AES BIOFLUX
Advances in Environmental Sciences - International Journal of the Bioflux Society

Community resources in disaster management – Valea Ierii commune, case study

[1]Camelia S. Botezan, [1]Monika Meltzer, [1]Alexandru Ozunu, [2]Yvonne Rademacher

[1] Babeş-Bolyai University, Faculty of Environmental Science and Engineering, Research Centre for Disaster Management, Cluj-Napoca, Romania; [2] Independent Researcher. Corresponding author: C. Botezan, camelia.costan@ubbcluj.ro

Abstract. The past disaster events demonstrated that the community and its resources play a major role in all the stages of disaster management: prevention, mitigation, response and recovery. The identification of these community's resources allows the individuals and the authorities to know and to use them in case of an emergency, thus contributing to both vulnerability and consequence reduction. This case study investigates community internal disaster assets of the mountain community, Valea Ierii, by applying Rademacher's conceptual framework of the political economy of community disaster management assets. The findings reveal the perceived versus self-reported actually used resources were congruent for coordination/response, assessment/preparedness, communication/mitigation and response, and implementation/mitigation and response. The community was particularly strong in the areas of communication and implementation and self-reporting regarding types of resources actually used revealed four kinds of community capital: human, physical, social and cultural.
Key Words: community disaster management assets, community resource types, prevention, vulnerability.

Rezumat. Ultimele evenimente cu impact semnificativ au demonstrat că întreaga comunitate şi resursele sale joacă un rol important în toate etapele managementului dezastrelor: prevenire, reducere, răspuns şi revenire la starea normală. Identificarea acestor resurse comunitare permite atât indivizilor, cât şi autorităţilor, să le cunoască şi să le folosească în cazul producerii unei situaţii de urgenţă, contribuind în acest fel la reducerea vulnerabilităţii şi a consecinţelor. Acest studiu de caz analizează resursele interne de care dispune o comunitate montană, Valea Ierii, în cazul producerii unui dezastru, prin aplicarea modelului conceptual Rademacher referitor la economia politică a resurselor comunităţii pentru managementul dezastrelor. Rezultatele demonstrează că resursele percepute versus resurse folosite de indivizi au fost similare în cazul coordonării/răspunsului, evaluării/pregătirii, comunicării/reducerii şi răspunsului, şi implementării/reducerii şi răspunsului. Rezultatele au arătat puncte tari ale comunităţii în ceea ce priveşte comunicarea şi implementarea, iar răspunsurile personale referitoare la tipurile de resurse folosite au arătat existenţa a patru tipuri de capitaluri: umane, fizice, sociale şi culturale.
Cuvinte cheie: bunuri ale comunităţii pentru managementul dezastrelor, tipuri de resurse ale comunităţii, prevenție, vulnerabilitate.

Introduction. The numerous disaster events which occurred in the last years demonstrated that the participation of the local community is necessary in all the stages of disaster management: prevention, mitigation, response and recovery (Grimm 2014). The community has a full range of potential resources, which need to be clearly identified, in order to use them in the planning process (Rademacher 2013). These are the rationale behind this study, which tries to identify the resources of a common mountain community in Romania, the Valea Ierii commune. The obtained results are useful for the emergency practitioners and the local and national authorities, improving their disaster management capacities, in order to protect the population and to reduce damages and loss.

Although the social capital is thoroughly investigated (Coleman 1988; Helliwell & Putnam, 1999; Payne et al 2010; Adam & Rončević 2003; Adler & Kwon 2002; Castiglione et al 2008; Field 2003; Lin 1999; Woolcock 1998), the still largely unexplored emergency

management capacities of individuals and communities themselves, who assist each other while awaiting the arrival of search and rescue teams, and fill gaps in assistance offer by the institutionalized disaster management system, have gained immense interest in the community of practice and among researchers (Blaikie et al 1994; Shaw 2012; Okada et al 2013). The importance of community resources and community based organizations which support the disaster management activities is emphasized by Twigg (1999), while Maskrey (1989) argues that those approaches which not involve the community increase the vulnerability level.

The Valea Ierii commune is situated in the Apuseni Mountains of northwestern Romania, within the hydrographical basin of Iara river, including three villages with a total of population of 864 inhabitants (NIS 2014). The demographic of the region declined dramatically over the last few decades. In 1977, its population had risen to 1,390 within (CIS, 1940; GIS, 1980) following the industrial development of wood harvesting and processing activities, but after a devastating flood in 1975 and the closure of the wood factor led to a trend of migration. A continuing demographic decline is caused by a falling birth rate and a lack of employment opportunities.

In terms of disaster events, Valea Ierii commune is mostly affected by floods. Most floods (82.1% of the total floods) occur during spring and summer, between May and November (Arghius 2008), due to the advection of air masses from North-West and West. During summer, strong thermal convection processes develop, producing rainfalls of high intensity and large quantities, which cannot be absorbed by the soil (Arghius 2008). There must be mentioned the 1975 flood, which affected the entire country and which had major negative impact on the community: the wood factory, infrastructure and numerous households were affected, while 420 persons were evacuated (data from the National Administration "Romanian Waters", Alba Water Management System). In 2005 another flood impacted the community, with less significant damages. Landslides, forest fires and severe winter weather are other common events.

The intent of this study was to examine the disaster management assets of a second community through the lens of Rademacher's conceptual framework of the political economy of community disaster management assets.

Material and Method. Similar to the original study on community disaster resources in Sussex County, Delaware (Rademacher 2013) a mixed method approach was applied to collect data from the perspective of the community exclusively.

The original questionnaire, which constituted the quantitative component of the study, was projected to uncover a community's capacity by asking about the community's own perception of their disaster management resources and reviews self-reported resources either actually used in previous disasters or perceived to be available but not having been tested in an actual event. Those capacities – actually used and perceived - were placed within a grit representing the four phases of the disaster management cycle, i.e. mitigation, preparedness, response and recovery, which are each further divided into four broad functional areas of disaster management: coordination, assessments, communication, and implementation. Two types of questions – general and exhibit - were attached to each functional area to make sure that the questions were understood by the respondents. For the study on Valea Ierii the original questionnaire was slightly modified to fit it to the local context: a few questions were omitted, while the demographic questions were simplified and questions modified to relate to disaster events in Valea Ierii, mainly the 1975 and 2005/6 floods (the literature review of the historical data demonstrated that these two events had the most significant consequences on the Valea Ierii community), but the multidimensional framework consisting of the above mentioned grid questions remained unmodified.

In addition to the questionnaire, in-depth interviews with residents and a focus group discussion with the town administration and emergency services were carried out. This data was supplemented with a document review as well as field observations – consisting the qualitative component of the study.

At the end of the study, a total of 23 questionnaires were completed representing 57% of females, 43% of males with 54% being between the ages of 26-50 and 46% over

the age of 50. The research team conducted one focus group discussion with government officials and emergency services in Valea Ierii and four in-depth interviews with residents, purposely seeking the perspectives and assessments of not only those residing in the valley but also those further up the mountains.

Results and Discussion

In the first part of the study looks at the finding of the questioner in terms of perceived versus actually used disaster management resources. As each disaster has its own characteristics and can never be entirely planned for, it is critical to understand a community's used- or, as the case may be, underused capacities. In additionally it is examined also when these resources were pooled for the benefit of the whole community in relation to the entire disaster management cycle. In the second part is summarized what specific categories of community resources could be identified in order to understand better the nature and scope of potential capacity available.

Perceived versus actually used resources and their use for collective actions. The study's conceptual framework purposefully included a segment on perceived versus actually used resources in order to better understand the full scope of community resources; that is not only those resources that have been used in previous disaster but also those that, for a range of possible reasons, have not had an opportunity yet to come to the fore but could have the potential to be activated.

The quantitative approach of this segment of the study included both general and exhibited questions to ensure that questions were properly understood and participants' answers were triangulated accordingly. The survey found that perceived versus self-reported actually used resources were congruent with regard to coordination activities in the response phase; assessments activities in disaster preparedness; and communication and implementation efforts during the mitigation and response phases.

However, strikingly, the data showed three areas of perceived but not actually used resources. These are assessment activities for disaster mitigation, as well as perceived resources for communication and implementation activities (Figure 1) during the preparedness phase. This could indicate either potential resources that have not had an opportunity yet to be used, or it could indicate overconfidence in potential resources.

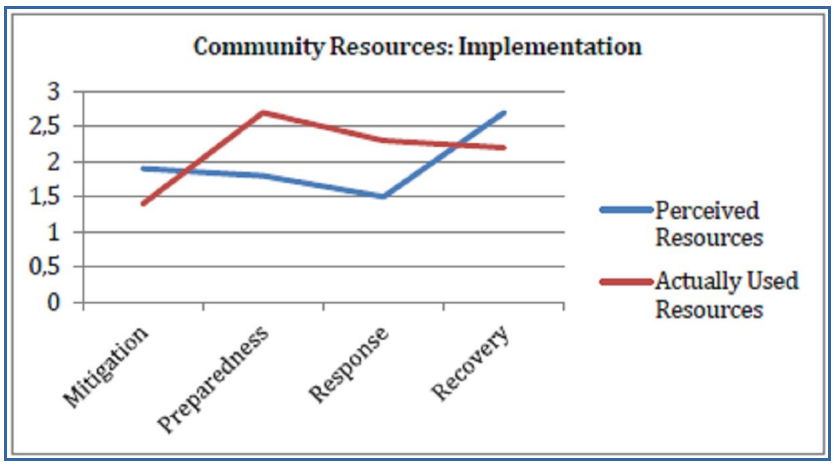

Figure 1. Community resources in implementation.

The data also showed an indication of actually pooled resources for the benefit of the community for implementation activities during disaster recovery. The fact that these were not recognized as also perceived resources would indicate an underestimation of community resources during disaster recovery efforts (Table 1).

Table 1

Questionnaire results in relation to disaster cycle management and functional areas in Valea Ierii

Parameter	Resources	Mitigation		Preparedness		Response		Recovery	
		General	Exhibit	Exhibit	General	General	Exhibit	General	Exhibit
Coordination	Perceived	3	3	2	2.8	1.8	1.8	2.7	3
	Actually used	2.2	2.5	2	2.9	2.3	1.5	2.3	2.8
Assessment	Perceived	1.9	2.6	1	1.8	2	2	2.5	2.4
	Actually used	2	3	1.6	2.7	2.5	2.3	2.8	3.2
Communication	Perceived	2.4	1.7	1.2	2.3	1.4	1.4	2.2	2
	Actually used	1.5	2.3	2.5	2.3	2	1.9	1.5	1.5
Implementation	Perceived	1.4	2.4	1.7	1.8	1.5	1.5	2.2	3.1
	Actually used	1.3	1.5	3.1	2.3	2.8	1.8	1.8	2.6

Note: The mean scores smaller than 2 are interpreted as a positive response and indicate the presence of community resource.

Overall, in relation to the four disaster management phases and functional categories of activity, the community in Valea Ierii showed active collective engagement spread throughout the entire disaster management cycle and evidence of activity in all functional areas. The community was particularly strong in the areas of communication and implementation. However, identifiable community coordination activities were confined to the response phase only.

What is notable is that there are three distinct areas where the community is confident that it has disaster management resources, which however had not been used in actual events that could be identified in this study. These three areas are: (1) assessment/mitigation, (2) communication/preparedness, and (3) implementation/ preparedness (Table 1).

As all of the above mentioned perceived but not actually used resources relate to mitigation and preparedness phase, there is in fact no need for an actual event to take place to observe their activation. These resources could be employed immediately without the constraint of the peculiarities of an actual event to manifest themselves. For instance, the perception that there are assessment capabilities for disaster mitigation measures in the community could be a very important complement and supplement to government assessments. Equally, it might be important for authorities to know how and what communication takes place outside the institutional framework during disaster preparedness. Information that is channeled and formed in the community could be helpful to local emergency services and used for information dissemination.

Assessment activities are a reflection of concern for and interest in hazards. Consequently, what assessment resources are deployed, when, and for what types of events, are all indicators of a community's level of risk awareness. The fact that this study has been able to detect assessment capabilities – actually used and perceived – for the mitigation and preparedness phases suggests that the community has a degree of awareness of hazards affecting Valea Ierii. This coupled with evidence of implementation activities during the same two phases points to assessments in fact subsequently leading to the actual implementation of mitigation and preparedness measures. Again, it has to be reiterated here that these are self-reported assessment and implementation activities that are initiated by community members, outside government efforts. Knowing that these capabilities exist in a community itself is important knowledge for emergency managers and policy-makers. For instance, are the community's assessments and mitigation activities considered in local emergency management plans and supported through public policy instruments? Do they go hand-in-hand, or is there a divergent understanding of disaster risks, and if so, why? The scope of this study was not deep

enough to answer these questions. However, the findings of this study offer entry points for further examination by those interested in working with community resources.

What types of community resources were used*?* The sections above summarized the findings of the relationship between perceived versus actually used community disaster management resources, and when resources where used in relation to the different functional areas of disaster management and the various phases of the disaster management cycle. In addition to this, what was of interest to find out in this study, were the specific types of community disaster management assets available to the community. They can be conceptualized in various ways. Here, two methods were employed. On the one hand, community resources were identified through the theoretical concept of community assets with its distinct types of community capitals and, on the other hand, resources were also categorized in a way that would be understood in the context of categories used by policy makers and in an operational setting. Both are presented below.

From a theoretical community asset perspective, this study of self-reported disaster management capacities in Valea Ierii revealed resources in human, physical, social and culture capitals.

Human capital. Human capital was the most prominent type of community capital detected in this study. However, it was also the most ambivalent and was clearly at the core of understanding the community disaster management assets in Valea Ierii overall.

On the one hand, the most striking self-reported resources related to lessons learned and experiences from past emergencies and disasters that translated into individual households and the community collectively taking proactive mitigation and preparedness measures complementing government efforts. A majority of 79% of survey participants reported that they had learned from previous disasters and had implemented mitigation measures in response (Figure 2).

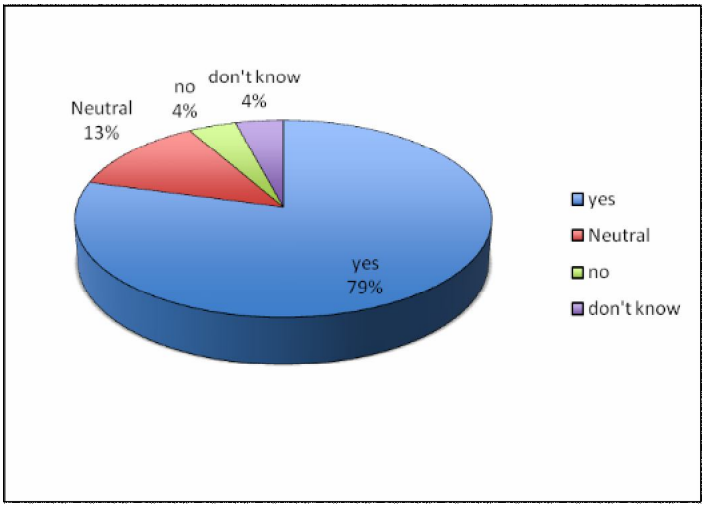

Figure 2. Has the community learned from a previous disaster and taken measures to prevent damage and loss in the future?

Some (62%) had actively looked for information on flood mitigation after the 2005/6 floods, 71% of households had used previous experience to prepare for last year's flood season and, in general, 67% confirmed having had access to external information on best practices for mitigation. In terms of preparedness, 63% reported to have a household preparedness plan in place (Figure 3), and 75% of households shared their information on vulnerable areas with neighbors.

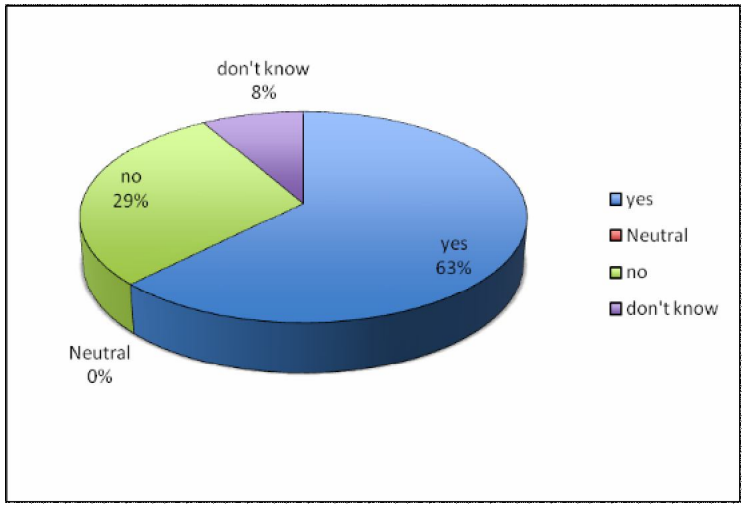

Figure 3. Do you have a household preparedness plan?

These statistics emerging from the questionnaire were corroborated by anecdotes consistently reported by survey participants. For instance, after the devastating floods in 1975, destroyed wooden houses on properties along the riverbed were rebuilt with concrete, on raised basements and, where possible, higher up. In addition, there is active self-reported information seeking on best practices on disaster mitigation and preparedness. Survey participants emphasized the availability of high-speed internet access that made it easier for them to research related topics.

On the one hand, the community seemed to be very active and informed about disaster mitigation and preparedness, indicating the existence of a strong and positive human capital for these two disaster management phases. On the other hand, human capital for response and recovery phases was not so eminent due to an almost fatalistic outlook, the individuals putting their lives in the hands of a supreme force ("No one can help;" and "God will help us").

Social capital. Social capital, like community networks and relationships, is the vehicle through which community members pool their individual resources. In that sense, the outcome of social capital is also an expression of the state of individual capital in the community. Therefore, it was no surprise that the tendencies observed in human capital were also observed in social capital.

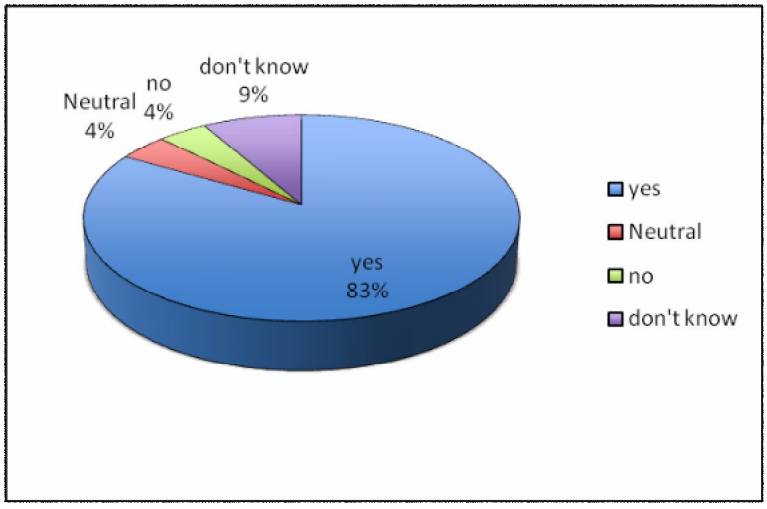

Figure 4. Has the community collective implemented mitigation measures?

Evidence of social capital mirrors the findings of human capital in mitigation and preparedness. For example, the quantitative data extracted from the questionnaire

indicated that 83% of participants reported on the community having collectively implemented mitigation measures (Figure 4), 58% verified that the community had carried out assessments for future flood mitigation, and still a substantial percentage (42%) confirmed that the community had the necessary equipment and resources to evaluate possible ways to minimize flooding.

However, the lack of confidence in response and recovery, as observed in individual human capital, was not entirely reflected in the social capital. There, the data was less conclusive. A sense of community cohesion was reported with 79% believing that they would contact a neighbor as a first point of contact after a disaster (Figure 5), 75% exchanging information after a disaster, and 62% confirming that they had helped a neighbor recover from disaster.

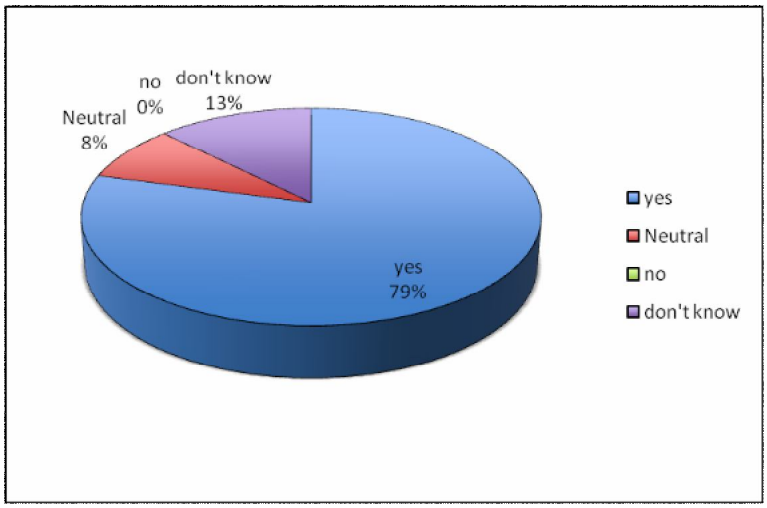

Figure 5. If your household needed help after a disaster, would you first contact a neighbor?

At the same time, while 75% were confident that the community would have the resources to organize their own emergency response, when asked if the community had had sufficient resources when responding to an actual disaster, in this case the 2005/6 floods, only 12% agreed. Even more telling by a hypothetical example in the recovery phase of the community being able to restore key flood protection themselves, only 8% were confident that the community could do so if no government support was available (Figure 6).

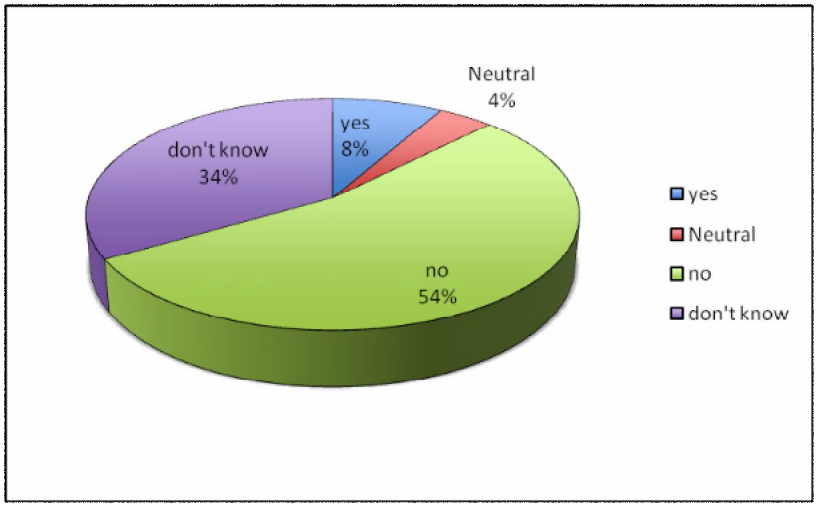

Figure 6. If no government support was available, could the community collectively have the resources to restore key flood protection measures?

This obvious discrepancy of self-reported capacity in mitigation and preparedness versus response and recovery may be best illustrated in the case of housing reconstruction in the flood zone right next to the riverbed. While the population insisted on having information and resources for better flood protection and uses those – as those who as children experienced the devastation of the 1975 flood and as adults consciously decided to build new or renovate old homes more flood resilient, in contrast a consensus on reconstruction in the immediate response phase emerged that "people rebuild homes faster – not better."

A very simple answer to this phenomenon appears to be not a lack of information during response and recovery but rather a lack of financial means readily available in that moment when urgently needed, both at the individual household as well as community level. Positive financial capital did not become visible in this study as community strength. However, it tended to be mentioned consistently as an obstacle to implement better disaster management. There was a great concern that flood protection measures in place at the moment through the dam system further up the river and river embankment in the town center would not be sufficient to contain a major future flood event.

In response to questions about the 2005/6 floods, only 29% concluded that the community had succeeded in integrating better mitigation strategies (Figure 7). Although the survey did not explore causal relationships, the interviews and background information collected consistently pointed to the concern that the awareness of mitigation strategies was present but a lack of financial resources were cited as the main obstacle to better disaster management.

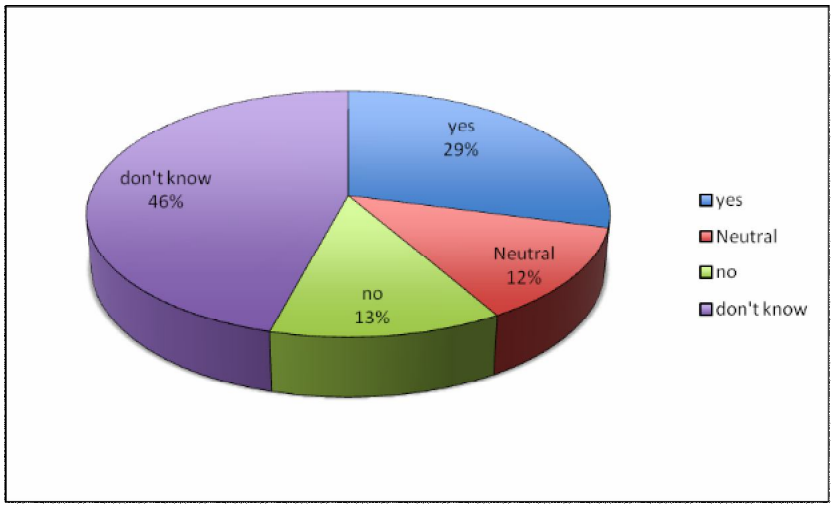

Figure 7. Did the community succeed in integrating better mitigation strategies after the 2005/6 floods?

The other difference between human and social capital in this study related to the prevalence of human capacity in mitigation and preparedness and a lack of confidence in resources for response and recovery. As mentioned above, with regard to social capital, the findings presented a slightly different picture. What explains the presence of social capital in, notably, response but also recovery? The Romanian disaster management system relies on a civil defense approach. By policy, Valea Ierii is supposed to have 50 trained volunteers on stand-by to help the government respond to local emergencies. Being a small and close-knit community and with the administration involving the population at all stages of the disaster management process, the majority of the population is aware of plans and policies.

For example, half of the survey participants confirmed that the community participates in disaster needs assessments alongside government. The community volunteers have extensive experience with working in a team and responding to forest fires. Furthermore, flood protection measures, such as the deepening of the riverbed, the building of cascades and the river embankment, involved local workers, and members of

the volunteer group are in charge of regular assessments of the condition of community structures, such as bridges.

Although only 17% of those participating in this survey were also members of the local volunteer group, one in two survey participants were familiar with the local disaster response plan and 1 in 3 had actually read it.

Extrapolating these statistics to the community at large, it offers some insights into why there might be a stronger perception of capacities to respond to a disaster as a community collectively. However, also for social capital, the community in Valea Ierii clearly expressed ambivalence about its response capacities and, overall, felt that it was not able to do much without government.

Physical capital. In addition to human and social capital, the study also found evidence of physical capital. However, resources were confined to simple household level assets, such as basic tools, communication devices such as mobile phones and access to internet services, food supplies, fire extinguishers and fire protection foil, as well as physical shelter for their own household members as well as to host neighbors displaced by a disaster. As a tradition in the area, many families have two houses, one in the village and the other on the mountain. Moreover, with the region being rich in lumber, the community was able to help each other with the donation of wood for the reconstruction of homes and the fortification of the river embankment.

When asked, 63% believed that they had sufficient resources to protect their households (Figure 8), and the same percentage of survey respondents confirmed a household emergency kit. Moreover, 75% had put additional safety measures in place not required by law, and, related to floods specifically, 48% had built flood protection measures on their properties independent of government support. However, the community did not seem to have stockpiled sandbags ready for use in flash floods.

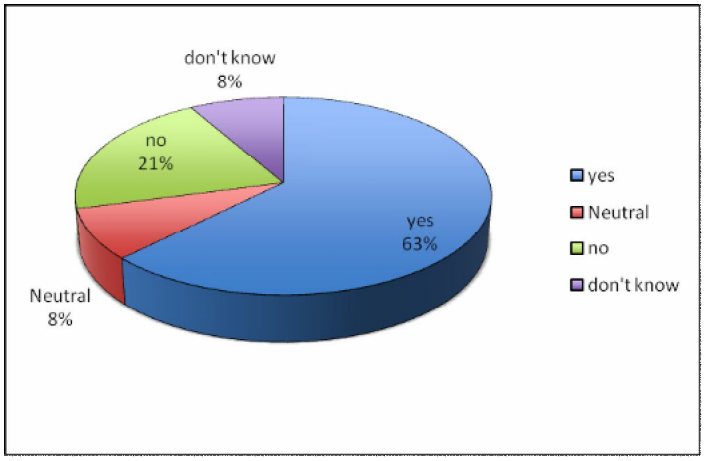

Figure 8. Do you have potential resources to protect the members of your household and your property in case of a disaster?

Again, it has to be emphasized that these self-reported physical assets were in essence basic household items. One survey participant commented that household emergency preparedness was “the medical kit in the car.” Overall, these resources were employed during the immediate preparedness and response phases.

Cultural capital. Last but not least, the other type of community capital that could be clearly identified in this study was cultural capital. Social and cultural capital joined in terms of building a strong local culture of assisting vulnerable neighbors, such as the elderly and disabled. This tradition of checking on this group in non-emergency times and assisting them with, for example, some basic household repairs was carried on in times of disaster. In this survey, 42% reported that they had assisted a vulnerable neighbor (Figure 9).

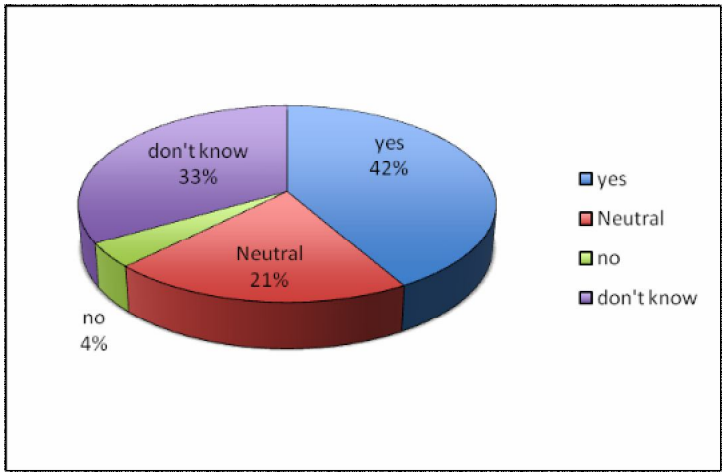

Figure 9. Based on past disasters, did the community take specific measures for vulnerable persons, such as the elderly or disabled?

Conclusions. The study findings uncovered the nature of community disaster recourses in the Valea Ierii mountain community. Understanding the nature of such community internal disaster resources is crucial for disaster managers to be able to plan with these particular resources on a local level to achieve a better disaster management.

An important aspect is to make a difference between perceived and actually used community resources. The study found that resources related to assessment/mitigation, communication/preparedness and implementation/preparedness were received by the community, but not actually used. This could either indicate a potential lack of opportunity, and in that case these resources could be employed immediately without the constraint of the peculiarities of an actual event to manifest themselves, but it could also indicate overconfidence in potential resource. In contrast to the above mentioned areas, community resources for implementation/recovery were used for self-reported collective actions, but were not perceived as such by the mountain community, indicating the underestimation of potential community resources. Finding also indicated that the community was particularly strong in the areas of communication and implementation. However, identifiable community coordination activities were confined to the response phase only and the recovery phase only showed implementation activities.

As for the types of community disaster management assets actually used for collective actions in the mountain community four types of capitals were identified, namely human, physical, social and cultural. Human capital featured as the most prominent but also most ambivalent potential capital highlighting confidence in mitigation and preparedness but strikingly less in response and recovery. There was also evidence of how the lack of one particular capital can be a key obstacle in the unfolding of other existing capitals - even if there was a strong self-reported awareness of mitigation strategies, as a result of past experience and lessons learned the lack of financial capital hindered the community to act on existing disaster capitals.

This study demonstrates that community individuals and resources are important assets and should be used in the process of planning for disaster management. The conclusions drawn after the study of the small mountain community of Valea Ierii may be applicable to other similar communities and should be considered by local and regional authorities in their future plans regarding disaster management.

References

Adam F., Rončević B., 2003 Social capital: recent debates and research trends. Social Science Information 42(2):155–183.

Adler P., Kwon S., 2002 Social capital: prospects for a new concept. Academy of Management Review 27(1):17–40.

Arghiuş V., 2008 [Study of floods on the water courses in Eastern Apuseni Mountains and the associated risks]. Casa Cărţii de Ştiinţă Publishing House, Cluj-Napoca, Romania. [In Romanian].
Blaikie P., Cannon T., Davis I., Wisner B., 1994 At risk: natural hazards, people's vulnerability, and disaster. Routledge, London.
Castiglione D., Van Deth J., Wolleb G. (eds), 2008 The handbook of social capital. Oxford: Oxford University Press.
CIS (Central Institute of Statistics), 1940 General census of Romania's population from 29 December 1930, Vol. IX, Bucharest.
Coleman J., 1988 Social capital in the creation of human capital. Am J Sociol 94:95–120.
Field J., 2003 Social Capital, London: Routledge.
GIS (General Institute of Statistics), 1980 The 5 January population and housing census. Vol. I, Bucharest.
Grimm D., 2014 Whole community planning: building resiliency at the local level. J Bus Contin Emer Plan 7(3):253–259.
Helliwell J. F., Putnam R. D., 1999 Economic growth and social capital in Italy. In: Social capital: A multifaceted Perspective. Dasgupta P., Serageldin I. (eds), pp. 253–268, Washington D.C.
Lin N., 1999 Building a network theory of social capital. Connections 22:28-51.
Maskrey A., 1989 Disaster mitigation: a Community-based approach. Oxfam, Oxford.
NIS (National Institute of Statistics), 2014 The 2011 Population and housing census. Accessed on 29 July 2014 at http://www.recensamantromania.ro
Okada N., Fang L., Kilgour D. M., 2013 Community-based decision making in Japan. Group Decis Negot 22:45–52. DOI 10.1007/s10726-012-9320-8
Payne G. T., Moore C. B., Griffis S. E., Autry C. W., 2010 Multilevel challenges and opportunities in social capital research. Journal of Management 37(2):491–520.
Rademacher Y., 2013 Community disaster management assets: a case study of the farm community in Sussex County, Delaware. Int J Disaster Risk Sci 4(1):33-47.
Shaw R., 2012 Overview of community-based disaster risk reduction. In: Community, environment and disaster risk management. Shaw R. (ed) 10:3–17, Emerald Group Publishing Limited.
Twigg J., 1999 The age of accountability? Future community involvement in disaster reduction. Australian Journal of Emergency Management 14(4):51–58.
Woolcock M., 1998 Social capital and economic development: toward a theoretical synthesis and policy framework. Theory Soc 27:151-208.

Rceived: 04 February 2015. Accepted: 11 March 2015. Published online: 24 April 2015.
Authors:
Camelia Sabina Botezan, Babeş-Bolyai University, Faculty of Environmental Sciences and Engineering, Research Center for Disaster Management, Romania, Cluj-Napoca, 30 Fântânele, 400294, e-mail: camelia.costan@ubbcluj.ro
Monika Meltzer, Babeş-Bolyai University, Faculty of Environmental Sciences and Engineering, Research Center for Disaster Management, Romania, Cluj-Napoca, 30 Fântânele, 400294, e-mail: meltzer.monika@gmail.com
Alexandru Ozunu, Babeş-Bolyai University, Faculty of Environmental Sciences and Engineering, Research Center for Disaster Management, Romania, Cluj-Napoca, 30 Fântânele, 400294, e-mail: alexandru.ozunu@ubbcluj.ro
Yvonne Rademacher, 14781 Memorial Drive, Ap.T 2683 Houston, TX 77079, USA, e-mail: yvonne.rademacher@yahoo.com

How to cite this article:
Botezan C. S., Meltzer M., Ozunu A., Rademacher Y., 2015 Community resources in disaster management – Valea Ierii commune, case study. AES Bioflux 7(2):212-222.