Reversing Rural Abandonment in the Mediterranean: a Capacity and Vulnerability Assessment of communities on the Ionian island Kefalonia, Greece.

By

Charles Jacob Huxford, Alexis Blue, Hope Rietzen

TABLE OF CONTENTS

1.0 INTRODUCTION

The intense earthquake of 1953, on the island of Kefalonia Greece, crippled historic Venetian buildings and infrastructure, creating a mass exodus from the island. Less than one quarter of the original population was left on the island. This report is a vulnerability analysis and risk assessment of the population of Kefalonia. The United Nations definition of sustainable community development was used for the basis of a case study of the village of Farsa, Kefalonia. Farsa is a small village that has deteriorated in the decades following the earthquake because of rural abandonment, economic and political pressures in Greece.

Kefalonia was an appropriate location to conduct vulnerability and risk reduction assessments because rural abandonment is a concern for Euro-Mediterranean countries. Rural abandonment is the leading factor for the large concentration of the Greek population in major cities such as Athens. After the 1953 earthquake, the majority of the residents on Kefalonia moved away, many abroad, but most of them to Athens, the country's capital. The island has been permanently repopulated with over one quarter of the original population, mostly older residents. The bigger villages on the island have been converted to tourist-based activities and only older farmers in remote areas still practice subsistence farming. The island can no longer sustain a long-term livelihood through agriculture, so local municipalities are relying more on tourism to sustain their economy (Ithaca, 2006).

Kefalonia is vulnerable to both natural and economic hazards because the island population fluctuates drastically during the spring and summer tourist seasons. Earthquakes and wildfires occur on a consistent basis on the island but health, fire, and other emergency response services do not account for fluctuations in population levels in their annual comprehensive planning (Evangelos, 2008).

Since most of the economy is centered on tourist activity in Kefalonia, economic downturns or crises' in Europe and Greece can have devastating effects on the vitality of the island. Many businesses that are only open during the spring and summer months rely on the seasonal influx of tourists to support their livelihoods.

2.0 OBJECTIVES

Kefalonia, Greece is vulnerable to hazards due to several unsafe conditions brought on by social and political pressures. The goal of this project was to conduct a general capacity and vulnerability assessment for Kefalonia, identifying unsafe conditions and their manifestation into increased vulnerability. We also analyzed several "households" and their access to resources to cope with various hazards. We then proposed a suite of risk reduction measures to reduce disaster risk while addressing community vulnerability. To help assess the capacity and vulnerability of different sectors of the political/economic

systems and groups in Kefalonia, the team used models to answer the following questions:

- What effect does a top-heavy political system in Greece have on the local decisions made on the island community of Kefalonia?

- How has rural abandonment affected the vulnerability of Kefalonian farmers?

- How can Kefalonia's economy be modified to be most resilient to hazards?

4.0 METHODS

A hybrid model, inspired partly by Wisner's "Pressure and Release Model (PAR)," and a typical problem tree were used to show how the progressions several factors lead to unsafe conditions increasing a community's vulnerability. Several "households," or group of people, were selected as used to form an access profile that inventoried the capacity of resources available assist these households to cope through a disaster. The table used for the access profile was based off the Capacity and Vulnerability Assessment outlined by Cannon et al (Cannon, 2003). We analyzed each household under the condition of one of three hazard scenarios relevant and likely in Kefalonia: severe earthquake, wildfire, or major oil shortage. These methods and models are described below.

4.1 PAR Model and Problem Tree

Wisner describes the Pressure and Release (PAR) Model as a conceptual model that represents the link between socio-economic processes and natural hazards that result in the unfolding of disasters (Wisner, 2004). The PAR model attempts to convey a general sense of the progression of social, political and economic factors that contribute to a community's vulnerability. The PAR defines this evolution with distant root causes that lead to unsafe conditions through dynamic pressures, and helps to explain how an individual, household or community has become vulnerable to various hazards.

Root causes affect the distribution of resources and access among different groups of people. The root causes are often economic, demographic and political factors. These factors are usually intertwined in cultural or ideological beliefs and can often be unrecognizable. Dynamic pressures then translate the effects of the root causes into unsafe conditions over a period of time. Unsafe conditions are the specific forms in which vulnerability is expressed in current time and local space at the intersection with the hazard event (Wisner et al 2004). Figure #1 below shows a basic PAR model.

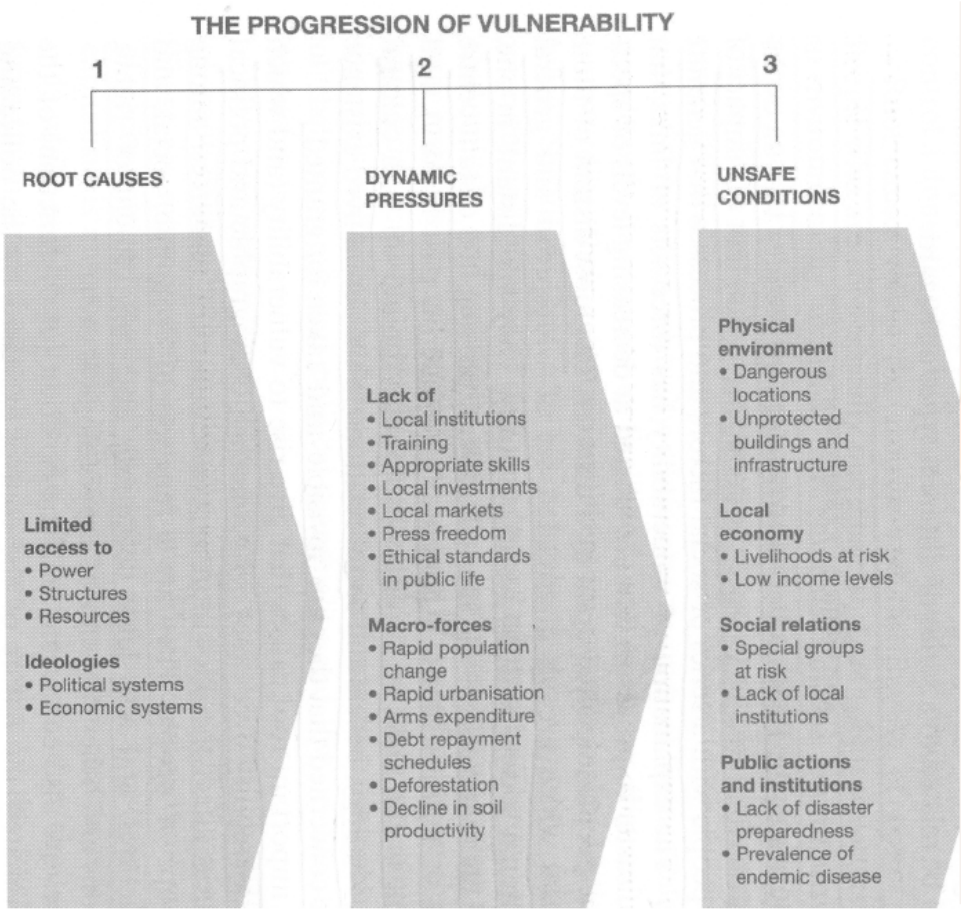

Figure 1 Basic PAR

The PAR is a good conceptual model to represent the factors that lead up to a disaster, but the team finds it difficult to select just three steps for the progression of vulnerability like the PAR suggests. Therefore, it was decided to use a "problem tree" to represent the Pressure and Release idea of root causes, dynamic pressures and unsafe conditions identified in Kefalonia. A problem tree is another conceptual graphic similar to a flow diagram that starts with causes and ends with effects through the one major problem. While some problem trees depict the causes as roots, the main problem as a tree trunk and the effects as leaves, this project used a flow diagram model with causes flowing down to effects through the main analyzed problem. For each of the objectives, our team formulated modified PAR models that consist of root causes leading to the problem or unsafe condition, and then detail the effects that contribute to the target groups' vulnerability.

The Release model is the reverse of the progression of vulnerability to a progression of safety. The release model is the opposite of the vulnerability model, where specific actions and initiatives taken will have a progressing affect towards building a more resilient community.

4.2 Access Profile

An Access Profile uses the concepts of access to resources and community capital that different groups of people rely on to support their livelihoods, and how this influences how their vulnerability to disaster. Community capital is composed of six building blocks including; economic capital, built capital, natural capital, human capital, social capital, and political capital.

This project utilized a hybrid of Wisner's "Access Model"[1] and the Capacity and Vulnerability Assessment (CVA) described by Cannon[2], to construct an access profile for each household. A CVA is used as a diagnostic tool to understand problems and their underlying causes. Creating a CVA for an area makes it easier to prioritize basic social needs and values while focusing on increasing capacity to its community capitals. The access profile is an inventory of the particular capacity to resources each household has and depicts the specific vulnerabilities to its community capitals.

The United Nations defines capacity as a combination of all the strengths and resources available within a community, society or organization that it can use to reduce the level of risk, or the effects of a disaster (UNISDR, 2004). The benefit to creating a CVA is that it can be used for multiple scales. CVA's are also used as a planning tool to prioritize and sequence actions and inputs, as a risk assessment tool to help assess specific risks, and as a tool for empowering and mobilizing vulnerable communities to become more resilient. Resilience is the capacity of a system or community to resist or change in the face of a hazard to reach or maintain a stable level of functioning and structure (UNISDR, 2004).

Below in Table 1 is an example of the access profile that was used to conduct the capacity and vulnerability assessment for the three households. The rows portray the six building blocks of community capitals for each household. There is an additional row for motivational and attitudinal aspects that will affect resilience. The column components signify the inventory of the elements that make up resilience to disaster, concerning each feature of community capital and specific household. Access to community capital, vulnerability and resilience was analyzed for each household, and then the table was filled in appropriately to represent the access profiles for each household.

Table 1 Blank CVA

HOUSEHOLD	Services and Infrastructure	Vulnerabilities	Capacities	Support Needs
Economic/Financial				
Natural/Ecological				
Human/ Personal				
Social/ Cultural				
Political/Organizational				
Built/ Manmade Technical				
Motivational/Attitudinal				

[1] (Wisner, 2004, p. 89)
[2] (Cannon, 2003, p. 21)

5.0 VULNERABILITY ASSESSMENT

The United Nations defines vulnerability as "the conditions determined by physical, social, economic, and environmental factors of processes, which increase the susceptibility of a community to the impact of hazards" (UNISDR, 2004).
This definition was used to determine the three unsafe conditions which have significant influence on the control various groups have over their livelihoods (the command a particular community, or individual, has over economic resources that are used to satisfy its needs) (Wisner, 2004). To analyze the underlying factors at the center of each of the unsafe conditions identified, we used problem tree's to outline the progression of vulnerability.

5.1 Rural Abandonment

Rural abandonment in Kefalonia has is due to several factors including the earthquake of 1953 and Western ideology of coastal development reaching Kefalonian shores. This has increased the sustainability and vulnerability of Kefalonia to various hazards. Due to the earthquake of 1953, most of the population had to move off the island. In the 1960s, government encouraged the building of tourist infrastructure to help Greece's economy catch up with the wealthier countries of the United States, Germany and Great Britain (Premier, 2008). Generations born after the development boom that started in the 1960s are more attracted to tourist-based income, which leaves the elderly population as the only interested people in the traditional farming lifestyle. Most of the Kefalonian population lives in Athens the majority of the year and is no longer interested in carrying on the farming traditions of the elderly generations (Voutsina, 2008).

Rural abandonment is a major issue to Kefalonia's vulnerability to natural hazards that could induce a disaster, such as wildfires. The island has become more conducive to wildfires because under-maintained, overgrown and intertwined olive branches are favorable material to feed and spread fire.

The island is less self-sustaining because fewer agricultural goods are produced thus resulting in more imported commodities (Zaferatos, 2006). These factors make Kefalonia more dependent on outside resources being transported in, especially during the busy tourist season. Those communities that rely on these outside resources to sustain their livelihoods are vulnerable to disruptions in the flow of those resources.

Below, illustrates through a problem tree how rural abandonment has made the farmers of Kefalonia more susceptible to disaster caused by wildfires. The vulnerability increased due to abandonment of their fields and younger generations lack interest in agricultural income opportunities.

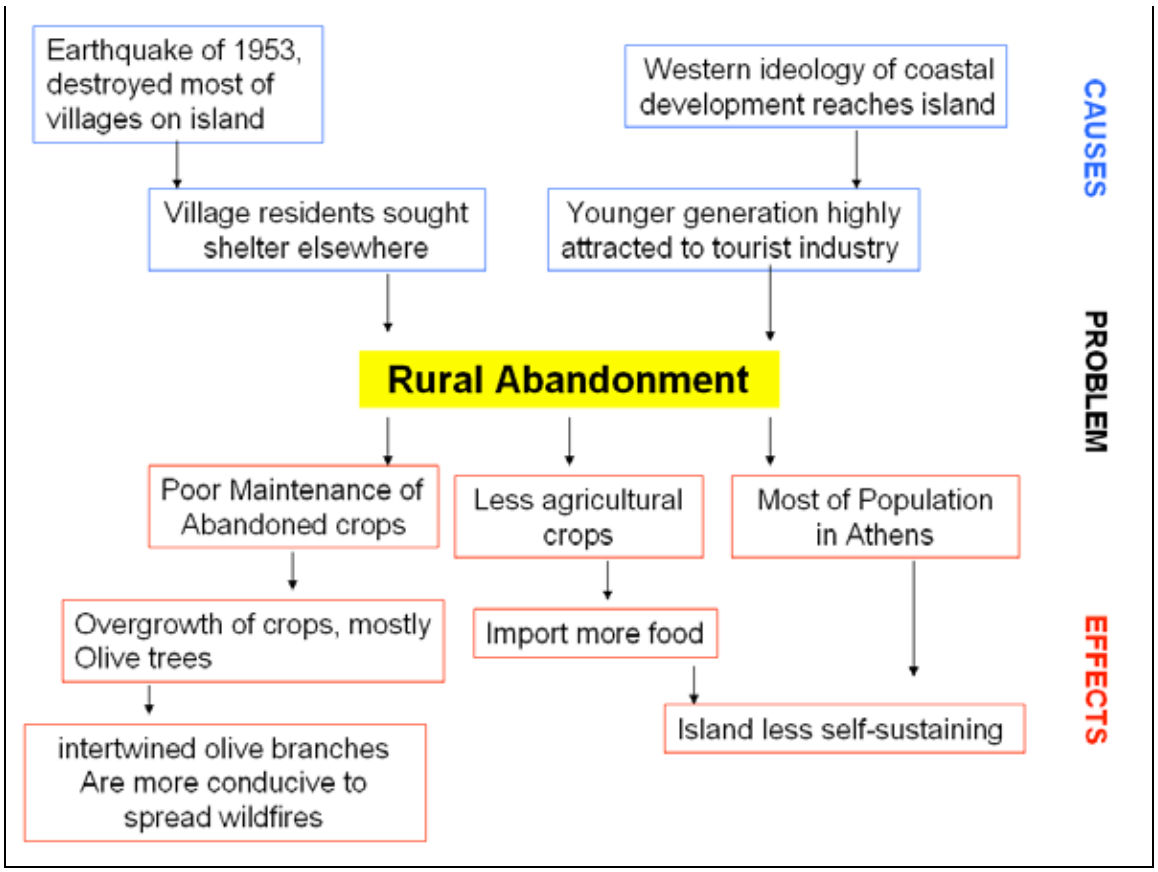

Figure 2 Rural Abandonment Problem Tree

5.2 Top-Heavy Political System

After centuries of war and internal strife, the Greek state has gone through several periods of political instability. The island of Kefalonia has experienced thousands of years of struggling factions and occupying forces littered throughout its history. After the liberation from the Nazi's in 1945, Kefalonia remained in a state of Civil War for several more years. Villages divided and family members turned against one another.

Greece's transition into a democracy developed into a bureaucratic form of patronage where political and public posts are appointed based on kinship and locality--who someone is related to, and where they are from (Tsoukas, 2004). With the succession of new political parties in ministerial positions, favoritism reigns over performance as many public posts are restructured. This in turn developed a "top heavy" bureaucracy in Athens, which has significant control and direct responsibility of carrying out EU policies (Dimitrakopoulos, 2001).

5.2.1 Problem Tree

Below, illustrates how a top-heavy political system has made Kefalonia more susceptible to disasters. This is due to important decisions about Kefalonia are made from the central government in Athens.

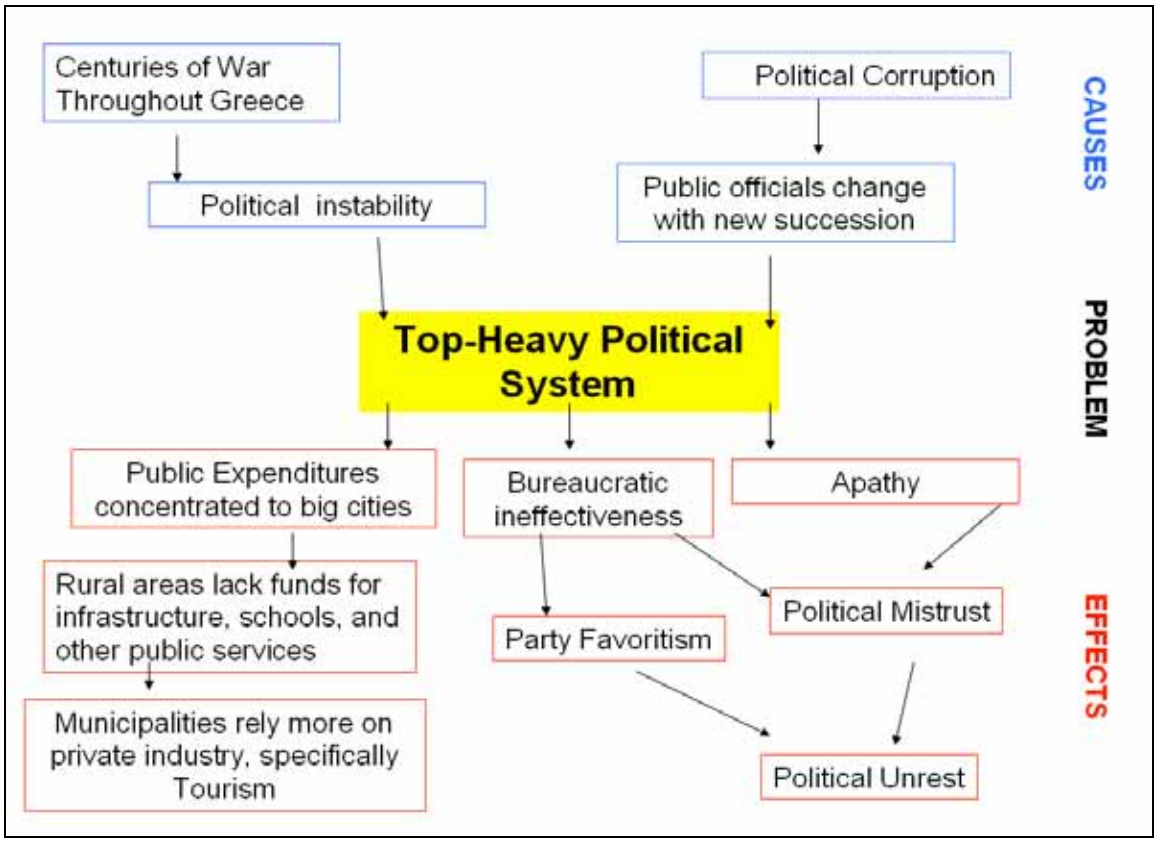

Figure 3 Political Problem Tree

5.2.2. *Island Vulnerability due to Political System*

What effect does a top-heavy political system in Greece have on the local decisions made on the island community of Kefalonia? A top-heavy bureaucracy in Athens has created several issues that influence local decision making on Kefalonia. Because most of the Greek population is concentrated in big cities, rural areas receive less in public expenditures so that local prefectures and municipalities rely more on tourist based private industries to support public funds for infrastructure, schools, and utilities.

With the constant shuffling of ministerial positions, bureaucratic ineffectiveness plagues local and regional governments working towards a project, which is terminated by an opposing party official. This kind of ineffectiveness leads to party favoritism in political appointees, apathy on the part of public officials, and political mistrust. These dynamic factors can lead to corruption and political unrest, in local and regional governments.

5.3 Building a More Resilient Economy

Before the earthquake of 1953, Kefalonia's economy relied on fishing, farming, and trading (Zaferatos, 2006). After the earthquake, the area experienced a massive population migration that has resulted in rural abandonment. The lasting effect of the earthquake to the farming economy combined with economic prosperity in Europe has led to Kefalonia becoming a popular tourist destination.

5.3.1 Problem Tree

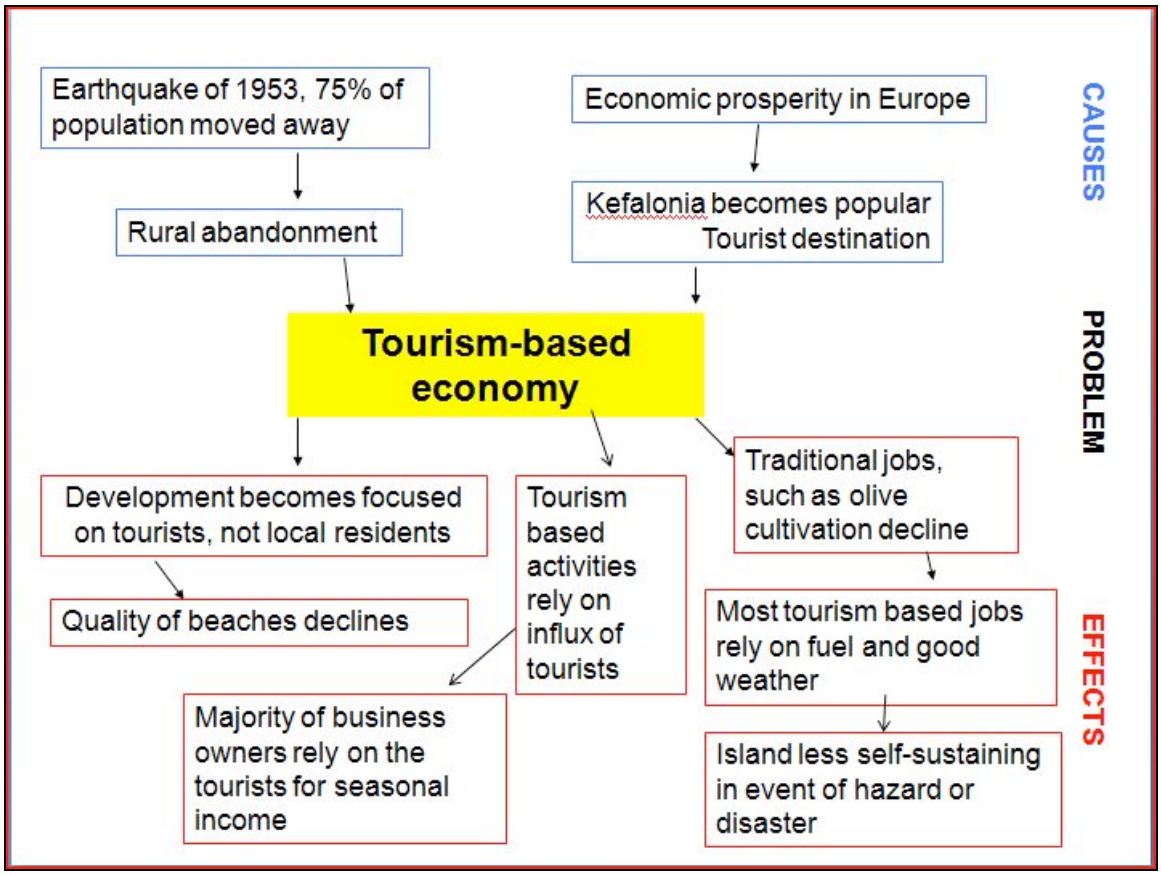

Figure 4 Economy Problem Tree

5.3.2 Strengthening the Economy

How can Kefalonia's economy be strengthened to be most resilient to hazards?
In order for Kefalonia to be most resilient to all hazards, it needs to have a balance between traditional jobs, like olive cultivation, and tourism-based businesses because an increase in tourism comes with vulnerabilities. If the island develops for the good of the tourist industry over the good of the island it is susceptible to a decline in the quality of beaches and other natural elements that keep the tourists coming. Without the influx of tourists during peak seasons due to weather or other conditions tourism-based businesses can seriously be affected since the owners rely on the seasonal income as their main income source. The island could be re-developed in a way that highlights the natural beauty of the area and uses cultural and traditional jobs to keep the economy strong. Traditional pastimes such as olive cultivation honey and wine production contributes to the nostalgia of the Greek culture and can be utilized to promote sustainable tourist activities that could attract visitors year round (Zaferatos, 2006).

5.4 Natural Hazards

Earthquakes and wildfires are the two main natural hazards that affect Kefalonia most frequently. The unsafe conditions outlined in the hybrid pressure and release models significantly increase the vulnerability of specific communities permanently living and visiting the island.

Earthquakes are not unfamiliar to Kefalonian's; the region experiences them at least once a day. This is due to the geographical location Kefalonia in conjunction with the intersection of the European and Aegean tectonic plates, placing it in the heart of a subduction earthquake zone. There has not been a severe earthquake like the one that devastated Kefalonia in the 1950's, so aside from some improved building standards, there is little preparation by emergency officials for another intense seismic event. This is especially problematic when accounting for the massive influx of visitors to the island during tourist season.

Because of the geological nature of the island, access along the two main roads that connect the towns and villages could be severely damaged in an earthquake, making one side of the island inaccessible to other (Evangelos, 2008).

Wildfires occur frequently because of the typical arid Mediterranean landscape and poor municipal firefighting capabilities. Rural abandonment contributes to wildfires because unmaintained vegetation-such as olive groves-grows wild, and becomes more susceptible to increased fire risk. Olive groves in particular are highly flammable, especially after a few years of neglect. Without the ability to build and maintain firebreaks, coupled with inefficient fire fighting resources, these massive blazes are fed by hot dry winds from northern Africa and roll across the landscape.

6.0 CAPACITY ASSESSMENT

Community capital is the human, social, political, natural, financial and built capital from which a community receives benefits, and on which the community relies to maintain its livelihood. The term 'capital' is commonly refers to money and material goods but in the context of vulnerability, this definition is expanded to incorporate actions and indirect factors that affect each community capital. All six types of capital are necessary for communities to function (Measures, 1998-2006). The community should be in charge of managing their capitals, thus making the community more self-sustaining and resilient

6.1 Household 1 - Hospital system

We chose the hospital system on Kefalonia for the capacity and vulnerability assessment because it is an underdeveloped system that is located in a location that receives a massive influx of foreign visitors on an annual basis. The prefecture that receives funding from the Ministry of Health and Social Solidarity (MHSS) in the Athens central government provides the upgrades and funding for the health facilities.

The General Secretariat for Civil Protection (GSCP) is the agency responsible for emergency policies and appropriations in Greece. All emergency response agencies and

health facilities submit an inventory of their immediate resources, as well as requests for additional resources to a regional division of the GSCP on an annual basis. This information is compiled and updated every year. The submitted requests by the hospitals and health clinics do not account for the drastic yearly fluctuations in the population of the island.

The several health clinics spotted around the island require easy access along the two main roads to transport anyone in serious condition to the main hospital in Argostoli, or if needed, by helicopter to Patras or Athens. There are fewer than two hundred beds on the entire island and only two intensive care medical rooms available. Though the hospitals are equipped to cope with the smaller permanent population of around 40,000 inhabitants, they do not have the capacity to treat mass care or perform major surgeries.

Since the central government is based on kinship and locality, a succession of a different party in the Hellenic Ministry significant restructure the health system (Tsoukas, 2004). In the case of Kefalonia, a minister could appoint a representative in the Ministry of Health and Social Solidarity from the Aegean Sea, which could affect their decision when granting financial requests from the prefectures in the Ionian Sea. The graphic CVA depicting the analysis of the hospital system is below.

Table 2 Hospital System CVA

	Services and Infrastructure	Vulnerabilities	Capacities	Support Needs
Economic / Financial	Cost: Ambulance's, Facilities Maintenance, Helicopter transport	*Funds to improve islands in Aegean Sea come out of funds for Ionian Islands *Low per capita health expenditures compared to other OECD countries	*Greece spends an average 9% of GDP on healthcare	*Financial Resources From Ministry in Athens (MHSS) *Supply of fresh water *European Union Funding to uprgade hospitals
Natural / Ecological	*Climate reduces the use of agricultural pesticides	Overgrown Vegetation-fire hazard, salt water intrusion to main water suppy in Argostoli	*Natural Fresh Water Springs around the Island	
Human / Personal	Private Health Insurance available, costs vary	Long waiting lists for specialist appointments and non-urgent operations		
Social / Cultural	*Social Insurance Fund (50% of Greek population): part time and full time employees *National Health System of Greece: free health care for all Greek Residents (EU and non-EU citizens covered on basis of bilateral agreements)		11 Pharmacies on the Island which can support with basic supplies	
Political / Organizational	*Greek National Health System (ESY)	*No welfare program *Home Health Care is underdveloped *kinship/locality, over performance in health care staffing *Top-Heavy Political System; problematic for appropriations	*Social Welfare Institutions *	Ministry of Health and Social Solidarity (MHSS)
Built / Manmade Technical	Two General Hospitals; Argostoli (100 beds) , and Lixouri (35 beds): Two Health Centers for primary care and prevention; Sami of Kefalonia (6 beds), and on the island of Ithaca	*Only two Intensive care rooms on the Island *Not equipped to perform major surgeries *Other medical resources are limitied on the island	Every Health Clinic has at least one generator	Transportation: road infrastructure, ferry boats, helicopter/airport functionality
Motivational / Attitudinal		*High number of smoke related health issues *Power utility workers go on strike, temporarily shutting down power to island	Mediterranean Diet, considered one of the healthiest	

6.2 Household 2 - Glass-bottom boat business and owner

The services, infrastructure, vulnerabilities and capacities specific to a Kefalonian glass-bottom boat business and owner are explained below. The CVA representing the Kefalonian glass-bottom boat business and owner can be found in Table 3 following the text.

Since the 1980's when the airport was first opened, tourism has increased throughout Kefalonia. The increase in tourism in the Prefecture of Kefalonia and Ithaca has pushed for tourism-based businesses that utilize the natural surroundings (Ithaca, 2006).
A glass-bottom boat business and owner were selected because currently there is only one on the island. With an expanding tourism-based economy, the island could see an increase in this business. In the past, Kefalonia has had fuel-shortage problems that can greatly affect the glass-bottom business since it relies on fuel to transport the tourists.

In order for a glass - bottom boat business to be successful, it needs unique and beautiful aquatic life to observe. Kefalonia fulfills these requirements and is also home to two protected species, the Mediterranean monk seal and the Mediterranean green loggerhead turtle. Because this business relies on both aquatic life and fair weather, it is vulnerable to fluctuations due to weather and aquatic life migratory patterns.

Less than half of Kefalonia's residents are full-time while the other half resides in Athens for most of the year (Voutsina, 2008). When the tourism season arrives, Kefalonia is full of seasonal employees to choose from which can be seen as both a capacity and vulnerability. If the employees are incompetent, they can be detrimental to the business and cause a high employee turnover rate, which is hard to deal with. Training people seasonally can get tiresome and is time-consuming. When a business is seasonal, the employees need to be trained and ready in time for the tourists to come. Since locals do not typically take tours like the glass-bottom boat, the business relies almost entirely on tourists. Any fluctuation in the amount of tourists can greatly affect the well-being of the glass-bottom boat business owner.

Table 3 Glass Bottom Boat CVA

Glass bottom boat business and owner	Services and Infrastructure	Vulnerabilities	Capacities	Support Needs
Economic/Financial	cost: boats, fuel, employee wages, pier and/or dock rental space, insurance	relies on accessible fuel to transport tourists; economic downturn in Europe or globally	Greece spends approximately 8.1% of GDP on tourism	consistent fuel supply
Natural/Ecological	water and beaches	endangered sea turtles	unique aquatic life; sea turtle migration	fair weather
Human/ Personal	alcohol and barbeque	incompetent employees; high turn-over rate	rich employee pool	people to take the tour
Social/ Cultural	n/a	over-fishing; seasonal tourism	strong family unit	n/a
Political/Organizational	ministry of tourism, Greek national tourism organization, insurance	renewing permits	utilize government organizations for promoting business;	renewing permits
Built/ Manmade Technical	five harbours/ports located in prefecture; boat maintenance	supply of fuel; fluctuation in oil prices	has easily accessible boat mechanics and parts	maintenance
Motivational/Attitudinal	competent employees	truckers go on strike causing fuel shortage on island	n/a	n/a

6.3 Household 3 - Farmer/Community Elder

A Kefalonian farmer's livelihood is built around the trading of goods and has less significance on monetary income. This is because most of the permanent residents, especially elderly, practice some form of subsistence farming and the cost of farmland is negligible due to inheritance (Fokas, 2008). Currently, there is little opportunity for a Kefalonia farmer to obtain capital other than produced goods and livestock. The larger farmers' markets on the island sell mostly imported goods, and are less likely to sell

locally produced goods. In order to be more resilient, the farmers need production facilities and cooperative organization, not just manufacturing facilities on the island. They also need additional avenues to gain capital besides the local farmer's market.

The natural infrastructure of vineyards and olive groves available to a Kefalonian farmer is immense. The olives and grapes cultivated from the island are of high quality. The water supply is adequate most of the year but due to low rainfall in the summer months, salt-water intrusion into the water system can be a concern (Zaferatos, 2008). There is few associated natural vulnerabilities Kefalonian farmers deal with but unmaintained, intertwined and overgrown olive groves are conducive to wildfire and could adversely affect their crops. Thus increasing the vulnerability of the natural infrastructure of the island to natural hazard induced disasters.

During wine and olive fruiting season, moderate temperatures are a necessity. Dependency on weather for the cultivation of quality goods produces vulnerability to chaotic and unpredicted weather.

Even though the Kefalonian farmer has centuries of experience and is highly specialized at olive and wine cultivation, the farming population is aging. Another contributor to the deterioration of Kefalonian farming culture is the lack of interest in the younger generations to learn and carry the trade. A way for the younger generation to become interested in traditional farming is needed.

Kefalonia farmers have immense social networks and great pride in the quality of their cultivated products. Only personally selected family members and friends receive complimentary olive oil and wine. This makes for a strong sense of community thus adding to the farming community's capacity. Because community members have much pride in sharing their products with close friends and family, it becomes difficult for farmers to organize into cooperatives (Theokatos, 2008). Even though farmers would obtain more subsidies from governments, they would have to give up the right to self-distribution to form an official cooperative. To become less vulnerable, the olive farmers should consider joining in a cooperative much like The Robola Wine Co-op, a successful example of an island-based cooperative.

The European Union designed the Common Agricultural Policy in the 1950's after World War II to address the needs of a stable supply chain of food in Europe. The policy aims to promote quality agricultural products, improve the life in rural areas and preserve the environment and European heritage. Another political entity that adds to the capacity of the Kefalonian farmer is the Ministry of Rural Development and Food. It has aimed to restructure the Greek countryside and promote agricultural production (Lunde 2007). Kefalonia qualifies for these subsidies because some villages were vacated after the earthquake and need funding to promote agricultural development. Greece has an interest in maintaining these areas to take advantage of agricultural production, specifically olive oil. If the farmers elect to receive funding, they will have to maintain low impact farming which could best be achieved through organic certification or Fair Trade Certification (Zaferatos, 2006). These certifications are costly and hard to qualify for as an individual

farmer, so Kefalonia would benefit if it creates a cooperative among interested parties among the villages to share the cost. This would create an organized, inclusive co-op to maintain the standards under the stipulations of the CAP (Theokatos, 2008).

The services, infrastructure, vulnerabilities and capacities specific to a Kefalonian farmer explained above are depicted below in Table 4.

Table 4 Farmer CVA

	Services and Infrastructure	Vulnerabilities	Capacities	Support Needs
Economic/ Financial	cost: farm equipment, olive processing expenses, personal property livestock shows wealth	very little monetary income, tourist-based farmers' market sale little island-based goods	local farmers market	production facilities not just manufacturing facilities, tourist industry to support farmers more
Natural/ Ecological	water supply, olive groves, vineyards	salt water intrusion in water supply during some Summer months due to low rainfall	quality of oilve and grapes, pesticides not needed due to humid and hot climate, Overabundance of olice groves and vineyards	sufficent rain, moderate temperatures during fruiting season, manure for fertilizer
Human/ Personal		aging population	well skilled in farming, centuries of experience	intrigue younger generations to farming
Social/ Cultural	deep pride in cultivating oilves, self distribute olive oil close family and friends, strong since of community	difficult to convince people to form co-op to obtain more subsidies from government, all olive goes to co-op and can't keep any for themselves for self distribution	high quality of social networking, subsistence farming, Rabola Wine Co-op, local farmers market	interest in farming
Political/ Organizational	Prefectural Administration of Kefalonia & Ithaca (PAKI), Common Agricultural Policy (CAP). European Union (EU), Ministry of Food and Rural Development	beurocricy seen in regristration of every olive tree in old communities wanting to restore, application process for ag subsidies	CAP, EU agrictultural subsidies and programs, PAKI in cooperation with the municipalities, organizes local produce exhibitions	subsidies to redevlop from EU due to Greece not having enough funding
Built/ Manmade Technical	buildings use for farm storage in city, farmers markets, grocery stores, manufacturing facitilities, farm equipment	tourist based farmers market uses off-island generated goods	local grocery stores selling island-generated goods, local farmers market	redevelopment of older, damaged cities, more farm equipment
Motivational/ Attitudinal		young population not interested in farming	pride in farming and culitvation, subsistence farming	interest in farming in younger generation

7.0 RECOMMENDATIONS

Between 2005 and 2008, Nicholas Zaferatos from Western Washington University organized a serious of projects where students from universities around the world constructed sustainable community development plans for the abandoned village of Farsa, Kefalonia. The program, Sustainable Development Alternatives for the Historic Village of Farsa, compiled three years of research into the cultural, political, societal and economic resources custom to Kefalonia, to provide the property owners and government officials of Farsa with development alternatives that would be more resilient in the event of another hazard event such as the earthquake in 1953. The objective for each project was to generate ideas for the redevelopment of the village that took into account modern and conventional methods of sustainability while maintaining the historic and traditional character of Farsa and the surrounding villages.

The spring 2008 project was centered on re-establishing Farsa as a vibrant and active community that would be more resilient to hazards. The most significant factor in reducing the vulnerability of Farsa was to reinstate a diverse economic base through

several methods: organizing farm cooperatives for cultural and unique olive, honey and wine production, as well as utilizing ecotourism and agricultural tourism to promote these sectors.

The methods and practices generated in the Sustainable Development Alternatives for the Historic Village of Farsa program were used to recommend techniques other Mediterranean communities also suffering from rural abandonment to utilize. Represented below is the “progression of safety” in the reverse problem tree.

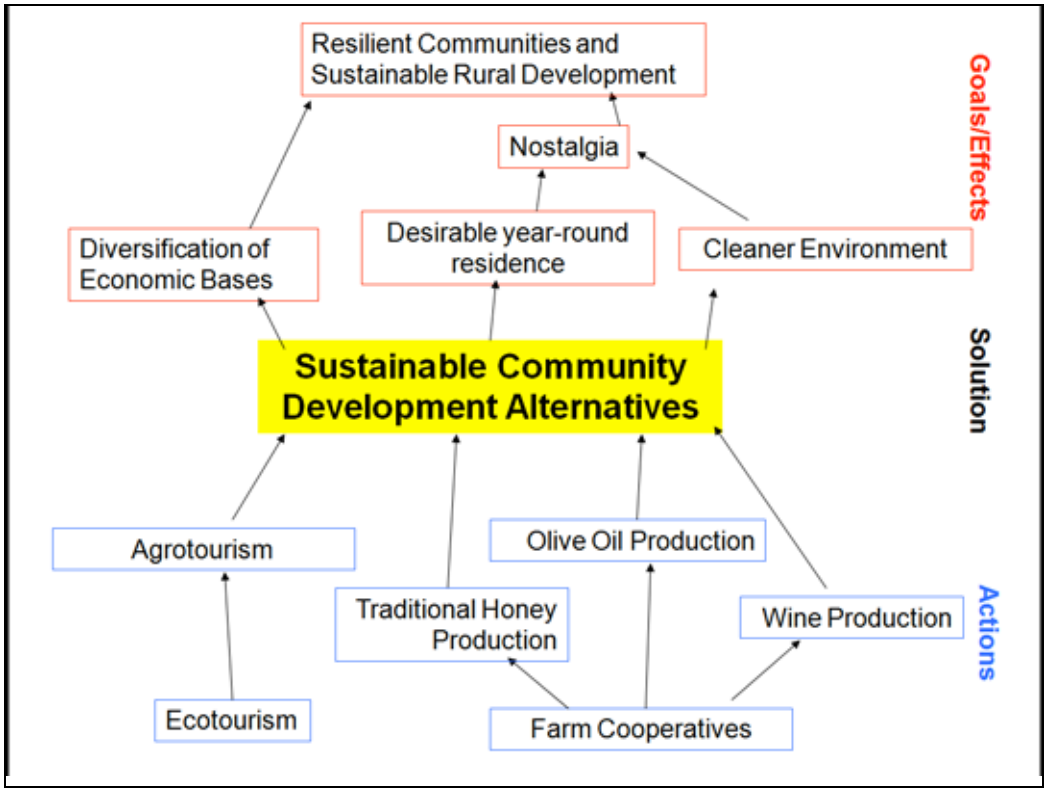

Figure 5 Release Model

Specific actions strengthen the Kefalonian economy through the pursuit of farm cooperatives and ecotourism that lead to the solution of providing sustainable development alternatives for the community. This will have lasting effects by diversifying the local economic base so that it isn’t strictly reliant on seasonal tourism, re-establish a desire for people to live on the island year-round, and strive to attain a cleaner environment.

These actions and development goals lead sustainable rural development, utilizing a blend of modern innovation with traditional character, to empower a community to become more resilient to hazards.

APPENDIX A: DATA SOURCES

This assessment was inspired by the spring 2008 Sustainable Community Development Program for the village of Farsa, Kefalonia Greece. Many of the interviews and research conducted during the spring program led to the formation of this assessment.

Data Sources for Top-Heavy Political System

Information gathered through interviews with local politicians, emergency management personnel, and Greek teachers and residents influenced the second objective; how a top-heavy political system affects local decisions on Kefalonia. Discussions with local government and public officials from the Farsa council and capital city of Argostoli, contributed in the formation of this objective. Other sources of information for this objective included films such as; "A Touch Of Spice" and "Rebetiko," which depicted the political history post World War II to modern Greece.

Data Sources for Rural Abandonment

Primary resources for data sources for rural abandonment are interviews. These interviews formulated the question on rural abandonment's effects on Kefalonian farmers including local farmers with generational ancestral lineage to Kefalonia, and members of the Robola Wine Cooperative-a successful organization of local farmers on Kefalonia. Secondary resources used included: Rural Development and Sustainable Agriculture in the European Mediterranean: A Case Study on Olive Oil Production in Kefalonia, Greece (Lunde, 2008); Agricultural Food—Greece, EarthTrends Country Profiles (Institute, 2003); The Common Agricultural Policy Explained (Commission, 2004);

Data Sources for a Resilient Economy

Most of the information used to formulate the resilient economy in Kefalonia objective was gathered through interviews with hotel and small business owners, and Greek university professors of tourism and business management. Secondary resources utilized for the objective include various articles on sustainable tourism, agricultural tourism, and Greek government websites, which outline their infrastructure and development initiatives for the Prefecture of Kefalonia.

APPENDIX B: REFERENCES

A.Kalokerinou. (2004). Home Health Care in Greece. *ICUS NURS WEB J* , Issue 17.

Anthopoulou, T. (1999). Agrotourism and the Rural Environment: Constraints and opportunities in the Mediterranean less-favoured areas. In H. Briassoulis, *Tourism and the Environment. Regional, Economic, Cultural and Policy Issues* (pp. 357-375). Huwer Academic Publishers.

ArtKreta.gr. (n.d.). *Greek Health System*. Retrieved March 12, 2009, from Greek Index: http://www.greeceindex.com/greece-health/greece_health_system.html

Benetatos, T. (2008, May 28). Farmer and property owner in Farsa. (C. Huxford, Interviewer)

Bitsaki, A. (2001). *Organic farming in Greece Trends and Perspectives.* Retrieved March 13, 2009, from http://ressources.ciheam.org/om/pdf/c61/00800151.pdf

Boulmetis, T. (Director). (2003). *A Touch Of Spice* [Motion Picture].

Cannon, T. (2003). *Socia Vulnerability, Sustainable Livelihoods, and Disasters.*

Commission, E. (2004). *The Common Agricultural Policy Explained.* Germany: Eugene Leguen de Lacroix.

Dimitrakopoulos, D. (2001). Learning and steering: changing implementation patterns and the Greek central government. *Journal of European Public Policy* , 604-622.

Evangelos, A. (2008, May 26). PSEA-Kefalonia division of General Secretariat of Civil Protection. (C. Huxford, Interviewer)

Ferris, C. (Director). (1983). *Rebetiko* [Motion Picture].
Fokas, S. (2008, May 15). Farmer with generational lineage to Kefalonia. (C. Huxford, Interviewer)

Food, M. o. (n.d.). *Strategic Targets for Agricultural Development And Restructuring of the Countryside*. Retrieved March 12, 2009, from Ministry of Rural Development and Food: http://www.minagric.gr/en/index.html

Institute, W. R. (2003). *Agricultural Food--Greece*. Retrieved March 13, 2009, from EarthTrends: http://earthtrends.wri.org/pdf_library/country_profiles/agr_cou_300.pdf

Ithaca, S. G. (2006). *Educational Institutions, First Aid Information* . Retrieved March 10, 2009, from Self Government Prefecture of Kefalonia and Ithaca: http://www.kefalonia-online.gr/frontoffice/portal.asp?cpage=NODE&cnode=1&clang=1

Kobe-Hyogo, J. .. (2005, January 18-22). *Report and information on disaster reduction for Greece for the World Conference on Disaster Reduction.* Retrieved March 1, 2009, from General Secretariat for Civil Protection: www.civilprotection.gr

Lunde, A. (2008). *Rural Develoopment and Sustaiable Agriculture in the European Mediterranean: A Case Study on Olive Production in Kefalonia, Greece.* Bellingham : Western Washington University .

Manfred Huber, P. a. (2003). *Health Expenditure Trends in OECD Countries, 1990-2001.* Retrieved March 12, 2009, from Health Care Financing Review: http://www.cms.hhs.gov/HealthCareFinancingReview/Downloads/03fallpg1.pdf

Measures, S. (1998-2006). *Key Term: Community Capital.* Retrieved March 15, 2009, from Sustainable Measures: http://www.sustainablemeasures.com/Sustainability/KeyTermCommCapital.html

mlahanas.de. (n.d.). *Kefalonia.* Retrieved March 14, 2009, from Greece: http://www.mlahanas.de/Greece/Cities/Kefalonia.html

Premier, M. (2008). Asia, beware Benidorm. *Economist* , 387.

Theokatos, S. (2008, May 23). Robola Wine Cooperative Director. (C. Huxford, Interviewer)

Tsoukas, A. A. (2004). Measuring Nothing: The Case of the Greek National Health System. *Human Relations* , Vol. 57 661-690.

UNISDR. (2004). *International Strategy For Disaster Reduction.* Retrieved March 10, 2009, from Living with Risk: A global review of disaster reduction initiatives: http://www.unisdr.org/eng/about_isdr/bd-lwr-2004-eng.htm

Voutsina, V. (2008, May 27). Farsa Council Representative. (C. Huxford, Interviewer) Wisner. (2004). *At Risk: Natural hazards, people's vulnerability and disasters.* New York: Routledge.

Zaferatos, N. (2006). *Sustainable Development Alternatives for the Historic Village of Farsa.* Western Washington University .

Zhou, D. (1997). ESTIMATING ECONOMIC IMPACTS from Tourism. *Annals of Tourism Research* , 76-89.