

The Effect of Social Capital on Post-earthquake Reconstruction (Programmes) in Nantou County, Taiwan: An Assessment

1. Introduction

On Sept. 21, 1999, an earthquake measuring 7.3 on the Richter scale struck Taiwan which resulted into serious damage to villages in the central part of the island. Many houses were destroyed, many facilities were damaged, and crops were ruined. Mountain collapses, landslides, and deformations in the shape of the land were noticeable. Nantou County was hardest hit by the earthquake, accounting for 54 percent of the houses totally or partially destroyed in Taiwan (see Table 1). The disaster presented central and local government with the biggest challenges they had ever faced. In order to revive the villages after the disaster, the government initiated an integrated programme of village reconstruction, especially in Nantou County.

Table 1: Damage to houses and human life by the 921 earthquake in 1999

County, city	Houses totally destroyed	Houses partially destroyed	Total	Dead and missing	Seriously injured
Taipei City	164	—	164	88	17
Taipei County	221	690	911	46	4
Taoyuan County	1	2	3	1	1
Hsinchu County	6	13	19	—	—
Miaoli County	624	578	1202	6	6
Taichung County	19,038	18,675	37,713	1,205	331
Changhua County	807	556	1,363	33	11
Nantou County	29,417	28,234	57,651	922	262
Yunlin County	523	472	995	83	20
Chiai County	30	91	121	6	—
Tainan County	3	3	6	1	1
Hsinchu City	—	—	-	2	3
Taichung City	2,803	3,709	6512	113	23
Chiai City	24	1	25	—	—
Total	53,661	53,024	106,685	2,506	679

Source : The 921 Earthquake Post-Disaster Recover Commission, Executive Yuan, 2004

What is Social Capital?

The works on social capital have made an effort to identify particular social conditions that lead to good economic condition and improve the conditions of society (Coleman 1988; Putnam 1993). They also refer trust and norms of civic-minded behaviour as manifestations of social capital. A study conducted by Narayan (1997) shows that ownership of social capital by households in Tanzania has strong effects on household welfare. Chopra (2002) discusses the precise nature of the creation of social capital and the role it plays in furthering development

interventions at the local level as well as the nature of interaction between new institutions and older formalized networks.

Bourdieu¹ divides capital into three forms: economic, cultural and social. He has suggested that one form of capital is convertible to another form. In addition, according to Coleman, social capital consists of different components, but all these components have two common features. First, all have some aspects of social structure. Second, they facilitate certain actions of actors within the structure. Social capital is capital because it is productive and can facilitate the achievement of certain objectives that are not possible in its absence. It is a public good and this feature distinguishes it from other forms of capital².

Type of Social Capital

There are two types of social capital: structural and cognitive. Structural social capital is an objective and tangible concept. It comprises informal and formal organizational structures in a community. Cognitive social capital refers to generalized norms, attitudes, and values among individuals. The two types of social capital are complementary.

Dimensions of Social Capital

Social capital has three dimensions: bonding, bridging and linking. *Bonding social capital* consists of strong ties within a horizontal network such as family, friends, neighbors, colleagues, and farmers in a division. *Bridging social capital* consists of ties with the members of other groups with similar economic and political status, such as relationships between the farmers of two divisions or farmers of other farms. *Linking social capital* consists of vertical relations with formal institutions and organization, which is the level of trust between farmers and extension agents, or the staff of government agencies. The first two dimensions of social capital are horizontal (that is, connecting people with more equal social standing), while the latter is vertical. Assess to linking social capital is very important for the well being of the individual and the community.

Measurement Issues

The indicators measure social capital at the micro and macro levels. Micro-level indicators measure social capital at individual and household levels. Macro-level indicators measure social capital at the national level.

¹ As cited in Winter (2000) .

² As cited in Winter (2000) .

Hence, the study makes an attempt to understand the impact of social capital on post-earthquake reconstruction programmes in Nantou County after the 1999 earthquake in a micro context. Instead of measuring social capital, the paper assumes that social capital has been fostered among government agents by their involvement in community reconstruction programmes and examines the impact of such capital on the practice, knowledge, and perception at the household level through a comparison between households before and after the quake. Specifically, the impact is investigated in terms of the following three aspects: “unemployment reduction”, “infrastructure improvement” and “respondents’ betterment”.

The study consists of six sections, including this introduction as the first. Section 2 describes research subjects and provides background information on the study site. Section 3 gives research questions and hypotheses. Section 4 introduces the methodology employed in this study. Section 5 presents results and analyses, and the final section gives conclusions and policy implications.

2. Survey subjects

(1) Background information on Nantou

Taiwan consists of sixteen counties and two special municipalities (refer to Figure 1). The study site, Nantou County, is located in central Taiwan, and has been likened to the heart of Taiwan; land area is 4,106 square kilometers. Nantou County had a total population of 541,292 in 2002, as shown in Table 2. Local government was initiated at Nantou City in 1950.

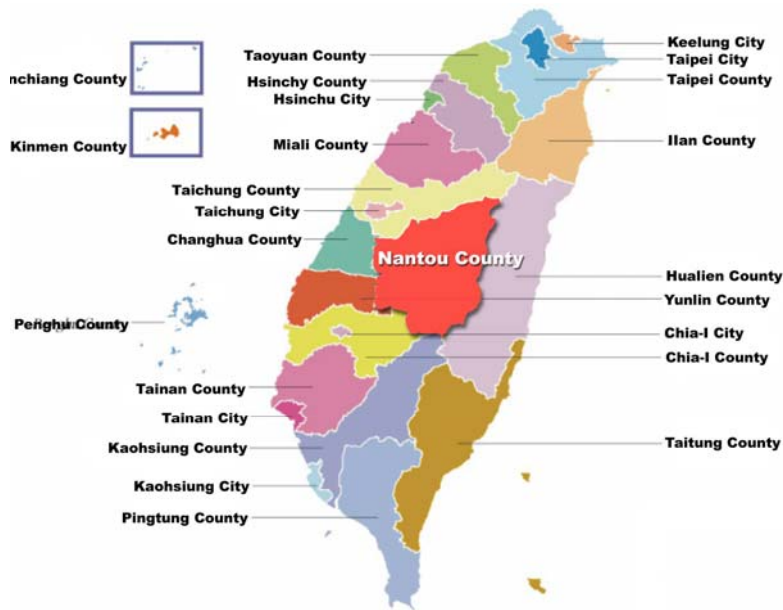


Figure 1: Map of Taiwan

Source: Dept of Land Administration, M. O.I. <http://www.moiland.gov.tw/translation/>

Nantou County has a city (Nantou City) and 12 townships, as shown in Figure 2. Each township area has villages and li. “Village” refers to a municipal administrative unit normally under the level of a township. The form of such villages varies according to their historical background and topographical features, but tightly nucleated patterns are common³. “Li” refers to a municipal administrative unit normally under the level of a city. There are a total of 127 villages in Nantou County, and 133 li. Each village and li consists of several liens, which are based on naturally formed residential patterns and number 4,228.

Comparing the periods before and after the 921 quake in 1999, the population decreased slightly from 544,022 in 1999 to 541,292 in 2002 (refer to Table 2).

³ Word usage follows Fukutake (1972), p.81.

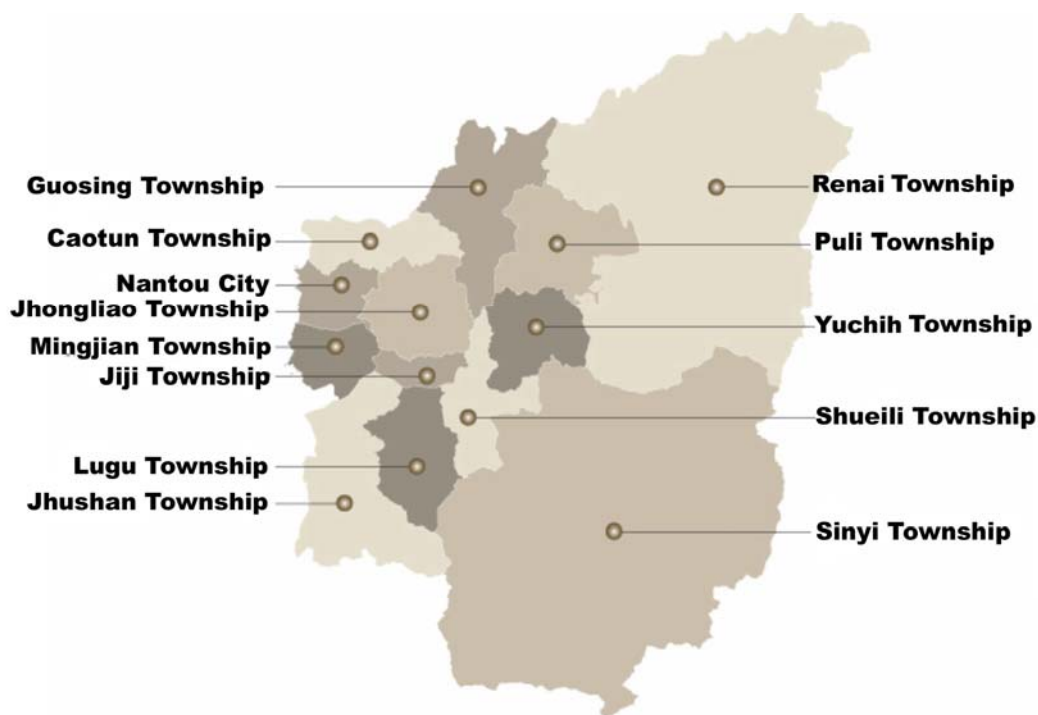


Figure 2: Map of Nantou

Source: Dept of Land Administration, M. O.I. <http://www.moiland.gov.tw/translation/>

Table 2: Nantou County population figures for 1994, 1999*, 2000, and 2002

Town-ship Year	Nantou City	Tsau Tuen	Chung Liao	Ming Chien	Ji Ji	Ju Shan	Guo Shing	Shuei Li	Lu Gu	Pu Li	Yu Chr	Ren Ai	Hsin Yi	Total
1994	102051	87493	94082	62912	12514	42895	21988	19240	18460	25622	25210	18304	15288	546059
1999	104723	87933	97280	61811	12335	42752	21062	17925	17910	24173	22996	17750	15372	544022
2000	104406	87526	97740	61209	12302	42791	20801	17688	17713	23675	22632	17673	11745	537901
2002	105061	87417	98617	60782	12328	42774	20428	17394	17806	23136	22276	17761	15512	541292

Source: Compiled from the Nantou County Statistical Yearbook, 2003

Note: * indicates the earthquake year

(2) Site selection (reasons for the sites selected)

Nantou was the most seriously damaged county in Taiwan during the 1999

earthquake, and Nantou City and Puli Township accounted for nearly 50 percent (24,361) of the 57,191 buildings damaged in Nantou County (refer to Table 3). Therefore, Lugu Village in Lugu Township and Taomi Village in Puli Township were selected for investigation since they were affected by government project implementations after the quake, and the two represent different parts of the County in terms of population size, economy, and administrative functions.

More important, the two townships were selected because they are so-called reconstruction successes, other villages are still suffering the effects of the quake.

This study is organized to enable comparisons between the two successful townships and other places where programme implementation is still lacking. Hence, Zhen-xing in Nantou City was selected because there has been “no policy implementation”⁴.

Table 3: Houses Damage by township in 921 earthquake

	Totally destroyed	Partially destroyed	Total
Nantou City	5,213	6,318	11,531
Puli Township	6,220	6,610	12,830
Caotun Township	2,557	4,003	6,560
Jhushan Township	2,715	2,973	5,688
Jiji Township	1,816	834	2,650
Mingjian Township	359	443	802
Lugu Township	1,140	1,016	2,156
Jhongliao Township	2,542	1,424	3,966
Yuchih Township	2,375	1,476	3,851
Guosing Township	1,913	1,871	3,784

⁴ The term “no policy implementation” used in this study, indicates that apart from concrete construction on some maintenance engineering works, there is no software package or structural readjustment programme to revive the local economy.

Shueili Township	599	1,231	1,830
Sinyi Township	438	357	795
Renai Township	330	418	748
Total	28,217	28,974	57,191

Source : The 921 Earthquake Post-Disaster Recover Commission, Executive Yuan, 2004

Lugu Township

Geography and public works

Geography

Lugu Township is situated in southwest Nantou County (refer to Figure 3) adjacent to Shueili Township and Sinyi Township on the east, Jhushan Township on the west and south, and Jiji Township across the Jhuoshuei River on the north. It is about 9 km wide and 16 km long with a total area of 141.89 km². Green mountains and hills rise and fall on the east, south and north and it has a mild and pleasant subtropical climate. Mt. Lingtou, the highest peak, has an elevation of 2,025 m and the famous Fonghuan Mountain is 1,698 m high. Most of the mountainous regions in the township consist of the extended ridges of these two tall mountains, and its rectangular shape of slanting topography is higher on the south and lowers on the north.

In 1999, more than one-third of its buildings (271) were destroyed, including partially destroyed, accounting for 42 percent of the 649 in Lugu Village, as shown in Table 4.

The policies for people, whose house totally destroyed are, a compensation from the government, amounting to NT\$200,000 (USD 6,250: 32NTD= 1 USD, 2002), plus a free loan of NT\$2,000,000 payable for 20 years; for the people whose house partially destroyed would get a compensation of NT\$ 100,000 grant.



Figure 3: Map of Lugu

Source: Elofa Portal Site <http://www.elofa.com.tw/nato/>

Table 4: Background information on Zhen-xing, Lugu and Taomi

Village	Area	Population	No. of households	Buildings totally destroyed	Buildings partially destroyed
Lugu Village	3.2925 km ²	2243	649	109	162
Taomi Village	17.9 km ²	1262	407	168	60
Zhen-xing Li	3.6812 km ²	2416	702	68	178

Source: Nantou County Statistical Year Book, 2004

At the end of October 2003, there were about 18,000 people in this township and 45 percent of the population made its living from farming and forestry. Over half of its arable land is devoted to tea gardens and the delicate and fragrant Dong Ding Wu Long tea is the most important economic crop. The booming development of tea plantations brought rapid progress and prosperity to the economy and culture of Lugu Township.

Major public works completed after the 921 earthquake in Lugu Village:

Table 5: Lugu village post-disaster reconstruction projects from 1999 to 2004

Project title	Executive organization	Funding organization	Duration	Capital*
Lugu commercial mall and billboard design project	Lugu Township Office	Ministry of Economic Affairs (MOEA) Department of Commerce	01/2004 – 01/2005	800,000
Lugu summer house project	Lugu Township Office	Nantou County Government	06/2004 – 06/2005	500,000
Lugu commercial mall design project	Lugu Township Office	921 Earthquake Post-disaster Recovery Commission	01/2002 – 12/2003	10,500,000
Lugu Village Pei-shei River dike maintenance	Lugu Township Office	921 Earthquake Post-disaster Recovery Commission	06/2003 – 12/2004	3,000,000
Lugu elementary school construction	Tzu Chi Foundation	Tzu Chi Foundation	08/2000 – 06/2001	51,870,000
Lugu Village agricultural path maintenance	Lugu Township Office	921 Earthquake Post-disaster Recovery Commission	2000 – 12/2000	80,000
Lugu Village agricultural path reconstruction engineering work	Lugu Township Office	921 Earthquake Post-disaster Recovery Commission	2000 – 12/2000	30,000
Lugu Village sub-path block abode engineering work	Lugu Township Office	921 Earthquake Post-disaster Recovery Commission	2000 – 12/2001	84,000
Lugu Village sub-path block abode engineering work	Lugu Township Office	921 Earthquake Post-disaster Recovery Commission	2000 – 12/2002	90,000
Lugu extinguisher installation	Lugu Township Office	Lugu Township Office	2000 – 12/2002	30,000
Total				66,984,000

Source: Lugu Township Office Documentary, 2005.

Note: *NT\$; 32NTD= 1 USD, 2002

Taomi Township

Geography and public works

Geography

Taomi is a remote hillside village on the outskirts of Puli Township in Nantou County (refer to Figure 4). According to news reports, bamboo shoots were once the main source of income for Taomi villagers, with production sometimes exceeding 100 tons per day. Unable to compete, the town's largest industry began a steep decline in the 1990s, until by the end of the decade the village was producing no more than five tons per day. As in so many other farm towns in Taiwan, youths moved out to the big cities to find work leaving the elderly behind with little hope for the future.



Figure 4: Map of Taomi

Source: Elofa Portal Site <http://www.elofa.com.tw/nato/>

That was the situation before Taomi's fate was changed dramatically by the huge earthquake that hit Taiwan on September 21, 1999 destroying about 60 percent of the town's buildings. Huang Jin-Jyun, the village chief at that time, requested help from the New Homeland Foundation, a non-profit organization that helps communities rebuild. After several discussions, the foundation and villagers decided to rebuild by focusing on the rivers.

Public works

Major public works completed in Taomi after the 921 earthquake:

Table 6: Taomi post-disaster reconstruction projects from 1999 to 2004

Project title	Executive organization	Funding organization	Duration	Capital*
Installation Taomi community instruction Project	New Homeland Foundation	Council of Labor Affairs	03/2002 – 08/2002	300,000
Pupil back home for part-time study	National Youth Commission	National Youth Commission	07/2001 – 08/2001	558,240
Instruction board for tourists	Development Committee of Taomi Village	Nantou Teacher's Association	2001 - 2003	400,000
Taomi Li seedbed promotion project	Development Committee of Taomi Village	Council of Labor Affairs	08/2002 – 03/2003	1,504,800
2002 promotion integrated community development project – making Taomi active	Development Committee of Taomi Village	Cultural Affairs Council	09/2002 – 02/2003	1,100,000
Restructing Taomi rural village industry project	Development Committee of Taomi Village	The Soil and Water Conservation Bureau (SWCB)	09/2002 – 06/2003	9,900,000
Protection Taomi river project (1 st project)	Development Committee of Taomi Village	Forestry Bureau	12/2002 – 03/2003	90,000
One house with a tree activity for Taomi community	Development Committee of Taomi Village	Forestry Bureau	03/2003	80,000
Protection Taomi river project (2 nd project)	Development Committee of Taomi Village	Forestry Bureau	04/2003 – 05/2003	95,000
Integrated community tourism seminar	Development Committee of Taomi Village	The 921 Earthquake Post-Disaster Recover Commission	07/2003 – 09/2003	122,000
Cultural industry Inhabitation for 921 Earthquake post-disaster recover areas	Development Committee of Taomi Village	The 921 Earthquake Post-Disaster Recover Commission	07/2003	15,000
921 Earthquake post-disaster recovery construction Engineering	Development Committee of Taomi Village	Council of Cultural Affairs	04/2003 – 09/2003	400,000

2003 Promotion integrated community development Project named “Cultivating Taomi”	Development Committee of Taomi Village	Council of Cultural Affairs	09/2003 – 12/2003	800,000
Integrated community development project	Development Committee of Taomi Village	Council of Agriculture Executive Yuan	01/2004	295,000
Integrated community development project	Development Committee of Taomi Village	The 921 Earthquake Post-Disaster Recover Commission	05/2004 – 10/2004	112,600
Total				15,772,640

Source: The Development Committee of Taomi Village, 2005

Note: *NT\$

Zhen-xing Township

Geography and public works

Geography

Nantou City was originally called 「Nantoushe」 aborigine. It was officially named Nantou City as a part of Nantou County in 1940, and is the seat of Nantou County Government. In 1957, the offices of the Taiwan Provincial Government were moved to Jhongsingsin Village in Nantou City. Being developed early compared to other areas in Taiwan gave Nantou City many advantages, including human and natural resources, and traditions.

Nantou City is situated in the northwest of Nantou County, adjacent to Jhongliao Township and Bagua Mountain on the west, Caotun Township on the north, and Mingjian Township on the south. It contains 34 lis with a total population of 104,631 with an area of 72km² and is generally square in shape.

Zhen-xing is located on the outskirts of Nantou City and has a population of 2,416. In 1999, more than one-third (246) of its 702 buildings were destroyed, including partially destroyed buildings that brings the total to 35 percent (refer to Table 4).

3. Research questions and hypotheses

Research questions

- (1) Who benefited from post-earthquake reconstruction programmes?
- (2) Are they better off after the programmes?
- (3) Are they satisfied with government's post-earthquake reconstruction programmes?

The research questions above lead to two sub-questions:

- Has the infrastructure improved compared before the quake in 1999?
- Do post-earthquake reconstruction programmes influence integrated community development in terms of relevance, effectiveness, efficiency, and sustainability?

Hypotheses

The effects of governmental post-earthquake reconstruction depend on the degree to which social capital's dimensions are identified.

“Influence” in this study is measured by “unemployment reduction”, “infrastructure improvement” and “respondents’ betterment”. Therefore, the quantitative interview results are based on evaluations of these three areas.

The hypothesis at the core of this research is divided into three specific hypotheses:

-Lack of market discrimination⁵ cripples post-earthquake reconstruction programmes.

-A lack of specialized agencies in Nantou to carry out and supervision prevented programme successes.

-The lack of a whole-county development plan⁶ leads to unbalanced regional development in terms of job opportunities, economics status, etc.

4. Methodology

This section discusses how the research was designed and implemented, and

⁵ “Market discrimination” in this study is defined as specialization or having specialty products.

⁶ The “whole-county development plan” referred to in this study means an integrated community development plan in which governments or planning agencies are able to integrate community resources, including natural and human resources, and to promote local specialities as distinct from other regions’ economic characteristics.

explains how sample households were chosen.

The process of selecting community household samples

Household registration has a long history in Taiwan. To make the fieldwork more manageable, the census from the Nantou County registration centre was used to sample households.

The following shows how a representative sample was obtained. It first lists the households registered in the three study sites with information on the timing and age of the head of household.

The criteria for selecting households from official registration lists were as follows.

Households in Lugu Village, Taomi Village and Zhen-xing Li: (1) those who moved to Nantou from 1994 to 2004, as recorded in the official Nantou Council survey, which made it possible to ensure that all those selected households have had the opportunity to establish themselves in Nantou. (2) Age at arrival in Nantou County was 16 years or more, which excluded non-decision making households. Those aged 16 or over in 1994 must have been at least 25 at the time of the survey.

Quantitative Data Collection

Quantitative data collection in this study was used to gather a representative sample as mentioned previously. The data was collected through a questionnaire constructed to obtain quantifiable information about reconstruction programmes in Nantou County.

Data Processing

The computer programme chosen for entering and analyzing the data was SPSS for Windows, which is regarded as one of the most advanced statistical packages on the market. The SPSS package for Windows has an important advantage on the labeling system of data entry, definition was very easy to understand and use, which saved a lot of time with a very helpful and powerful tutorial aid.

5. Results and Analyses

This section provides some evidence of social capital in post-earthquake reconstruction programmes. As mentioned earlier, **one way to classify social capital is based on its function: bonding social capital and bridging social capital**

according to Narayan (1999). The former works within groups to facilitate cooperation and/or collective action among members, while the latter improves the access to the outside, such as markets, NGOs and government.

As for bonding social capital, there is evidence that post-earthquake reconstruction (programmes) in Nantou County facilitate mutual support as they foster social capital among the villagers if compared during and after the quake in 1999 and 2004 in terms of the following three aspects: “unemployment reduction”, “infrastructure improvement” and “respondents betterment”.

With regards to bridging social capital, Taomi’s respondent does interact with other community if compared with the other two areas. As a number of government-supported re-structuring programmes and promoting integrated community development were initiated in order to revive the village after the disaster, while in Lugu and Zhen-xing the collaboration and linkage among villagers and other communities are very limited.

Strengthening horizontal associations will help to establish vertical linkages. As for the case of Taomi’s respondents the local bodies and the government departments have started identifying their needs to support the execution of the development programmes.

(1) Socio-economic details of sample households

Figure 6 shows that of the 300 sample subjects, 57 were male and 43 female in Lugu, 58 male and 42 female in Taomi, and 50 male and 50 female in Zhen-xing (refer to Figure 8).

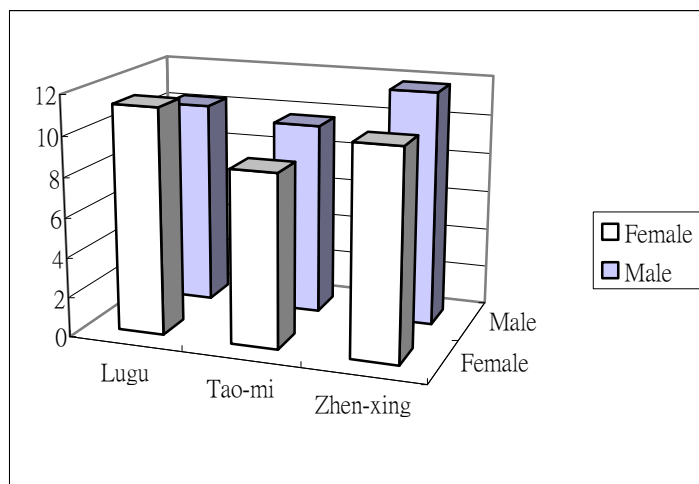


Figure 6: The study population by gender

Source: drawing based on Table 3

Figure 7 shows that the respondents age distribution were 53, 45 and 44 in Lugu, Taomi and Zhen-xing, respectively.

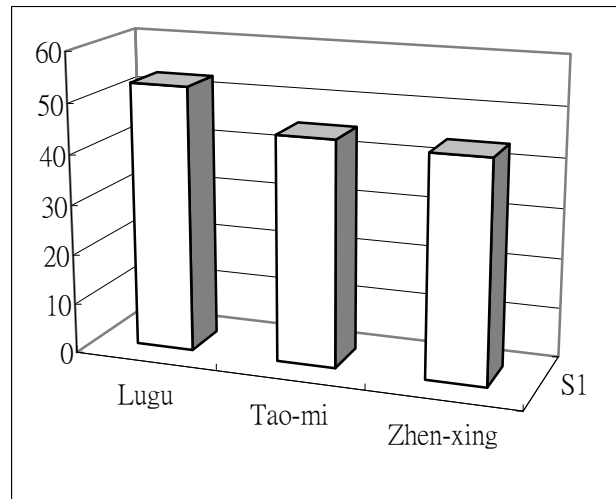


Figure 7: Age distribution by respondents

Source: results of statistics analysis

Respondents' educational attainments were higher in Zhen-xing than in the other two areas. Figure 8 shows, an average of 10.83 years of schooling for respondents in Lugu, compared to 9.13 and 11.08, for respondents in Taomi and Zhen-xing.

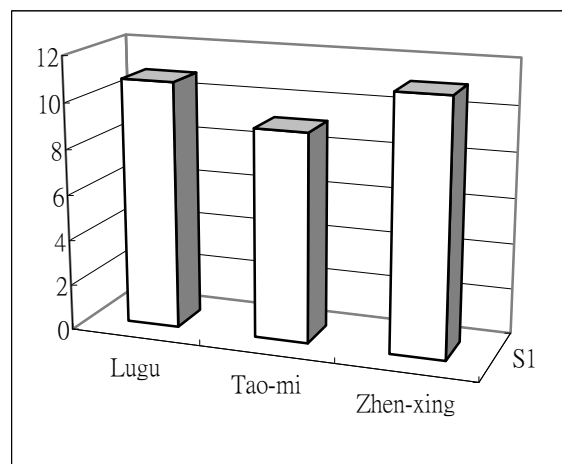


Figure 8: Average schooling of Lugu, Taomi and Zhen-xing respondents

Source: drawing based on Table 8

Table 8: Average schooling of Lugu, Taomi and Zhen-xing respondents

Schooling	Lugu		Taomi Village		Zhen-xing	
	Male	Female	Male	Female	Male	Female
6	22 (38.60)	7 (16.28)	17 (29.31)	26 (61.94)	0	13 (26)
9	7 (12.28)	0	16 (27.59)	0	12 (24)	0
12	14 (24.56)	29 (67.44)	17 (29.31)	8 (19.05)	26 (52)	12 (24)
14	0	7 (16.28)	8 (13.79)	8 (19.05)	12 (24)	12 (24)
16	14 (24.56)	0	0	0	0	13
Total	57 (100)	43 (100)	58 (100)	42 (100)	50 (100)	50 (100)

Source: Results of statistical analysis

Table 9 shows that there was a significant change in occupation by respondents between 1994 and the time of the interview in 2004. In the case of Lugu, the data indicate that 7 percent of the respondents were unemployed in 2004, compared to 0 percent in 1994 and 1999. This is partly true because some areas' soil could not be cultivated after the quake and some farmers had to leave their land to seek other employment.

In Taomi, 8% in 1994, 25% in 1999 and 9% in 2004 of the respondents were unemployed. The unemployment rate was high in 1999 because of the earthquake. **A number of government-supported re-structuring programmes were initiated in order to revive the village after the disaster.** In particular, the area was intended to specialize as an eco-community, and hence developed eco-tourism and a retreat center to significantly distinguish this village from others. Due to the job opportunities created for locals, Taomi's economy is more prosperous than most townships in Nantou.

In the case of Zhen-xing the unemployment rate is still high, 18 percent in 2004, compared to 0 percent and 25 percent in 1994 and 1999. This might be explained by respondents in Zhen-xing Li, a part of Nantou City, having jobs that differ significantly from those of other townships' respondents (refer to Table 9). After the quake, Nantou City was the second-most-damaged city in Nantou County (refer to Table 3). In a part of Nantou City, Zhen-xing, local businesses are still in a recession resulting in many private sector employees (including salaried and day laborers) being jobless. This is so because, first, the government does not have any rebuilding programmes to revive the local economy apart from some concrete engineering projects to maintain the infrastructure and subsidies for those whose houses were

damaged (refer to Table 7), and second, the local government does not have a clear vision of what Zhen-xing might be in the future.

It is also instructive to note that Table 7 shows four projects that are all infrastructure works, unlike the case in Taomi, which has quite a few integrated rebuilding programmes for the community. Above all, these programmes are not very costly when compared to the costs in Lugu and Zhen-xing: NT\$15,722,640 (491,332.5 USD: The exchange rate for NT\$:US\$ is approximately NT\$32:1US\$ in the year 2000) in Taomi, NT\$66,984,000 (2,039,000 USD) in Lugu, and NT\$14,800,000 (462,500 USD) in Zhen-xing (refer to Tables 5, 6 & 7). Thus, lack of market discrimination to revitalize the community and to emphasize its role in Zhen-xing has led to recession and prevented success.

Table 9: Types of respondent jobs in Lugu, Taomi and Zhen-Xing in 1994, 1999, and 2004

Variables	Lugu			Taomi Village			Zhen-xing		
	1994	1999	2004	1994	1999	2004	1994	1999	2004
1 Farmer	14	14	7	25	25	17	0	0	0
2 Tenant farmer	0	0	0	0	0	0	0	0	0
3 Part-time agricultural labour	7	7	0	0	9	9	0	0	0
4 Business owner	36	36	43	16	8	16	36	36	36
5 Public sector employee (day labour)	7	7	0	0	0	0	13	13	13
6 Public sector employee (salary)	7	7	7	0	0	0	13	13	13
7 Private sector employee (day labour)	0	0	0	9	0	0	13	0	0
8 Private sector employee (salary)	21	21	21	34	25	41	25	13	20
9 Housewife	8	8	8	8	8	0	0	0	0
10 Others	0	0	7	0	0	8	0	0	0
11 Unemployed	0	0	7	8	25	9	0	25	18
Total	100	100	100	100	100	100	100	100	100

Source: results of statistical analysis

Note: 1999 data presented here is pre-earthquake

(2) Effect of post-reconstruction programmes

Table 10 shows the number of landowners is higher in Taomi and Lugu than Zhen-xing. While the earthquake had no effect on land ownership in Taomi and Zhen-xing, the number of landowners in Lugu decreased in 2004. The decrease in the number of landowners in Lugu as mentioned above is attributable to some agricultural

land being unfit for cultivation after the quake, causing some farmers to leave the land and seek other employment.

Land and house ownership by Zhen-xing respondents is lower than in the other two survey areas, perhaps because Zhen-xing did not initiate any programmes to stimulate the local economy after the quake, resulting in a worse economic decline (in land and house ownership) than in the other two survey areas. One might suspect that housing prices in Zhen-xing are higher than in Taomi or Lugu, however, this is not the case. Zhen-xing is located on the outskirts of Nantou City and is an old community, unlike Taomi, which is quite well-developed with green fields that attract tourists. Consequently, houses are more expensive in Taomi than in Zhen-xing.

Table 10: Land Ownership in Lugu, Taomi and Zhen-xing in 1994, 1999, and 2004

Variables	Lugu			Taomi			Zhen-xing		
	1994	1999	2004	1994	1999	2004	1994	1999	2004
Yes	71	71	64	66	66	66	38	38	38
No	29	29	36	34	34	34	62	62	62
Total	100	100	100	100	100	100	100	100	100

Source: results of statistical analysis

Table 11: House Ownership in Lugu, Taomi and Zhen-xing in 1994, 1999, and 2004

Variables	Lugu			Taomi			Zhen-xing		
	1994	1999	2004	1994	1999	2004	1994	1999	2004
Yes	95	93	90	100	84	100	85	73	84
No	5	7	10	0	16	0	15	27	16
Total	100	100	100	100	100	100	100	100	100

Source: results of statistical analysis

Table 12 shows 100 percent of Taomi Village respondents indicated that infrastructure was improving, 72 percent of Lugu respondents revealed that infrastructure was improving and 63 percent of Zhen-xing respondents indicated that infrastructure was improving.

**Table 12: ‘Infrastructure is improving’ by respondents
in Lugu, Taomi and Zhen-xing**

	After the quake, did you think the infrastructure is improving?			Total
	Yes	No	Others	
Lugu	72	14	14	100
Taomi	100	0	0	100
Zhen-xing	63	37	0	100

Source: results of statistical analysis

For the variable of receiving help from the government, 42 percent, 36 percent and 65 percent of total respondents in Lugu, Zhen-xing and Tao-mi had received help (refer to Tables 13, 14 and 15).

According to Chi-square(X^2) test, Table 13 shows that the degree of satisfaction (in terms of whether respondents felt better off in 2004 after the quake than before the quake in 1999) did not depend on whether the respondents received help from the government. Table 13 shows that the majority of Lugu respondents answered “no difference” or even “not better” in 2004 compared to before the quake in 1999.

In Zhen-xing, a majority of respondents, 75 percent, considered themselves “not better off” after the quake in 2004 as compared to 1999. This is because the majority of respondents did not get compensation for house damage and help from government rebuilding programmes for local economies either (refer to Table 15).

In Taomi Village, on the other hand, the majority of respondents, 74 percent, considered themselves “better off”. Among this group, 88 percent (65 of 74) received government help (refer to Table 14) by way of compensation and restructuring programmes. In particular, the government intends to revive the local economy as an ecological community, which should make the local economy prosperous. The sense of belonging is also much stronger as Taomi was one of the main quake areas in Puli, which strengthened local commitment to participating in restructuring programmes and quite often, local governments promote agricultural specialties in accordance with local characteristics to assist in the development of local industry.

In Lugu, 72 percent (7+14+22+29 in 100 respondents) of the respondents felt “no difference” and considered themselves “not better off” (refers to Table 13) even though they received compensation for losses and help from government rebuilding

programmes because some of the soil is no longer suitable for tea production after the quake. Moreover, after Taiwan joined the WTO local businesses could not compete in terms of production, pricing, and promotion.

One hundred percent of the farmers in Lugu (7 of 7) considered themselves “no better off” at interview time in 2004, as shown in Table 16. In Taomi, 100 percent of the farmers (26 in 26), part-time agricultural labourers (9 of 9), and business owners (16 of 16), housewives (8 in 8), and 58 percent of the private sector employees (24 in 41) consider themselves “better off”. In Zhen-xing, 100 percent of the private sector employees (20 in 20) and 66.7 percent of the business owners (24 of 36) consider themselves “not better off”.

Tables 16 and 17 show that for respondents in Lugu and Zhen-xing, the more properties they own the “better off” they feel after the quake. For example, 100 percent of Lugu respondents (14 of 14) who own land properties consider themselves better off. However, in Taomi, even though respondents do not own properties, they still seem to be very positive about their prospects.

One key factor to the success of Taomi is that residents knew their goal, not only to rebuild their village but also to revitalize it such as with “2002 Promoting Integrated Community Development Project – Making Taomi Active” and “Cultural Industry Inhabitation for 921 Earthquake Area Post-disaster Recovery”. Taomi residents also set up a committee called the Taomi Community Development Committee consisting of villagers helped by professionals from Taomi and elsewhere. With the help of experts and university professors, the residents gradually accepted the concepts of "holistic community building" and the "knowledge economy." They came to believe they could carve out new prospects if they applied their efforts in their community.

In Taomi and Lugu, residents knew their goal and with the help of the experts to supervise them, they successfully implemented government policies. Even with government policy implementation, but without knowing the most needed priority in the village, Zhen-xing did not recover much after the quake.

Table 13: ‘Received help’ vs. ‘better off’ for Lugu respondents

Did you receive any help from the government after the quake in 1999?	Do you think yourself better off than after the quake in 1999?			Total
	Yes	No	No difference	
Yes	21	7	14	42

	(0.75)	(0.24)	(0.33)	
No	7 (0.25)	22 (0.76)	29 (0.67)	58
Total	28 (100)	26 (100)	43 (100)	100

Source: results of statistical analysis

Note: $X^2 = 17.899$, $p > 0.05$. The obtained P-value is below $\alpha = 0.05$; we may confidently reject the null hypothesis that this sample came from a survey population in which whether respondents received help or not and think themselves better off compared to after the quake in 1999 are unrelated.

Table 14: ‘Received help’ vs. ‘better off’ for Taomi respondents

Did you receive any help from the government after the quake in 1999?	Do you think yourself better off than after the quake in 1999?		Total
	Yes	No	
Yes	65 (87.84)	0	65
No	9 (12.16)	26 (100)	35
Total	74 (100)	29 (100)	100

Source: results of statistical analysis

Note: $X^2 = 65.25$, $p < 0.001$. The obtained P-value is below $\alpha = 0.05$; we may confidently reject the null hypothesis that this sample came from a survey population which whether respondents received help or not and think themselves better off than after the quake in 1999 are related.

Table 15: ‘Received help’ vs. ‘better off’ for Zhen-xing respondents

Did you receive any help from the government after the quake in 1999?	Do you think yourself better off than after the quake in 1999?			Total
	Yes	No	No difference	
Yes	12 (48.0)	24 (32.0)	0	36
No	13 (52.0)	51 (68.0)	0	64
Total	25 (100)	75 (100)	0	100

Source: results of statistical analysis.

Note: 1. $X^2 = 2.083$, $p < 0.05$, N.S. The obtained P-value is above $\alpha = 0.05$; we do not reject the null hypothesis that this sample came from a survey population in which whether respondents received help or not and think themselves better off than after the quake in 1999 are related.

2. Note: “Y” indicates better off; “N” indicates not better off; “N.D” indicates no difference

Table 16: “Better off” after the quake vs. job type for Lugu, Taomi and, Zhen-xing respondents

Variables	Lugu					Taomi					Zhen-xing				
	1994		1999			1994		1999			1994		1999		
	Y	N	N.D	Y	N	N.D	Y	N	N.D	Y	N	N.D			
1. Farmer	14	14		7		25	25	17							

2. Tenant farmer															
3. Part-time agricultural labour	7	7					9	9							
4. Business owner	36	36	14	15	14	16	8	16			36	36	12	24	
5. Public sector day labour	7	7									13	13		13	
6. Public sector salaried	7	7	7								13	13	13		
7. Private sector day labour						9					13				
8. Private sector salaried	21	21	7	7	7	34	25	24	17		25	13		20	
9. Housewife	8	8			8	8	8	8							
10. Others					7										
11. Unemployed					7	8	25	9			25		18		
Total	100	100	28	29	43	100	100	74	26	0	100	100	25	75	0
			100					100					100		

Source: results of statistical analysis

Note: "Y" indicates better off; "N" indicates not better off; "N.D" indicates no difference

Table 17: "Better off" after the quake vs. landownership for Lugu, Taomi and Zhen-xing respondents

	Lugu					Taomi					Zhen-xing				
	1994	1999	2004			1994	1999	2004			1994	1999	2004		
			Y	N	N.D			Y	N	N.D			Y	N	N.D
No	29	29		14	22	34	34	25	9		62	62	25	37	
Under0.5	36	36	14	8	7	41	41	32	9		13	13		13	
0.5-1	28	28	14		14	8	8	8			12	12		12	
1-2	7	7				9	9	9			13	13		13	
More than 5						8	8		8						
Total	100	100	28	29	43	100	100	74	26		100	100	25	75	

Source: results of statistical analysis

Note: "Y" indicates better off ; "N" indicates not better off; "N.D" indicates no difference

Table 18: "Better off" after the quake vs. house ownership for Lugu, Taomi and Zhen-xing respondents

	Lugu					Taomi					Zhen-xing				
	1994	1999	2004			1994	1999	2004			1994	1999	2004		
			Y	N	N.D			Y	N	N.D			Y	N	N.D
No	5	7		7	7		16				15	27	4	10	2
1	67	58	21	15	22	84	68	58	18		61	55	3	38	20
2	28	35	7	7	14	16	16	8	8		24	18	2	16	5
4								8							
Total	100	100	28	29	43	100	100	74	26		100	100	9	64	27

Source: results of statistical analysis

Note: "Y" indicates better off; "N" indicates not better off; "N.D" indicates no difference

6. Conclusion and policy implications

Conclusion

After the 921 earthquake in 1999, integrated community development became a

focus of people's attention. Although the government of Taiwan has been advancing structural readjustment programmes and promoting agricultural specialties for the central part of the island to assist in the development of local industry, its short-term promotion is only of limited help to local producers. Without specific assistance and economic discrimination for the region, development results were sure to be inadequate and unproductive, as in the case of Zhen-xing or the case of Lugu, two areas from which the productive population is still out-migrating to other regions.

Social capital in government reconstruction programmes surely affects community development. However, the effects of post-earthquake reconstruction by government depend on the degree to which it identifies social capital's dimensions. For example, in Lugu, which used to be a tea-producing community, the government sought to develop the tea industry in a creative post-modern agricultural manner after the quake in order to discriminate it from other regions' structural readjustment programmes. In other words, the greater the degree of identification of regional economy discrimination from other regions to facilitate cooperation, the more effective the structural readjustments from the government are.

The findings show that most respondents in the three survey areas were satisfied with all government construction programmes, as measured by "infrastructure improvement". However, Lugu Township and Nantou City need more progress in "unemployment reduction" and "respondent better off".

Policy implications

The conclusions above suggest the following policy implications:

1. More training courses should be provided.

Farmers lack economic knowledge and fear market changes. For example, after Taiwan joined the WTO their fruit prices fall. Therefore, the government should provide more "post-modern agriculture" technique programmes to upgrade their competitive skills by emphasizing "quality" over "quantity". In other words, to strength the function of social capital: bonding social capital, bridging social capital and horizontal associations.

2. Train specialized agencies for local community development.

Rural community development projects in Taiwan have for some time now, been implementing rural development projects. Sector agency projects are initiated by the COA and other related ministries. Integrated community development project

are implemented at the village level (as shown in Tables 5, 6, and 7), however the governments concerned with local community development lack specialized agencies to promote and discriminate the local economies from others.

3. A whole-county development plan is needed.

In general, the programmes cover infrastructure, life, industry, community reconstruction, and disaster prevention. Short-term programmes focused mainly on post-disaster recovery reconstruction in one or two years' time after the quake. Medium- and long-term programmes focused on promoting community development apart from post-disaster recovery over periods ranging from 2 years to 10 years. These proceeded step by step in order to ensure economic competitiveness with other regions, such as the programme to promote post-921 agriculture.

However, each area had a unique type of disaster in terms of geography, agriculture, etc. Therefore, the government should have programmes focused on each area in order to develop individual economic characteristics.

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