arrows) in the process of telecoupling.

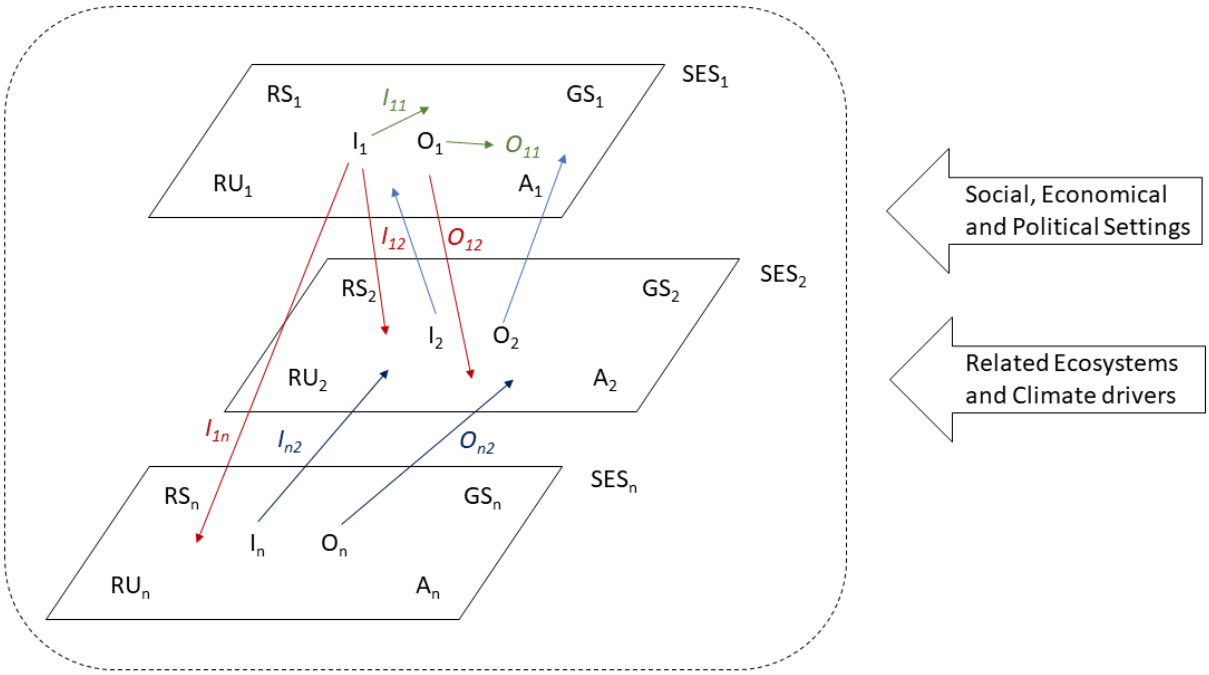

Figure 4: Connections among telecoupled SESs in consequence of the activation of value chains

Changes in the governance of value chains can alter the interplay of supply in the sending SES (SES_1) and demand in the receiving SES (SES_2) transforming the material and information flows among these SESs and thus the structure and boundaries of the telecoupled system. The dynamic outlined can generate feedback mechanism where the effects of SES_1 on SES_2 affect in turn SES_1. For example, actors belonging to SES_1 engage in social practices and value chains

which exploit an unreproducible resource localised in the SES_1 (e.g., a forest used for wood production) to produce the outcome O_1. If the interactions within SES_1 lead to excessive extraction and reduced availability of the unreproducible resource, the supply of the unreproducible resource to SES_2 decreases. Assuming the demand for the unreproducible resource remains constant in the receiving system (SES_2), to satisfy this demand the boundaries of the telecoupled system must be extended to include another socio-ecological system (SES_n) suppling the same outcome (O_n). The inclusion of SES_n can, in turn, decrease the amount of O_1 demanded by SES_2 to SES_1 in favour of the newly added SES_n. Similar dynamics of effects and feedbacks mechanisms can be described for interactions (I) among different SESs. Effects and feedbacks mechanisms are important properties of telecoupled systems, they can be positive or negative, and can affect socio-economic and environmental properties of the telecoupled SESs, thus promoting or hindering their sustainability and resilience (Liu et al., 2013).

4. Implication for analysis

The purpose of MOVING is to analyze how different value chain configurations can contribute to the resilience of SESs in European mountain areas. For this purpose, 23 reference mountain regions have been selected as case studies. In each reference region, the natural resources characterising the SESs (MOVING project, Deliverable 3.1 “Land use systems and land cover map in 23 the reference regions”) as well as the case-study value chains have been identified (MOVING project, Deliverable 4.2 “List of selected value-chains”). These value chains will be further investigated by Multi-Actor Platforms (MAPs) created in each case study by means of dedicated value chain analysis methodology. This methodology provides guidance and protocols to build the representation of the value chain and assess its contribution to the resilience and sustainability of its embedding SES in each case study mountain reference region.
The methodology will guide the MAPs to analyse the current configuration of the value chains in terms of resource use, material and non-material flows, actors, practices, governance, assemblages with other value chains, and telecoupled socio-ecological systems and to identify its impacts on the respective SES in terms of resilience and contribution to sustainable development. The outcome of this analysis allows MAPs to identify opportunities and lock-in mechanisms and to set targets to be achieved to ensure the resilience and sustainable development of mountain areas.

Table 2 summarises the analytical questions which may guide the value chain analysis.

Table 2: Analytical questions for the value chain analysis in MOVING

Framework components	Analytical questions
Practices	What are the most relevant practices carried out by the actors of the observed value chain that may affect the sustainability and the resilience of the region? What are the individual attitudes and habits that shape these practices? What is the know-what and the know-how used?

Framework components	Analytical questions
	How are practices assembled into the analysed value chain? How have practices been adapted to the SES's resource unit/resource system?
Value Chain	What is the importance of the relevant practices in the value chain? Which types of connections are identified for the actors within the observed value chains? Which is the degree of flexibility and diversification of the connections established by primary producers in the assembled value chain? Are the actors connected with other value chains? How did the actors change the practices when joined other connected value chains? Who are your main customers and suppliers in the value chain? What are the most important functions/activities/flows in the value chain?
Resource Units	What are the resource units the practices and the value chain rely upon?
Resource Systems	What are the resource systems the practices and the value chain rely upon (exploit, valorise)? Which of these resource systems are internal and which external to the SES? How are they geographically distributed? Are these resource systems under- or over-exploited? How can we measure their sustainability? Are exploited resource systems private, public or collectively owned? What is the geographical distribution of resource systems involved in value creation?
Actors	Who are the relevant actors involved in the value chains? Which are the actors performing the practices? Are they individual or collective? How do actors justify the way they do their practices?
Governance	What formal and informal governance systems shape or influence the practices at the local level? Which technological pathway provides the background against which practices have developed? What are the power relations within the assembled value chain, with special regard to small players (e.g., small farmers)? Did the value chain's governance system has changed? If yes, how? Does the local governance system support local actors in the realization of practices? And in the creation of new practices?
Outcomes	What are the outcomes of the practices? What values (economic, social, cultural, ecological, symbolic) are generated? From which practice most of the value comes from? How does your value chain contribute to resilience and sustainability of the local SES? Which characteristics and which functions of the value chain can reduce the identified vulnerabilities for the SES and enhance its resilience?
Socio-economic and political setting	Which norms and formal and informal rules shape or influence the practices at the regional, national, and global level?
Related Ecosystems	What are the resource units or actors external to the local SES?

Framework components	Analytical questions
	Do identified assemblages connect the case-study SES with other SESs? How many different SES are telecoupled through the value chain? Where are they located, also in relation to the SES under study? How are the values (or dis-values) distributed among the telecoupled SESs?

Highlighted the questions and related conceptual framework components external to the SES embedding the case-study value chains.

The framework components in Table 2 are ordered based on their centrality into the conceptual framework and their order does not reflect an opinion concerning the relevance of each component for the value chain analysis in MOVING.

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Glossary

Assemblage

The concept of "'assemblage" has been proposed by DeLanda[1], who has developed the reflections by Deleuze and Guattari[2]. In general terms, the assemblage can be conceived as a metaphor that describes complex social objects in which heterogeneous components that may be human and non-human, technical and natural, interact with each other while retaining (regarding purposeful agents) their capacity to act autonomously, including the capacity to leave an assemblage and to participate in more than one assemblage at the same time. Assemblage thinking also highlights the contingency (and intrinsic instability) of any configuration of elements, which are constantly evolving under changing conditions. From a different perspective, the assemblage approach underlines that there are elements (parts) that interact with each other in a way that together they have properties not referable to/observable in the individual elements[3]. These properties are inherently relational, they assume relevance only through the connections/interactions that each element establishes with others.

Business Model

A Business Model (BM) is a conceptual scheme of an enterprise (or in general of an organization), which describes the rationale of how the value is created and captured considering key internal components and key external linkages. This representation constitutes a point of arrival but also of departure of a trajectory that is the result of management decisions (dynamic character)[4]. The expression was first probably used in business modelling software. In the 90s, with the development of Internet, it spread among managers and scholars, who tried to clarify its meaning[5], also connecting it to business strategy in an innovation perspective, and showing its closeness to other concepts, as Networks or Clusters, Business ecosystems, and Value chains[6]. The literature suggests considering the following elements to identify a BM: 1) key Resources and

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[1] DeLanda M. (2006). A New Philosophy of Society: Assemblage Theory and Social Complexity, Bloomsbury Publishing PLC, London.
[2] Deleuze, G., Guattari, F. (1987). A thousand plateaus: capitalism and schizophrenia, University of Minnesota Press, Minneapolis MN.
[3] DeLanda (2006). A New Philosophy of Society: Assemblage Theory and Social Complexity, Bloomsbury Publishing PLC, London.
[4] See among others: 1) Osterwalder, A., & Pigneur, Y. (2010). Business model generation: A handbook for visionaries, game changers, and challengers: (self-published). 2) Burkhart, T., Krumeich, J., Werth, D., and Loos, P., "Analyzing the Business Model Concept — A Comprehensive Classification of Literature" (2011). ICIS 2011 Proceedings. https://aisel.aisnet.org/icis2011/proceedings/generaltopics/12
[5] See among others: Massa, L., Tucci, C. L., Afuah, A., A Critical Assessment of Business Model Research, Academy of Management Annals, 2017, Vol. 11, No. 1, 73–10; DaSilva C. M., Trkman P., Business Model: What It Is and What It Is Not, Long Range Planning 47 (2014) 379–389; George, G., Bock, A.J., 2011. The business model in practice and its implications for entrepreneurship research. Entrepreneurship Theory and Practice 35 (1),83–111; Fielt, E. 2014, 'Conceptualising Business Models: Definitions, Frameworks and Classifications', Journal of Business Models, Vol. 1, No. 1, pp. 85-105; Baden-Fuller C. and Morgan M. S., Business Models as Models, Long Range Planning 43 (2010) 156-171.
[6] Zott, C., & Amit, R. H. (2013). The Business Model: A Theoretically Anchored Robust Construct for Strategic Analysis. Strategic Organization, 11 (4), 403-411.

Competences; 2) Organization (Key activities, key partnerships, and networks); 3) Value proposition (Customer needs and interaction, Channels, Pricing logic)[7].

Conducive policy environment

The concept of policy environment refers to the understanding of 'policy' as a process, that consists of sequences of stages such as problem definition, agenda setting, policy design, policy implementation, policy evaluation[8]. Because of this approach, the outcomes of a policy cannot be related only to the legislative act that has generated the policy, but to the concrete web of interaction between a multiplicity of involved actors. Actors have a different impact according to the stage of the policy process: civil society organization have a key role in the problem definition, political parties in the agenda setting, governments in the policy design, decentralized administrative bodies in the policy implementation, specialized bodies in the policy evaluation stage. Each of these stages can influence the others: for example, public opinion or implementation failure can bring to policy redesign, and policy evaluation can make new problems emerge. The policy environment is thus characterized by the policies, the actors, their patterns of interaction at each stage. A conducive policy environment is generally referred to enterprises, as a policy environment that allows enterprises to operate successfully and achieve their objectives.

Social Practice

The concept of "practices" is developed regarding the Social Practice Theories (SPT), based on the reflections made by sociologists like Bourdieu[9], Giddens[10], Foucault[11], and then developed by other sociologists and anthropologists with reference to specific fields of application. In Shove et al. (2012), social practices are actions-based routines characterized by material elements (objects, tools, infrastructures) and organised with a purpose on the base of available competences and expressing specific meanings (conventions, expectations, tastes)[12]. Thus, a practice is realized on the base of these three elements: material components, competences, meanings (and influenced by actors' habits and attitudes). SPT overcomes the dichotomy between structuralist and functionalist approaches on the one side, and more subjectivist and individualist views on the other: the central unit of analysis is to be found neither on society, nor in autonomous self-determined individuals, but in the meso-realm of "practices"[13].

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[7] See among others: Demil, B., Lecocq, X., Business Model Evolution: In Search of Dynamic Consistency. Long Range Planning 43, 2010, 227-246; Osterwalder & Pigneur (aforementioned); George, G. & Bock, A. J., The Business Model in Practice and its Implications for Entrepreneurship Research. (2011). Entrepreneurship Theory and Practice. 35, (1), 83-111. Research Collection Lee Kong Chian School Of Business). Teece D. J., Business models and dynamic capabilities Long Range Planning 51, 2018, 40-49

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[10] Giddens, A. (1984). The Constitution of Society: Outline of the Theory of Structuration, Stanford University Press, palo Alto, CA.

[11] Foucault, M. (1978-1986). The History of Sexuality, vol. 1, An Introduction, trans. R. Hurley, Pantheon, New York.

[12] Shove, E., Pantzar, M., & Watson, M. (2012). The dynamics of social practice: Everyday life and how it changes. Sage.

[13] Hargreaves, T. (2011). Practice-ing behaviour change: applying social practice theory to pro-environmental behaviour change, Journal of Consumer culture 11 (1): 79-99.

Relational space

According to the relational approach, space is not a 'container', but a 'stabilization' of processes and relations between entities[14]. This approach stresses change over stability, and the need for a study of difference between places not as 'natural' and a-historical features, but as the outcomes of relational dynamics. This approach looks at space as an 'open' entity, where entities meet and interact. 'What gives any place its specificity is the constellation of relations that meet and weave together at a particular locus'. To this regard, 'local' and 'global' are considered 'nodes in relational settings' and are defined in relation to the density and frequency of relations. The concept of relational space allows an understanding of the power relations underlying spatial differences, and opens to new approaches to development, that look at resource flows, at the 'positioning' of places in systems of differences, and at the capture of flows through relational configurations as keys to development strategies[15]. With this approach, network analysis becomes the key analytical tool for geographical studies.

Specificity

The concept of "specificity" relates to the resources characterising a confined geographical area (e.g., municipality, region, mountain area) – local resources - that are embodied in the value chains' products. In the neo-endogenous development approach, these resources are defined as endogenous capital that are mobilised, within value chains, to create value. The concept of specificity is attributed to the subset of resources, also defined as "club goods"[16] (a subset of public goods which are non-rivalrous up-until the point of congestion and excludable) in the economic literature, which are accessible to those belonging to a local community[17]. According to Bourdieu[18], the capital forms that can be designated as endogenous capital are the economic, social, cultural, symbolic, and – accounting for the specificity of rural areas – also natural[34] (e.g., local biodiversity, landscape patters, geomorphological formations) endowed by a rural community.

Socio-Ecological System

Social–ecological systems (SES) are complex, interdependent, and linked systems of people and nature which are nested across scales[19]. They reflect the idea that people (the social system) are part of ecosystems (the ecological system) and shape them according sets of norms and rules

[14] Murdoch, J. (2005). Post-structuralist geography: a guide to relational space. Sage.
[15] Harvey, D. (2006). Spaces of global capitalism. Verso.
[16] Cornes, R., & Sandler, T. (1996). The theory of externalities, public goods and club goods (2nd ed.). Cambridge: Cambridge University Press.
[17] Brunori, G. (2006). Post-rural processes in wealthy rural areas: hybrid networks and symbolic capital. In Between the local and the global. Emerald Group Publishing Limited.
[18] Bourdieu, P. (1998). Practical reason: On the theory of action. Stanford University Press.
[19] Fischer, J., Gardner, T. A., Bennett, E. M., Balvanera, P., Biggs, R., Carpenter, S., ... & Luthe, T. (2015). Advancing sustainability through mainstreaming a social–ecological systems perspective. Current Opinion in Environmental Sustainability, 14, 144-149.

(institutions[20]) and are at the same time dependent on the capacity of ecosystems to provide services for human wellbeing and societal development such as supply of food, fibre, energy, and drinking water. SES are structured in different subsystems which are independent of each other in the accomplishment of many functions but eventually affect each other's performance[21]. In a SES, the resource units (RU), the resource system (RS), the governance system (GS) and the users (U) deliver outcomes (O) as result of interactions within them and with the social, economic, and political settings (S) and the related ecosystems (ECO)[22,23].

Susceptibility, Vulnerability and Resilience

These are interrelated concepts that require to de defined one in relation to the other, for easier understanding.

Susceptibility

Susceptibility is often understood as equal to exposure. In our view, the concept of "susceptibility" includes the concept of "exposure", although it is more elaborated, or detailed. Exposure means the nature and degree to which a system experiences environmental or socio-political stresses, including the characteristics of the disturbance regime: magnitude, frequency, duration, and real extent. However, in a mosaic of land use systems, a given landscape can be exposed to a certain disturbance regime but showing spatial variability in the "susceptibility", e.g., the probability of each landscape element (e.g., land use system), or landscape unit (spatial differentiation of units), of being affected by the disturbance. A considerable part of the ecological disturbances shows a certain level of selectivity for types of elements in the landscape, in regimes of low or moderate disturbance intensity. This is the case also for most socio-economic disturbances. This selectivity decreases with increasing severity of the conditions driving the disturbances. Ultimately, for the most detailed scales "exposure" can be the same as "susceptibility", and the concepts come together again when the disturbances are so severe that they do not show selectivity between landscape elements. Susceptibility can then be conceptualized as the probability of a landscape or land use element to be affected by a particular disturbance.

Vulnerability

Vulnerability identifies the expected losses and damages related to specific disturbances, acknowledging that different elements of a system might be affected differently by these disturbances. According to Adger 2006[24], vulnerability includes the aspect of exposure, which is

[20] Ostrom, E. 1990. Governing the Commons: the Evolution of Institutions for Collective Action. Cambridge: Cambridge University Press.
[21] Ostrom, E. (2007). A diagnostic approach for going beyond panaceas. Proceedings of the national Academy of sciences, 104(39), 15181-15187.
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[24] Adger, W. N. (2006). Vulnerability. Global environmental change, 16(3), 268-281.

part of susceptibility, but also the aspect of sensitivity and adaptive capacity. Vulnerability can be defined as the propensity of exposed elements such as land use systems, landscape features, social groups, local communities, and their activities to suffer adverse effects when impacted by disturbance events. These events can be of distinct magnitude, frequency, duration, and they can occur in the form of sudden shocks or continuous stressors. To this, the different elements will react differently: the disturbance can cause damage to some elements of the system in consideration, and not to others. This means that some are "vulnerable", and others are not. For complex socio-ecological systems, the consequence of vulnerability, or the size of expected losses and damages, or in turn eventually benefits, depends on the qualities of the natural components of the ecosystem, and on the system of knowledge, values, interests and needs prevailing in the area considered.

Resilience

The concept of resilience, starting from its original meaning of “bouncing back” or “withdraw”, mainly referred to physical systems to describe the stability of materials, has rapidly spread in the last decade in the academic and then in the public and policy sphere, first regarding ecosystems and then applied to socio-ecological systems in the aim to frame the analysis of their capability to recover after a perturbation. Its adaptation to the ecological systems and processes comes mainly from natural sciences and hinges on the seminal work on adaptive cycles. A classical definition is given by the Resilience Alliance: “*resilience is the capacity of a social-ecological system to absorb or recover from perturbations and other stressors such that the system remains within the same regime, essentially maintaining its structure and functions*”[25]. In sum, resilience is the capacity of a system to ‘maintain its basic functions and return to the original state after a perturbation’. Resilience can only be measured along time. For the elements of the landscape or land use system mentioned above, there is the possibility that they possess the ability to return to the pre-disturbance stable state.

Technology Pathways

Technology Pathways are cumulative and path-dependent processes (*trajectories*[26]) along which a technology progresses and evolves. These processes are influenced by the conventional knowledge and shared cognitive frames of technology practitioners and societal actors in the broader socio-technical landscape[27]. Technological Pathways are shaped and constrained by the

[25] https://www.resalliance.org/resilience
[26] Dosi, G. (1982). Technological paradigms and technological trajectories: a suggested interpretation of the determinants and directions of technical change. *Research policy*, *11*(3), 147-162.
[27] Geels, F. W. (2002). Technological transitions as evolutionary reconfiguration processes: a multi-level perspective and a case-study. Research policy, 31(8-9), 1257-1274.

technological paradigms[2] or *regimes*[28] in which they have been initiated, which represent the prevailing models and routines for the solution of socio-technical problems[22,29].

Telecoupling

The concept of telecoupling represent the logical broadening of the concepts of coupled socio-ecological systems[19] and their dynamics[30]. Telecoupled systems consists of three components: agents, causes, and effects that generate information, economic resources, and material flows to interrelate a set of apparently distant Socio-Ecological systems[31]. In telecoupled systems, a disturbance in one system (the "sending system")[29] can propagate to the interrelated systems (the "receiving systems")[29] generating unexpected effects, especially if the former dominates the material and non-material flows and the latter are highly sensitive to changes in the dynamics of these flows[32]. The effects include positive or negative environmental and socioeconomic impacts that can promote or prevent the transition towards more sustainable and resilient Socio-Ecological Systems[30,33,34].

Territorial Capital

Territorial Capital is defined as all the local, tangible and intangible, endogenous and exogenous assets, of public and private nature, that constitute the development potential of an area[35]. In an economic perspective, territorial capital is regarded as a distinct bundle of assets which attracts investments and makes the return of certain investments higher than in other regions[36]. These assets are a system of: a) localised externalities, both pecuniary (where their advantages are appropriated through market transactions) and geographical (when advantages are exploited by simple proximity to the source); b) production activities, traditions, skills and know-hows; c) proximity relationships which constitute a 'capital' – of a social, psychological and political nature, d) cultural elements and values which attribute sense and meaning to local practices and structures and define local identities; and e) rules and practices defining a local governance model. A more encompassing understanding, where environmental assets are also included, is provided by the geographic perspective, where territorial capital is conceptualized as all

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[36] OECD (2001), OECD Territorial Outlook, Paris

geographically bounded assets of a territorial nature on which the competitiveness potential of regions and places reposes, which can be broken down into further sub-dimensions, as the economic, human and labour market, social, institutional, environmental, cultural and symbolic[37,38]. For MOVING, dealing with mountains which are spaces where nature assets and the environmental conditions are so determinant of human activity, this integration is crucial.

Value

Value is a perceived benefit. Within a value chain, it is the benefit that each of the components of the supply chain gets from the participation to its activities[39]. The evolution of the concept of value crossed the economic theories from its first conceptual definition in the 1600. During the mercantilism time, the value came from the "trade", one century later in the physiocrats time, the value was related to the "Land", while in 1800 the value came from the "labour" inside the product. Starting from 1900 to now, the concept of value comes from the "preferences". In a market environment, value is translated into 'market value', that depends on the willingness to pay of final users. Today, the concept of value has two specific meanings "the amount of money something could be sold for" and also "how useful or important something is" (Cambridge dictionary). To put together these two elements, we must consider the "direct value" but also the "non direct value" and, in some specific cases, also the "option value" that are specific components of the Total Economic Value[40].

Value chain

Value chain (VC)[41] is the network of actors and activities geographically localised that - through upstream and downstream "often intricate" linkages (inputs, outputs, financial flows, information, etc.) - provide the consumer with a product (or service) obtaining in exchange a value to be distributed between the components of the chain[42]. The "vertical" concept of VC on one hand can be connected to that of Filière and the other hand to those of Commodity Chain and Supply Chain (the latter emerged in logistic management)[43]. The VC approach has been used to describe the shift in the organization of global production toward external networks, giving rise to the Global

[37] Camagni, Roberto. 2019. "Territorial Capital and Regional Development: Theoretical Insights and Appropriate Policies." P. 688 in Handbook of Regional Growth and Development Theories, edited by R. Capello and P. Nijkamp. Handbook of Regional Growth and Development Theories.

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[41] The expression is generally attributed to Porter: "The scope of a firm's activities is to have a powerful role in competitive advantage through its influence on the value chain." Michael E. Porter, Competitive Advantage Creating and Sustaining Superior Performance, The Free Press Division of Macmillan, Inc., 1985 (Chapter 2).

[42] Christopher M., & Peck H., Building the Resilient Supply Chain, International Journal of Logistics Management, Vol. 15, No. 2, pp1-13, 2004; European Commission, Value Chain Analysis for Development (VCA4D), Methodological Brief - Frame and Tools, Version 1.2, April 2018.

[43] See e.g., Michael Hugos, Essentials of Supply Chain Management, John Wiley & Sons, Inc., Hoboken, New Jersey, 2003.

Value Chains (GVC) concept[44]. In the last decades, the VC – in particular the GVC – perspective has gained significant influence in development studies, leading to a standardized analytical procedure known as Value Chain Analysis (VCA)[45]. The key elements of a VCA approach can be summarized as follows: input-output structure; geographical (spatial) characters; governance structure; institutional contexts[46].

[44] See: Timothy J. Sturgeon, From Commodity Chains to Value Chains: Interdisciplinary Theory Building in an Age of Globalization, in: From Frontiers Of Commodity Chain Research By Jennifer Bair, (C) 2008 by the Board of Trustees of the Leland Stanford Jr. University.

[45] We remember here: the FAO procedure; the GIZ technique; and the VCA4D previously mentioned.

[46] Gary Gereffi & Karina Fernandez-Stark, GLOBAL VALUE CHAIN ANALYSIS: A PRIMER, Center on Globalization, Governance & Competitiveness (CGGC), Duke University, Durham, North Carolina, USA, May 31, 2011.