Factors Affecting Family Welfare of Garut-Indonesia Flash Flood Survivors: A Case Study of Impact Disaster on SDGs

Euis Sunarti[1], Irni Rahmayani Johan[2], Mullina Rosullih[3], Nur Faizatus Sholikhah[4]

[1] Professor of Family Resilience, Department of Family and Consumer Sciences, Faculty of Human Ecology, IPB University, Bogor, 16680, Indonesia.
[2] Assistant Professor, Department of Family and Consumer Sciences, Faculty of Human Ecology, IPB University, Bogor, 16680, Indonesia.
[3,4] Department of Family and Consumer Sciences, Faculty of Human Ecology, IPB University, Bogor, 16680, Indonesia.

ARTICLE INFO	ABSTRACT
	Disasters risk reduction and sustainable development goals (SDGs) are closely linked. The frequent disaster causing devastating impact on society and community. This study aims to analyze the driver of family welfare of survivors of the 2016 Garut flash flood. The total sample consisted of 120 families, some living in temporary sheltered evacuation sites (SF) and others having returned home (non-sheltered group/NSF). Data was obtained at the four months following the disaster. The study revealed that, compared to the respondents in the SF sites, the NSF respondents had higher income, more sources of stress, better coping strategies, and a higher level of welfare. Income, financial management, coping strategies, and economic pressure all had a positive effect on total welfare while, in the case of subjective wellbeing, greater impact came from sources of stress compared with coping strategies. Objective wellbeing, on the other hand, was only influenced by income and coping strategies.

Corresponding Author's Email: irni_johan@apps.ipb.ac.id

1. Introduction

Indonesia is a country with a variety of hazards and a very high level of disaster risk. Many Indonesian families are at significant risk of becoming disaster survivors, with all the physical and psychological impacts that this brings to bear on the quality of family life. Disasters also disrupt the achievement of sustainable development goals [SDGs] (Bello, Bustamante, & Pizarro, 2021; UNDRR, 2020). SDGs and disaster risk reduction are often intertwined with one another (UNDRR, n.d.). Disaster frequently devastated society and community (Uitto & Shaw, 2016). Disaster often leads to massive loss in not only by financial and infrastructure but can also create an adverse psychological effect due to a loss of lives and livelihoods. In terms of disaster management, of the 17 SDGs focus points, more than half are closely related, such as eradicating poverty, improving healthy lives, promoting wellbeing, building safe and sustainable cities (UNDRR, n.d.).

For multiple reasons, therefore, it is also very important that the resilience of families and communities to face disasters is strengthened (Sunarti, Sumarno, Islamia, & Fithriyah, 2018). The National Agency for Disaster Management (BNPB, 2014), in the 2015-2019 National Disaster Management Plan (RENAS PB), explained that disaster events in Indonesia had increased significantly in the past decade. During this period, Indonesia was hit by 11,274 disasters which claimed as many as 193,240 lives and resulted in a total loss of IDR 420 trillion. In 2016, there were 2,369 disaster events in Indonesia, the highest ever annual figure at that time, with 92 percent of them being hydro meteorological disasters dominated by floods, landslides, and tornadoes. One of the biggest hydro meteorological disasters that year concerned the flash floods that occurred in September in Garut, West Java Province. Flooding

was particularly severe in six sub-districts—namely, Garut, Bayongbong, Pasirwangi, Samarang, Tarogong Kidul and Banyuresmi. The floods were estimated to have caused damage and losses of approximately IDR 288 billion, with 830 homes severely damaged, 473moderately damaged and 1,226slightly damaged. In addition, the flooding caused 34 confirmed fatalities (with a further19 people missing); 9 people were severely injured; and 787 families were displaced (BPBD Garut, 2016).

Indeed, housing issue has become one of the urgent priorities in the context of disaster (Safapour, Kermanshachi, & Pamidimukkala, 2021; Sunarti, Gunawan, Widiyantoro, Marliyani, & Ida, 2021). In term of Garut flash flood, many survivor families who lost their homes fled to temporary shelters (SF) provided by the government. However, the overcrowding in these shelters forced many survivor families to return to the site of their initial now-unsheltered residence (NSF). The loss of their homes, assets, and source of livelihood led to an increase of economic pressure that disrupted family welfare (Skoufias, 2003). Sunarti (2015) analyzed various disaster events in Indonesia and concluded that disasters disrupt the expressive functions and family welfare, potentially leading to impoverishment. According to the World Bank (2016), disasters cause 26 million people to fall into poverty every year.

Welfare can be divided into objective and subjective welfare (Milligan, Fabian, Coope, & Errington, 2006). Based on Sunarti (2013), objective welfare emphasizes the role of normative standards in meeting basic needs while subjective well-being emphasizes family satisfaction. Sunarti (2015) noted that factors relating to family welfare include family size, the education of husband and wife, income, job stability, economic pressure, family resource management, social support, and availability of livelihoods. Family resource management can be implicated in financial management, livelihood strategies and coping strategies.

Disasters can also disrupt the achievement of sustainable development goals (SDGs) (Bello et al., 2021)— therefore it is very important to increase the resilience and capabilities of families and communities to face disasters. The vision and mission of disaster management in Indonesia is to build the resilience of the nation and society so that the country is more able to face and respond to disasters. With this in mind, a study that could contribute to various scientific fields, especially the social sciences, and be used as a basis for formulating policy, was devised. The Sendai Framework for Disaster Risk Reduction (UNISDR, 2015) argued that disaster risk reduction should be more people-centered and give more attention to social science research in terms of understanding risks and stimulating certain behaviors in order to protect the public from those risks and the long-term impacts of disasters.

It was, therefore, important to conduct this research with the aim of identifying the factors that influenced the welfare (total welfare, subjective, and objective welfare) of survivor families of the flash flood in Garut that occurred in September 2016. It is hoped the results of this study can form the basis of future disaster-response policy-making, particularly the integration of disaster management with regular development.

2. Methods

This study used secondary data set from the umbrella research, titled "Portrait of Family Resilience of Flash Flood Survivor in Garut September 2016", which involved 120 families that was selected by disproportional stratified random sampling according to the type of housing, that is shelter and non-shelter(each consist of 60 families),at the four months of post-disaster. The dependent variables were family welfare (objective, subjective and total welfare), while independent variables include stressor (sources of stress), coping strategies, economic pressures, livelihood strategies, financial management, per capita income, disaster damage, and losses due to disasters. The objective and subjective well-being variables were measured using the questionnaire that was designed by Sunarti, Ifada, Desmarita, and Hasanah (2005) and it was then developed and applied in the further study of Sunarti, Johan, and Haryati (2010), the Cronbach's alpha values of this questionnaire was 0.693 and 0.877 respectively. The damage and loss data were measured using a method that was developed by the Economic Commission for Latin America and the Caribbean (ECLAC), known as the Damages and Losses Assessment (DaLA) and had been modified by the Center for Disaster Studies IPB.

Moreover, the economic pressure was measured using a questionnaire developed by (Sunarti et al., 2005), while the livelihood strategy was measured using a questionnaire that was developed by the researcher by referring to Ellis (2000)' livelihood capital theory. The Cronbach's alpha value was 0.56. In addition, the variable of financial management was measured using a modified questionnaire from Firdaus and Sunarti (2009) with the Cronbach's alpha value of 0.847. The source of stress was measured using a questionnaire which modified from Family Inventory Life and Change (FILE) by McCubbin and Thompson (1987) with the Cronbach's alpha value of 0.611. Furthermore, the coping strategy variable was measured using a modified questionnaire from Folkman and Lazarus (1985) with the Cronbach's alpha value of 0.688. Data were then analysed using the descriptive analysis, the difference tests, the correlation tests, and the multiple regression tests.

3. Results
3.1 Family Characteristics

Table 1 illustrates some interesting finding about the sample's characteristic. It presents the minimum, maximum, and average figures for each characteristic. Table 1 shows that in average, the sample was categorized as medium size family, or consist of 5-7 members. Both husband and wife were more likely in the middle adulthood category (range from 41 to 60 years old), the length of education was six years (equivalent to elementary school, or not completing a 12 years of compulsory education). Moreover, this study also found that the average income per capita of families in the non-shelter (NSF) was higher than in those in the shelter (SF) area (both of pre-disaster and the four months post-disaster).

Table 1
Minimum, Maximum, and Average Score of Characteristics of the Sample Family

Characteristic	Shelter (Min-Max; average)	Non-shelter (Min-Max; average)	Total (Min-Max average)
Husband's age (year)	28.0 - 85.0; 43.3	22.0 - 71.0 ;46.0	22.0 - 85.0; 44.5
Wife's age (year)	23.0 - 68.0; 39.1	21.0 - 70.0; 41.3	21.0 - 70.0; 41.0
Husband's education (year)	4.0 - 12.0; 7.55	4.0 - 22.0; 8.1	2.0 - 12.0; 4.5
Wife's education (year)	4.0 - 13.0; 7.38	2.0 - 15.0; 7.6	4.0 - 22.0; 7.8
Size of family (people)	2.0 - 8.0; 4.0	2.0 - 12.0; 4.0	2.0 - 15.0; 7.0
Income / capita / month before disaster (IDR; in 000)	28.5-3300.0; 676.0	42.0 - 3571.0; 763.0	28.5 - 3571.0; 692.0
Income/cap/month post disaster (IDR; in 000)	0.0-1625.0; 354.0	0.0 - 2857.0; 578.0	0.0 - 2857.0; 467.0

*note: 1 IDR equivalent to USD 0.000070

As seen on Table 2 and 3, a noticeable variation was found in term of the losses and damage value, where it was ranging from IDR0.15 million to IDR128 million (IDR12.8 million, in average; 1IDR equivalent to USD 0.000070, approximately) for the losses, while the damage was worth from IDR10 million to IDR164 million (IDR35 million, in average). The total welfare were also varied, that is from 11 to 90 percent (mean 58.4), while the objective welfare ranged from 0-85 percent (mean 47.1) and the subjective well-being ranged from 22-100 percent (mean 69.7).

Table 2
Distribution of Minimum and Maximum Value of Variable According to the Type of Residence

Variable	Value of Minimum – Maximum		
	Shelter	Non-Shelter	Total
Damage (million in IDR)	10.00 – 123.75	18.00 - 164.05	10.00 - 164.05
Loss (million in IDR)	0.15 – 42.70	0.30 – 128.11	0.15 – 128.11
Economic Pressure (index)	0.00 – 80.00	10.00 -70.00	0.00 – 80.00
Livelihood Strategy	11.11 – 100.00	0.00 – 94.44	0.00 – 100.00
Financial Management (index)	18.00 – 89.00	8.89 – 91.11	8.89 – 91.11
Stressor	3.80 – 46.20	0.00 – 61.50	0.00 – 61.50
Coping Strategy	33.33 – 70.00	16.67 – 83.33	16.67 – 83.33
Objective Welfare (index)	0.00 – 71.40	28.57 – 85.70	0.00 – 85.70

Subjective Welfare (index)	22.22 – 100.00	38.89 – 100.00	22.22 – 100.00
Total Welfare (index)	11.00 – 77.20	35.00 – 90.10	11.00 – 90.10

*note: 1 IDR equivalent to USD 0.000070

This study found no significant differences in term of the damage and losses experienced between families in the shelter and the non-shelter. Moreover, the similar result was also found in term of the livelihood strategies. Compared to the families who lived in the shelter, those in the non-shelter tended to have higher welfare (total, objective, subjective), which was associated with the lower of family economic pressures, although their financial management was bad and the stressors were higher, however they also experienced better coping strategies than the shelter' respondents. This data confirms that the conditions before disaster were very decisive, where those living in non-shelter area had better financial condition and own more settled jobs.

Table 3
Average, Standard Deviation, and Results of Different Test of Research Variables, Based on the Research Sample's Residence

Variable	Average ± Deviant Standard		P value	Average±Deviant Standard Total
	Shelter	Non-shelter		
Damage	32.35±30.90	37.21±41.55	.468	36.54±36.54
Loss	9.65±8.03	18.57±24.78	.010	14.11±18.88
Economic Pressure	43.83±25.78	33.67±15.06	.009***	38.28±21.81
Livelihood Strategy	39.44±19.03	34.86±16.05	.157	37.15±17.68
Financial Management	48.66±19.02	41.85±15.96	.036**	45.25±17.81
Stressor	17.75±10.57	22.17±10.39	.023**	19.96±10.67
Coping Strategy	54.00±9.42	57.88±14.96±	.091*	55.94±12.60
Objective Welfare	30.46±20.28±	63.80±14.98	.000***	47.14±24.40
Subjective Welfare	66.81±21.12	72.55±16.20	.097*	69.68±18.96
Total Welfare	48.64±17.29	68.17±12.70	.000***	58.40±18.01

3.2 The Relationship Between Variables and the Family Welfare

Table 4 shows a positive significant correlation between income per capita and family welfare (total, objective and subjective); conversely, a negative correlation was found between the economic pressure and family welfare (total, objective, and subjective). Interestingly, the damage and losses due to disasters had no correlation with the welfare. Meanwhile, coping strategies were positively correlated with the welfare (total and objective).On the contrary, the significant negative correlation was found between the livelihood strategy and the welfare (total and objective). In addition, financial management had a positive relationship with the subjective welfare, while the source of stress was found to be a negatively correlated with the subjective welfare (Table 4).

Table 4
Distribution of Correlation Coefficients between Family Welfare and Other Research Variables

Variable	Family Welfare		
	Objective	Subjective	Total
Income per capita (IDR)	.572**	.331**	.613**
Damage (IDR Million)	.148	.068	.136
Loss (IDR Million)	.016	.059	.052
Economic Pressure	-.224*	-.271**	-.282**
Livelihood Strategy	-.209*	-.088	-.211*
Financial Management	.046	.255**	.166
Stressor	.092	-.233*	-.071
Coping Strategy	.338**	.164	.322**

Table 5 indicates that total welfare was influenced positively by the type of residence, income per capita, financial management and coping strategies, while negatively affected by economic pressure (p = .0000 and adjusted R^2 = .541). This explains that, families who lived in the non-shelters were 15.249 times more likely to have better family welfare, and for every IDR1 increase in income per capita, the possibility of having greater welfare would raise by 0.015 times. In addition, for a single unit increase in financial management and coping

strategy index, the possibility of having better welfare would increase by 0.168 and 0.297, respectively. Meanwhile, for each unit increase of economic pressure, the total welfare would decrease by 0.096.

Moreover, the subjective welfare was positively affected by income per capita income and financial management, while it was negatively affected by the sources of stress and economic pressure (p = .000 and adj R2 = .260). Therefore, for every IDR1 increase in income per capita, the subjective wellbeing index would increase by 0.010 times. While for each unit increase in financial management index, it would raise the subjective wellbeing index by 0.208 times. However, if one unit of the economic pressure and the source of stress increased, it would decrease the subjective wellbeing by 0.162 and 0.489, respectively.

Table 5
Regression Coefficient of per capita Income, Damage, Loss, Economic Pressure, Livelihood Strategy, Financial Management, Sources of Stress, Coping Strategies on Welfare (Objective, Subjective and Total)

Variable	Objective welfare			Subjective welfare			Total welfare		
	B	Beta	Sig	B	Beta	Sig	B	Beta	Sig
Constant	-2.832		.755	55.820		.000	26.494		.001
Type of residence (0=shelter; 1=non-shelter)	26.131	.538	.000***	4.367	.116	.202	15.249	.425	.000***
Income/capita (IDR)	.020	.357	.000***	.010	.244	.007***	.015	.370	.000***
Damage (IDR)	.069	.103	.089	-.038	-.074	.388	.033	.031	.645
Loss (IDR)	.001	.001	.993	.115	.114	.184	.064	.060	.371
Economic Pressure	-.031	-.028	.648	-.162	-.184	.033**	-.096	-.116	.088*
Livelihood strategy	-.136	-.098	.106	.046	.043	.615	-.045	-.044	.515
Financial management	.128	.093	.139	.208	.195	.030**	.168	.166	.019**
Stressor	.207	.091	.148	-.489	-.275	.002***	-.141	-.083	.233
Coping Strategy	.388	.200	.002***	.206	.137	.120	.297	.208	.003***
R²	.659			.316			.576		
Adjusted R²	.631			.260			.541		
F	25.596			5.639			16.598		
Sig	.000***			.000***			.000***		

In addition, the driver of the objective welfare were type of residence, income per capita, and coping strategy, all with the positive direction effect. While, economic pressure had a negative influence on the objective welfare (p = .0000 and adj R2 = .631). It can be interpreted that, families who lived in the non-shelters were 26.131 times more likely to have better of objective welfare. Moreover, for every IDR1 increase in income per capita, this would lead to 0.020 increase in the index of objective welfare. Meanwhile, if one unit of coping strategies increased, it would also raise the objective welfare by 0.388.

4. Discussion

This study highlights the magnitude of damage and loss experienced by flash flood survivor families, the sources of stress and economic pressures that arise, as well as disruptions in income that affect family welfare. The focus is on the disturbance caused by one particular disaster, but disasters occur regularly all over Indonesia. BNPB (2016) shows that some 205 million people are exposed to disasters and that 81 percent of Indonesia is at high risk of disasters.

The incidence of disasters has significantly increased in the past decade (BNPB, 2014). During this period, Indonesia was hit by 11,274 disasters that claimed as many as 193,240 lives and resulted in the total loss of at least IDR 420 trillion. The results of the disaster risk analysis by the National Agency for Disaster Management (BNPB) in Indonesian Disaster Risk BNPB (2016) show that all regions of Indonesia were in the medium to high-risk categories

and none was categorized as low-risk—this indicates just how many families are vulnerable to being affected by disasters.

This study elaborates on family welfare—as a whole, subjectively, and objectively. The findings indicate that four months after the flood hit the area, the survivor families had a total welfare index of 58 percent (47% objective welfare, and 69.7% subjective welfare), and that that there was no significant difference between the SF and the NSF groups. The study found that the higher the family income, the better the family welfare (objective, subjective and total). This result is in line with the research by Yulfa and Herawati (2017) which found that income consistently influences objective and subjective well-being. Yu and Chen (2016) also revealed that relative income had positive relationship with the happiness. Moreover, Headey and Wooden (2004) shows that wealth and income appeared to have positive association with subjective wellbeing although it is not as much as the impact in relieving financial stress. In addition, the study of Johan, Muflikhati, and Mukhti (2013) stipulated that objective welfare was influenced by income and the size of the family, while subjective well-being was influenced by the age of the wife. Similarly, Sugiharto, Hartoyo, and Muflikhati (2016) found that income affects objective welfare.

The results of this study indicate that economic pressure has a negative relationship with all components of well-being—the higher the economic pressure, the lower the family's welfare (total, subjective, and objective). This is also in line with previous research (Firdaus & Sunarti, 2009; Raharjo, Puspitawati, & Krisnatuti, 2015; Sabania & Hartoyo, 2016). Firdaus and Sunarti (2009) found that economic pressure and financial management were related to family welfare, where higher economic pressure will result in lower family welfare. The same research found a positive relationship between better financial management and greater family wealth.

This study also shows that economic pressure has a significant negative effect on total and subjective welfare, while no significant effect was found on objective welfare. These findings enrich the previous study by Elder Jr, Conger, Foster, and Ardelt (1992), as well as Raharjo et al. (2015) which found that economic pressure negatively affected subjective well-being while financial management had the opposite effect. In addition, the study shows the relationship between financial management, income, economic pressure, and welfare. Disasters lead to a disruption in families' means of livelihood which results in an increase of economic pressure. The correlation test shows that the lower the family income the higher the economic pressure. Economic pressure experienced by families is also related to levels of family resource management (Sunarti, 2015), such as financial management. The regression result shows that the better the financial management, the higher the family subjective well-being. These results corroborate the results of Johan et al. (2013); Sunarti et al. (2021) and Yulfa and Herawati (2017) who found that subjective well-being was positively influenced by financial management. Similarly, Xiao, Chen, and Chen (2014) concluded that financial capability had a positive association with financial satisfaction. Another important finding is that families in the NSF areas had higher sources of stress compared to the families in SF areas. Kim, Greenberg, Seltzer, and Krauss (2003) shed light on the problem related to privacy, noise, and security as challenges experience by disaster victims that lived in the temporary housing (shelter), making it much harder to go through. Sources of stress negatively affect the subjective well-being. Several studies have found that disasters affect family stress levels (Sunarti et al., 2005; Sunarti & Syahrini, 2011) and post-disaster problems such as housing affect family function (Maryam, Sukandar, Guhardja, Asngari, & Sunarti, 2008; Sunarti et al., 2005). The study also shows that the sources of stress negatively affect subjective well-being. Meanwhile, coping strategies have a positive effect on both objective and total well-being—this is in line with (Kim et al., 2003).

The damage to and loss of family assets as well as the loss of family livelihoods in the months following the disaster caused economic hardship, decreased welfare, and a descent into poverty among the disaster survivors. This is in accordance with Sunarti (2015) who found that disaster greatly disturbs progress towards achieving family welfare and even causes poverty. Our finding is also consistent with Hamama-Raz, Palgi, Leshem, Ben-Ezra, and Lavenda (2017) which had revealed the negative impact of home damaged on subjective well-being. According to the World Bank (2016), disasters cause 26 million people to become poor each year. The literature also shows that poor people in the United States are more vulnerable

to disasters (Fothergill & Peek, 2004). In addition to property loss, disasters can also result in the loss of income. Sabania and Hartoyo (2016) showed that livelihood strategies affect family welfare, so families need to have a livelihood strategy in place in order to continue making a living after a disaster. Recent study by Sunarti et al. (2021) identified that after the disaster many families start to seek new and safer jobs in order to potentially avoid the dangers posed by the disaster. Moreover, as suggested by Brouwer, Akter, Brander, and Haque (2007), the insurance service for the appropriate target could be a promising program, as well as the microcredit scheme. Such a program might help the victims to cover the losses and material damage of affected household and support the livelihood recovery.

The findings of this research show the importance of accelerating rehabilitation and reconstruction, by reducing the interval between disaster events and the implementation of post-disaster recovery. Previous studies PSB IPB (2010, 2015a) show that the time lag between the emergency response period and the realization of reconstruction rehabilitation is critical as it highlights the discrepancy between needs and implementation. The time lag might be attributed to several factors, including the mechanism for the budgeting of rehabilitation and reconstruction funds allocated in the year following the disaster occurrence. All-aspect readiness is needed so that each stage of disaster management can be carried out as promptly as possible to minimize risk and loss (PSB IPB, 2015b).

Disaster risk reduction was ubiquitously present in sustainable development goals (SDGs). As an example, earthquake, tsunami, volcano and massive flood, has a potential to destroy several important aspect of life such as our livelihoods, economic, and psychologic (UNDRR, n.d.). Aligning with the work of Albright and Crow (2021), evidence from our study reinforces the urgency of building community resilience to disasters. This is consistent with previous study by Thornley, Ball, Signal, Lawson-Te Aho, and Rawson (2015), which demonstrated the need to foster community resilience and the important of good partnership between communities and authorities. Buckle (1999) suggests that it is also necessary to conduct the need analysis assessment first to develop a more appropriate support basis. The result of Hallegatte, Vogt-Schilb, Bangalore, and Rozenberg (2016) shows the magnitude of changes, challenges, and threats faced by families, especially families in disaster-prone areas. The magnitude of the risk and the magnitude of the impact of disasters on the quality of family life Sunarti (2015) underscores the importance of building resilience in families and communities in the face of disasters. Osofsky and Osofsky (2018) suggest the important of social capital in strengthening community resilience. As noted by Hamama-Raz et al. (2017) social support play a role in increasing wellbeing and reducing the stress among disaster survivor. Various studies highlight the urgency of integrating disaster management—especially disaster risk reduction—with regular development (Sunarti et al., 2021; Thomalla et al., 2018). Every stakeholder is required to play an active role in disaster management activities through the integration of disaster risk reduction into development planning (PSB IPB, 2015a; Sunarti et al., 2018). Strenuous attempts should be made to include disaster management activities in development planning documents, both at the central and regional levels, in the long-term, mid-term, and short-term (BNPB, 2016).

5. Conclusion and Recommendation

Disasters could disrupt the achievement of sustainable development goals (SDGs), such as worsening the poverty and wellbeing. This study found that, on average, family survivors of the flash flood in Garut in this study suffered damage of IDR 35 million and losses of IDR12.8 million. The survivors are experiencing economic pressure with an index of 38 and have a stress source index of 20. However, they are more likely to have good coping and livelihood strategies, as well as sound financial management. In general, respondents were in the low category for objective welfare, and moderate for subjective welfare and total welfare. In terms of family size, respondents were mainly from families with 5-7 members. The majority of men and women were in the age bracket 41-60 and, in terms of education level, the majority had not completed the 12 years compulsory education. The average education level was 6 years (equivalent to primary school).

This study found no significant differences in terms of the damage and losses and the livelihood strategies between families living in the shelters (SF) and those choosing not to (NSF). However, per capita income per month of the (NSF) group was higher compared to

those in the shelters (SF). Despite having a higher source of stress and lower financial management, the NSF families with lower economic pressures and good coping strategies tended to have a higher level of welfare (total, subjective, and objective) than the families in shelters (SF). However, the opposite was the case among those living in the shelters with higher economic pressures. Even though they have better financial management and less source of stress, this study found that welfare (total, objective, subjective) was lower than in the NSF families. Unstable jobs and loss of livelihood were found to be the main sources of economic pressure for families in the shelters since it was very difficult to find new livelihoods there.

This study found that the higher the per capita income, the higher the family welfare (both total, objective, and subjective). Meanwhile, higher economic pressure resulted in lower family welfare (total, objective, and subjective). The higher the coping strategy, the better the family's welfare (total and objective)—however, families with lower levels of welfare (total and objective) tend to have more livelihood strategies. This study also found that subjective well-being positively correlates with financial management, but has a negative relationship with the source of stress (stressor).

The total welfare index of survivors of a disaster is positively affected by per capita income, financial management and coping strategies, and negatively affected by economic pressures. Subjective well-being is positively influenced by per capita income and financial management, and negatively affected by sources of stress and economic pressure. Meanwhile, objective well-being is positively influenced by per capita income and coping strategies. The result of the regression analysis shows that NSF families are more likely to have better welfare (total and objective). Moreover, per capita income significantly affects welfare (total, subjective, and objective).Disaster risk reduction was ubiquitously present in sustainable development goals (SDGs). This study recommends that all stakeholders in disaster management policies endeavor to promote the development of family resilience in disaster-prone areas.

References

Albright, E. A., & Crow, D. A. (2021). Capacity building toward resilience: how communities recover, learn, and change in the aftermath of extreme events. *Policy Studies Journal, 49*(1), 89-122. doi:https://doi.org/10.1111/psj.12364

Bello, O., Bustamante, A., & Pizarro, P. (2021). Planning for disaster risk reduction within the framework of the 2030 Agenda for Sustainable Development.

BNPB. (2014). Rencana Nasional Penanggulangan Bencana 2015-2019. In: Badan Nasional Penanggulangan Bencana.

BNPB. (2016). Resiko bencana Indonesia In: Indonesian disaster risks.

BPBD Garut. (2016). Rencana aksi [Action plan].

Brouwer, R., Akter, S., Brander, L., & Haque, E. (2007). Socioeconomic vulnerability and adaptation to environmental risk: a case study of climate change and flooding in Bangladesh. *Risk Analysis: An International Journal, 27*(2), 313-326. doi:https://doi.org/10.1111/j.1539-6924.2007.00884.x

Buckle, P. (1999). Re-defining community and vulnerability in the context of emergency management. *Australian Journal of Emergency Management, The, 13*(4), 21-26.

Elder Jr, G. H., Conger, R. D., Foster, E. M., & Ardelt, M. (1992). Families under economic pressure. *Journal of Family issues, 13*(1), 5-37. doi:https://doi.org/10.1177/019251392013001002

Ellis, F. (2000). *Rural livelihoods and diversity in developing countries*. Oxford: Oxford university press.

Firdaus, F., & Sunarti, E. (2009). Hubungan antara tekanan ekonomi dan mekanisme koping dengan kesejahteraan keluarga wanita pemetik teh. *Jurnal Ilmu Keluarga & Konsumen, 2*(1), 21-31. doi:https://doi.org/10.24156/jikk.2009.2.1.21

Folkman, S., & Lazarus, R. S. (1985). If it changes it must be a process: study of emotion and coping during three stages of a college examination. *Journal of personality and social psychology, 48*(1), 150-170. doi:https://doi.org/10.1037/0022-3514.48.1.150

Fothergill, A., & Peek, L. A. (2004). Poverty and disasters in the United States: A review of recent sociological findings. *Natural hazards, 32*(1), 89-110. doi:https://doi.org/10.1023/B:NHAZ.0000026792.76181.d9

Hallegatte, S., Vogt-Schilb, A., Bangalore, M., & Rozenberg, J. (2016). *Unbreakable: building the resilience of the poor in the face of natural disasters*. Washington, DC: World Bank Publications.

Hamama-Raz, Y., Palgi, Y., Leshem, E., Ben-Ezra, M., & Lavenda, O. (2017). Typhoon survivors' subjective wellbeing—A different view of responses to natural disaster. *PloS one, 12*(9), e0184327. doi:https://doi.org/10.1371/journal.pone.0184327

Headey, B., & Wooden, M. (2004). The effects of wealth and income on subjective well-being and ill-being. *Economic record, 80*, S24-S33. doi:https://doi.org/10.1111/j.1475-4932.2004.00181.x

Johan, I. R., Muflikhati, I., & Mukhti, D. S. (2013). Gaya hidup, manajemen keuangan, strategi koping, dan kesejahteraan keluarga nelayan. *Jurnal Ilmu Keluarga & Konsumen, 6*(1), 30-39. doi:https://doi.org/10.24156/jikk.2013.6.1.30

Kim, H.-W., Greenberg, J., Seltzer, M., & Krauss, M. (2003). The role of coping in maintaining the psychological well-being of mothers of adults with intellectual disability and mental illness. *Journal of intellectual disability research, 47*(4-5), 313-327. doi:https://doi.org/10.1046/j.1365-2788.2003.00493.x

Maryam, S., Sukandar, D., Guhardja, S., Asngari, P. S., & Sunarti, E. (2008). Analisis faktor-faktor yang mempengaruhi keberfungsian pasca gempa dan tsunami di Nanggroe Aceh Darussalam. *Media Gizi dan Keluarga, 32*(2), 40-51.

McCubbin, H. I., & Thompson, A. I. (1987). *Family assessment inventories for research and practice*: University of Wisconsin-Madison.

Milligan, S., Fabian, A., Coope, P., & Errington, C. (2006). Family wellbeing indicators from the 1981–2001 New Zealand censuses. *Wellington: Statistics New Zealand*.

Osofsky, J. D., & Osofsky, H. J. (2018). Challenges in building child and family resilience after disasters. *Journal of Family Social Work, 21*(2), 115-128. doi:https://doi.org/10.1080/10522158.2018.1427644

PSB IPB. (2010). *Laporan Pendampingan Ekonomi Korban Gempa Bumi di Provinsi Jawa Barat Tahun 2009*. Retrieved from

PSB IPB. (2015a). *Kajian model koordinasi Kementerian/Lembaga dan Pemerintah Provinsi dan Kabupaten/Kota dalam penanganan bencana*. Retrieved from

PSB IPB. (2015b). *Model koordinasi, sinkronisasi dan pengendalian program pasca bencana*. Retrieved from

Raharjo, I. T., Puspitawati, H., & Krisnatuti, D. (2015). Tekanan ekonomi, manajemen keuangan, dan kesejahteraan pada keluarga muda. *Jurnal Ilmu Keluarga & Konsumen, 8*(1), 38-48. doi:https://doi.org/10.24156/jikk.2015.8.1.38

Sabania, H., & Hartoyo, H. (2016). Economic Pressure, Livelihood Strategy, and Family Well-being in Cimanuk Watershed, Garut and Indramayu, West Java, Indonesia. *Journal of Family Sciences, 1*(1), 24-38. doi:https://doi.org/10.29244/jfs.1.1.24-38

Safapour, E., Kermanshachi, S., & Pamidimukkala, A. (2021). Post-disaster recovery in urban and rural communities: Challenges and strategies. *International Journal of Disaster Risk Reduction, 64*, 102535. doi:https://doi.org/10.1016/j.ijdrr.2021.102535

Skoufias, E. (2003). Economic crises and natural disasters: Coping strategies and policy implications. *World development, 31*(7), 1087-1102. doi:https://doi.org/10.1016/S0305-750X(03)00069-X

Sugiharto, A., Hartoyo, H., & Muflikhati, I. (2016). Strategi nafkah dan kesejahteraan keluarga pada keluarga petani tadah hujan. *Jurnal Ilmu Keluarga & Konsumen, 9*(1), 33-42. doi:https://doi.org/10.24156/jikk.2016.9.1.33

Sunarti, E. (2013). *Pembangunan Sosial-Ekonomi Berbasis Ketangguhan Masyarakat Menghadapi Bencana*. Retrieved from

Sunarti, E. (2015). *Ketahanan Keluarga Indonesia: Dari Kebijakan dan Penelitian Menuju Tindakan*. Retrieved from

Sunarti, E., Gunawan, E., Widiyantoro, S., Marliyani, G. I., & Ida, R. (2021). Critical point on housing construction, resilience and family subjective welfare after disaster: Notes from the Lombok, Indonesia, earthquake sequence of July-August 2018. *Geomatics, Natural Hazards and Risk, 12*(1), 922-938. doi:https://doi.org/10.1080/19475705.2021.1910576

Sunarti, E., Ifada, Q., Desmarita, I., & Hasanah, S. (2005). Ketahanan Keluarga, Manajemen Stres, Serta Pemenuhan Fungsi Ekonomi Dan Fungsi Sosialisasi Keluarga Korban Kerusuhan Aceh. *Media Gizi dan Keluarga, 29*(1), 41-49.

Sunarti, E., Johan, I. R., & Haryati, C. (2010). Hubungan fungsi agil dengan kesejahteraan keluarga nelayan yang rawan terkena bencana alam. *Jurnal Ilmu Keluarga & Konsumen, 3*(1), 11-17. doi:https://doi.org/10.24156/jikk.2010.3.1.11

Sunarti, E., Sumarno, H., Islamia, I., & Fithriyah, A. (2018). *Integrating disaster risk reduction with sustainable development goals: Mechanism analysis and readiness of stakeholders.* Paper presented at the IOP Conference Series: Earth and Environmental Science.

Sunarti, E., & Syahrini, J. S. (2011). Pengelolaan stres pada keluarga korban bencana longsor di Kabupaten Bogor. *Jurnal Ilmu Keluarga & Konsumen, 4*(2), 111-120. doi:https://doi.org/10.24156/jikk.2011.4.2.111

Thomalla, F., Boyland, M., Johnson, K., Ensor, J., Tuhkanen, H., Gerger Swartling, Å., . . . Wahl, D. (2018). Transforming development and disaster risk. *Sustainability, 10*(5), 1458. doi:https://doi.org/10.3390/su10051458

Thornley, L., Ball, J., Signal, L., Lawson-Te Aho, K., & Rawson, E. (2015). Building community resilience: learning from the Canterbury earthquakes. *Kotuitui: New Zealand Journal of Social Sciences Online, 10*(1), 23-35. doi:https://doi.org/10.1080/1177083X.2014.934846

Uitto, J. I., & Shaw, R. (2016). Sustainable development and disaster risk reduction: Introduction. In *Sustainable development and disaster risk reduction* (pp. 1-12): Springer.

UNDRR. (2020). Integrating disaster risk reduction and climate change adaptation in the un sustainable development cooperation framework: Using climate and disaster risk management to help build resilient societies. Retrieved from https://drupal.preventionweb.net/sustainable-development-and-drr/sdgs-targets-related-disaster-risk

UNDRR. (n.d.). SGDS with targets related to disaster risk. Retrieved from https://drupal.preventionweb.net/sustainable-development-and-drr/sdgs-targets-related-disaster-risk

UNISDR. (2015). The Sendai framework for disaster risk reduction.

World Bank. (2016). Natural disasters force 26 million people into poverty and cost $520bn in losses every year. *new World Bank analysis finds.* Retrieved from https://www.worldbank.org/en/news/press-release/2016/11/14/natural-disasters-force-26-million-people-into-poverty-and-cost-520bn-in-losses-every-year-new-world-bank-analysis-finds

Xiao, J. J., Chen, C., & Chen, F. (2014). Consumer financial capability and financial satisfaction. *Social indicators research, 118*(1), 415-432. doi:https://doi.org/10.1007/s11205-013-0414-8

Yu, Z., & Chen, L. (2016). Income and well-being: Relative income and absolute income weaken negative emotion, but only relative income improves positive emotion. *Frontiers in psychology, 7*. doi:https://doi.org/10.3389/fpsyg.2016.02012

Yulfa, R., & Herawati, T. (2017). The influence of social support and financial management toward family well-being in early marriage. *Journal of Family Sciences, 2*(2), 45-57. doi:https://doi.org/10.29244/jfs.2.2.45-57