Factors Affecting Rehabilitation of Food Security:

A Study in Earthquake - Affected Districts in Nepal[1]

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List of Acronyms and Abbreviation

CBS	Central Bureau of Statistics
COBN	Cost of Basic Needs
FAO	Food and Agriculture Organization
FGD	Focus Group Discussion
HH	Household
INGOs	International Non-Governmental Organization
MOAD	Ministry of Agriculture Development
MOLE	Ministry of Labour and Employment
MOEST	Ministry of Science, Environment and Technology
NDHS	National Demographic and Health Survey
PCPY/D	Per Capita Per Year/Day
Rs	Rupees (Nepali currency)
USD	United States Dollar *(1 USD= approx Rs 110 in July 2018)*
WVI/N	World Vision International/ Nepal
WB	World Bank

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Abstract

Half of Nepalese people are not able to feed themselves with the food they need for healthy life. This is either due to food not being available at the household or they do not have economic or physical access to buy the required amount or type of food for the nutritional requirement. The mega earthquake on 25th April 2015 and its powerful aftershock on 12th May disrupted living conditions of people in about ten districts. Thousands of people were rendered homeless. To respond to the disaster, aid agencies, government, civil societies, informal groups and individuals distributed necessary relief items to the affected people. Subsequent to the relief phase, the government bodies, international non-government organizations and UN agencies worked for recovery and rehabilitation in the different sectors in the most affected districts; aiming to help the communities to restore to normal life by rehabilitating livelihoods, facilities and networks. World Vision International Nepal (WVIN) worked in the sectors of Livelihood, Water Supply, Shelter and Education during the recovery and rehabilitation phases. Food security was integral part of the WVIN's Livelihoods Rehabilitation Project.

This research is based on some of the data, which were collected with the direct beneficiaries of different sectors, before conducting qualitative part of final evaluation. The survey was conducted in three highly earthquake- affected WVIN working districts in April 2018, just after the three years of the earthquake. The aim of the research is to assess the situation of food security and analyze key socio-economic factors regarding access to food security for the affected households during the rehabilitation.

The findings reveal that significant proportion of households were able to recover, restore or even improve access to food; as a result of their individual efforts and organizational support. However, some level of food insecurity remains with a certain bottom groups, which are culturally disadvantaged or having limited livelihood strategies. Not surprisingly, the food insecurity prevails with the households with limited off-farm options. Moreover, there is a question mark on the sustainability on the level of the food security achieved by the household during the rehabilitation phase.

1. Overview of Food Security and Situation of Nepal

According to FAO definition; "Food security is a situation that exists when all people at all times have physical, social, and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life." (FAO, 1998). Reutlinger & Knapp (1980) define the

magnitude of food security as 'enough food as minimum level of food consumption'. Similarly, as per World

Bank definition, food security is considered as 'enough for active healthy life.', as cited in Maxwell & Smith

(1992). FAO (1998) provides a better framework with four dimensions of food security, viz. availability, access,

utilization and stability.

 Global Hunger Index Report - 2017, conducted by Concern World Wide (2017), presents that despite

the global hunger dropping by 27 percent in the last 15 years, UN is likely to fail in achiving the 'eradication

hunger target' by 2030. The hunger prevails with around 800 million people (Concern World Wide, 2016). For

under developed or least developed country, this scenario poses a challenges in assuring food security for the

vulnerable population. Food is fundamental need for survival, growth and development but the fact, that 36

percantage of under five children in Nepal are malnourished (MoH, New ERA, & ICF, 2017), indicates an

alarming situation of food insecurity in Nepal.

Expanded over the area of 147,141 square kilometers, Nepal is a landlocked country, surrounded by

China in the north and India in the east, south and west. About 68 percentage of people depend on agriculture

(MoAD, 2016). But the farming system of Nepal yet inclined to subsistence type; and commercialization of the

farming is yet to develop.   Agriculture and remittance are the biggest sources of household income and are the

two biggest contributors to the GDP, with a share of 34.0 and 27.7 percentage of GDP respectively (MoAD,

2015; and MoLE, 2015). With the extreme altitude ranging from 60 meter to 8848 meter from the sea level,

Nepal is divided in three ecological zones; viz. Terai (the southern alluvial plain), the hilly area, and the

Himalaya (mountaineous area), which cover the area of 23 percentage, 43 percentage and 34 percentage

respectively. The Terai has a fertile soil for production; therefore Terai is called *annako bhandar* (food basket).

But the hill has only 10 percentage of area under cultivation (MoEST, 2015).

According to the national research entitled, 'National Demographic and Health Survey (NDHS) - 2017'

conducted by (MoH, New ERA & ICF, 2018); only half (52%) of the households in Nepal are food secure.

Because lack of food security affects negatively on physiological, mental and social arena of human-being

(Hamelin, Habicht & Beaudry, 1999); it is important to assure that people have access to food all the time for their healthy life.

On 25th April, a powerful earthquake with 7.8 magnitude struck Nepal, with its epicenter in Gorkha. The biggest aftershock occurred on 12th May with its epicenter in Sindhupalchowk. It was estimated that approximately 8,000,000 living in affected ten districts were negatively affected by the earthquake and aftershook as per post disaster needs assessment (NPC, 2015). Close to 9,000 people were killed. The earthquake pushed an additional 2.5-3.5 percentage of Nepalese population into the poverty through the following year (NPC, 2015). Due to damage of the houses, fully (488,852) and partially (256,697); the households were displaced, their sources of subsistence were disrupted; and children, women and adults became econimically, physically and psycologically vulnerable. To respond to the situation, different aid agencies worked in the affected districts with relief, early recovery and rehabilitation programmes. The recovery and rehabliation focused on brining lives to normal situation and on building resillence. Above all, individual effort of the people to recover and rehabilitate themselves is an important aspect.

This research focuses on the three districts, which were severely affected by the mega earthquake. The communities of this research are from hilly and mountainous areas.

2. Methodology and Process

2.1- About the Context of the Survey:

As the earthquake affected people and disrupted their living, government and International Non-Governmental Organizations (INGOs) were actively involved in assistance of relief, followed by implementation of recovery and rehabilitation programmes. World Vision International (WVI) initiated relief operations in 10 districts; and recovery and rehabilitation programmes in 5 districts, mostly affected by the earthquake. WVI is relief and development organization, committed for well-being of children, their families and communities.

This research utilizes some of the data that came from a comprehensive survey, conducted with 2,026 households in the three earthquake affected districts: Gorkha, Nuwakot and Sindhupalchowk. Under the leadership of this researcher; the MEAL & Strategy - department, conducted the survey with use of mobile based application named FieldTask, in order to assess the changes in the project specific indicators before the qualitative evaluation. Using the systematic sampling method, the survey was conducted at household level. On the top of the survey, this research also reflects the interactions i.e. FGDs, that this researcher carried with the community after the survey.

2.2- Method, Sample Size and Data Analysis

This research basically includes the analysis of a few number of the variables out of the multi-sectoral data which were collected for the evaluation of Rehabilitation Programme implemented by World World Vision International Nepal (WVIN). The sample size for the survey was determined using the equation that Cochran (1977) provided. For each of the three research districts, the following three steps were taken to calculate sample size:

Step-1: Calculation of sample size without known population per research area

$$S' = Z^2 \times P \times Q \div C^2 \text{ ----------------------1)}$$

Where,   S' = Sample size of research area

Z = Z value for confidence level (adopted: 1.96 for 95%)

P = Probability of picking a choice in fraction (adopted 0.5)

Q = Probability of not picking a choice in fraction (ie. 1-P=1-0.5=0.5)

C = Margin of error, expressed in decimal (Adopted 0.05 i.e. 5%)

Step-2: Adjusted sample size for given population.

$$S = S' \div [1 + (S' - 1) \div N] \text{ -------------------2)}$$

Where,   N = Population in the research area in the given district

S = Adjusted sample size for given population for the research area in the given district

2.3- Outcome Variable and Predictive Variables

The Household Food Insecurity Access Scale (HFIAS); propounded by Coates, Swindale & Bilinsky (2007); provides a simple and helpful tool to measure household food security and to categorize the food insecure HHs in the three different levels : mild, moderate and severage. The HFAIS is commonly being used by Demographic and Health Surveys (NDHS) to be conducted in every five years. Given that a single indicator is not adequate to represent the situation of food security, there are various models for different perspectives. HFIAS is convenient model to more easily capture the food security with access perspective. The responses in the nine perceiption based questions of HFIAS were triangulated by the other questions viz. months of food shortage, income and coping mechanism during the data collection and analysis.

As per the various literatures, livelihood sources, income from farm-based or off-farm based activities; and access to market are the common determinants on access to food. According to the previous studies; off-farm (FAO, 1999; Haile, Alemu, & Kudhlande, 2005); livestock (Haile, Alemu, & Kudhlande, (2005); agricultural inputs (Haile, Alemu, & Kudhlande; 2005); income (Zhou, Shah, Ali, Ahmad, Din, & Ilyas, 2017; Odunivi, 2018; Adeyefa, 2016); access to credit (Zhou, Shah, Ali, Ahmad, Din, & Ilyas ; 2017); are the variables are considered to bring about significant economic access to food security. Regarding the household characteristics; education level (Haile, Alemu, & Kudhlande, 2005; Ojogho, 2010; Zhou, Shah, Ali, Ahmad, Din, & Ilyas, 2017); illness in the household(Zhou, Shah, Ali, Ahmad, Din, & Ilyas ; 2017); gender (Babatunde, Omotesho, Olorunsanya, & Owotoki, 2008; Ojogho, 2010; Oduniyi, 2018; and Adeyefa, 2016); age of household head (Ojogho, 2010; and Oduniyi, 2018), household size (Ojogho, 2010; Haile, Alemu, & Kudhlande, 2005; Adeyefa, 2016) and so forth are key factors used in various researches.

This reaseach also included test if the caste (Dalit vs Non-Dalit) predicts the food security. Because Dalits are socially and economically disadvantaged caste groups in Nepal, due to traiditon of stratefied caste system in Nepal where Dalits are considered as unclean, untouchable, and are discriminated in the society many ways; despite the fact that caste based discrimination is illegal in the paper. Nationally, the poverty rate is

higher for Dalit caste, by almost two times of average prevalence of poverty. All the variables that this

researcher selected from the dataset are presented in the Table-1 below.

2.4- Emperical Model

For the analysis, binary logistic regression (logit) model was adopted because this is recognized as the

suitable model when the outcome variable is of binary type. The functional form of logistic regression model

can be given as equation below:

$[Pi/(1-Pi)]=B_0+B_iX_{ii}+\ldots\ldots B_k.X_{ki}$ …(1) Where, P=probability of the outcome;   i = i[th] observation in the

sample; $B_{0\,=}$ intercept term; $B_{i,\ldots}$ $B_{k=}$ Co-efficients associated with each independent variable $X_i\ldots..X_k$

Converting it to exponential function, $In[Pi/(1-Pi)]=E(B_0+B_iX_{ii}+\ldots\ldots B_k.X_{ki)}\ldots\ldots(2)$ where, E=

Exponential.

SPSS-20 was used to run this analysis. The odds ratio in the outcome variable represents the ratio

between the probability of occurrence (i.e. food secure) to the probability of non-occurrence (i.e. food insecure).

In the case that a predictive variable is of binary nature, the exponential of the respective coefficient represents

the the times that outcome variable will household likely to turn to be food secure from the insecure,

corresponding to shift in the condition of predictive variable. Furthermore, in the case that a predictive variables

is continuous or interval, the odds ratio is governed by one unit change in the predictive variable. Table-1

presents the list of predictive variables (independent variables), their types and the outcome variable

(dependant variable).

Table-1
Outcome Variables and Predictive Variables for Logit Test

SN	Variable	Coding for Logit	Type of Variable
Dependent Variable			
0	Food Insecure (0)/ Secure (1)		**Binary**
Independent Variables			
1.- Access: Geographic and Household Characteristics and Economic Access			
1.1	Dalit vs Other Ethnic Groups	0: Dalit, 1: Others	Binary
1.2	Gender of HH head	0: Female, 1: Male	Binary
1.3	Age of HH head	<30, 30-45, 45-60, >60	Ordinal
1.4	HH size	(Intiger)	Continuous

2.- Socio-Economic Variables			
2.1	Livelihood - Farming	0: False, 1:True	Binary
2.2.	Livelihood - Livestock	0: False, 1:True	Binary
2.3.	Livelihood - Unskilled labour	0: False, 1:True	Binary
2.4	Livelihood - Skilled labour	0: False, 1:True	Binary
2.5	Livelihood - Small business	0: False, 1:True	Binary
2.6	Livelihood - Remittance	0: False, 1:True	Binary
2.7	Access to Credit	0: False, 1:True	Binary
2.8	Training/ Equipments/ Inputs assitance by INGO (WVIN)	0: False, 1:True	Binary

In the process of running logit, Omnibus Tests of Model Coefficients, Step-1 (Step, Block, Model) with Chi-square value of 402.20 at 18 degree of freedom with significance indicated by $p=0.00 < 0.05$ shows accuracy of model improves when explanatory variables are added. Similarly, the model summary produced by SPSS shows: a) -2 Log Likelihood = 1492.211; b) Cox and Snell R Square = 0.192; c) Nagelkerke R Square = 0.270. The Nagelkerke R Square value tells that 14 independent variables used in this model together account for 27 percentage of the variation of the dependent variable . Therefore, this model is acceptable.

The purpose of Hosmer and Lemeshow Test is to assess whether or not the observed event- rates match expected event- rates in the sub-groups of the model population. Hence in this model, the Hosmer and Lemeshow Test gave the Chi-square value of 6.41 at 8 degrees of freedom; which gives the significance $p=0.60 >0.05$. This value indicates that the model is suitable to apply.

3. Findings

3.1- Result and Interpretation of Logit Test

The logit result is presented in Table-2.

Table-2
Output Table of Logistic Regression

Variables	B	S.E.	Wald **	Sig.	E(B)
Socio Economic Factors					
Farm (livelihood)	0.01	0.14	0.01	0.93	1.01
Livestock (livelihood)	-0.32	0.12	25.62	0.10	0.72
Skilled Labour (livelihood) (x)	0.45	0.16	7.64	0.01	1.56
Unskilled Labour (livelihood) (x)	0.40	0.19	4.41	0.04	1.49

Variables	B	S.E.	Wald **	Sig.	E(B)
Remittance (livelihood) (x)	1.31	0.20	43.68	0.00	3.70
Small Business (livelihood) (x)	1.34	0.23	35.16	0.00	3.86
Salaried Employment (livelihood) (x)	1.13	0.17	43.75	0.00	3.12
Pension (x)	0.86	0.30	8.19	0.00	2.38
Access to credit	0.30	0.06	24.51	0.10	1.35
Training/ Inputs from INGO (WVIN) (x)	0.30	0.13	5.78	0.02	1.45
HH & Demographic Characteristics					
Gender	0.18	0.12	2.25	0.13	1.19
Dalit and Other Caste (x)	1.67	0.14	151.29	0.00	5.26
HH size	0.04	0.03	3.12	0.08	1.04
HH Head Age (x)	-0.02	0.00	27.54	0.01	0.98
Constant	-6.86	0.72	91.90	0.00	0.01

Source: Data Analyzed in SPSS v.16 from WVIN Field Survey- 2018

Note: 1) **: Degree of Freedom is 1 for each of these
      2) x: As per the test, these variable show significance (i.e. $p < 0.05$)

  The result of the test for each variables is interpreted below. No. 1-10 are related with the economic access and 11-14 are related with demographic & household characteristics. Provided that all other variables are controlled, at 5% significance level, a HH who ....

1.- …. has a skilled labour as livelihood source, as opposed to a household who has not this, has the probability of being food secure by 1.56 times than being food insecure.

2.- ….has an unskilled labour as livelihood source, as opposed to a household who has not this, has the probability of being food secure by 1.49 times than being food insecure.

3.- …. has a foreign remittance as livelihoods source, as opposed to a household who has not this, has the probability of being food secure by 3.70 times than being food insecure.

4.- …. has salaried employment as livelihood source, as opposed to a household who has not this, has the probability of being food secure by 3.12 times than being food insecure.

5.- …. has pension as livelihood source, as opposed to a household who has not this, has the probability of being food secure by 2.38 times than being food insecure.

6.- …. has farming as a livelhood source, is not necessarily be food secure.

7.- …. has livestock as a livelhood source, is not necessarily be food secure.

8.- …. has an off-farm business as livelihood source as opposed to a household who has not this has the probability of being food secure 3.86 times than being food insecure.

9.- …. has access to formal or informal credit is not significant contributor to the food security.

10.- ….received support from WVIN' Livelihoods Project (training, inputs, small equipments) as appposed to

non-receipient, is probable to be food secure 1.45 times than being food insecure.

11.- ….has male or female to head the HH does not significantly affect food security.

12.- …. is Dalit carries 5.26 times greater probability than of Non-Dalit to be food insecure against the chance

to be food secure.

13.- … has big or small HH size does affect significantly to food security.

14.- … has yonger HH head is likely to become food secure compared to the older head.

3.2- Prevalence of Food Security

A 29.7% of the HHs are found food insecure: with a break down of 34.6 percentage in Gorkha, 16.3

percentage in Nuwakot and 44.9 percentage in Sindhupalchowk. Table-3 presents the status of overall food

security/ insecurity of the research area.

Table- 3
Food Security Status of Earthquake Affected Households in 2018

Food Security Situation	Frequency	Percentage
Insecure	590	29.1%
Secure	1436	70.9%
Total	2026	100.0

Source: Field Survey of WVIN, 2018

In the absence of comparable survey on food security before the earthquake, it makes it difficult to track

the extent of the change that took place. However, according to the comparative measurement of some proxy

indicators as baseline and evaluation; particularly: a) increase in 'absorptive and adaptive resillience capacity

of HHs'; b) increase in 'HH's ability to meet food expenditure'; c) increase in 'crop production' (WVIN, 2018)

are helpful to figure out the significance of change. As these indicators shows the singificant positive changes

in the economic well-being of the households; these also indicate a good progress on the access and availability

of food.

Table-4 here presents the categorical prevalence of food security/ insecurity. This tells that among the food insecure HHs, the significant majority of them fall under the 'mildly insecure'. Moderately food insecure (6.3%) and severely food insecure (1.9%) altogher makes 8.2 percentage of HHs, who need to be focus for the development projects.

Table-4
Food Security/ Insecurity Level of Earthquake Affected Households in 2018

Level of Food Security	Number	Percentage
Secure	1436	70.9%
Mildly Food Insecure	423	20.9%
Moderately Insucrue	127	6.3%
Mildly Insecure	39	1.9%
Total	2026	100.0%

Source: Field Survey of WVIN, 2018

3.3- Demgraphic and Household Factors

Household Size: Average HH size is 5.1; and disability rate is 2.1 percentage of the population. The test showed that HH size is not the significant predictor of food security. The study has shown that with the larger HH sizes, the HH members can be engaged in larger variety of works. Number of chilren would have increased the dependancy ratio. Under five children are only 11 percent among the total population.

Livelihood Sources: About 90% of the HHs have someone from their families to earn for the households and 10% do not have. In the household size of 5.1, an average of 1.4 people earn somewhere outside the subsistence farming. The earning includes skilled labour, unskilled labour, livestock selling, selling farm produces in small or medium scale, small or micro off-farm business, pension, salaried employment and so forth. People keep livestock basically for household consumption, which is important for household nutritional purpose. But a few percentage of of the HHs sell the livestock produces as source of some earning for the HHs.

Age of Household Head: Analyzing the distribution according to age of HH head, 14.7 percentage are in the age group of 18-30 years, 32.2 percentage in 30-45 years, 31.1 percentage in 45-60 years, and 22.0 percentage above 60 years. The logit test has proved that yonger HH heads contribute to food security than the

older heads. However, during FGDs, it was also found that youth are more inclined to go abroad for employment.

Dalits: Almost 3 times more prevalence of food insecurity stays with Dalits than the other castes; as presented in Table-5. Dalit, means *'oppressed '* who are traditionally discriminated. Dalits also represent a variety of social groups such as Kami, Damai, Sarki, Sunar etc.; who are considered as lowest caste in the stratefied caste system. Each of these social groups traditionlly had pre-defined occupations, but which are gradually fading away. Table-5 below shows strong association between insecurity and Dalit.

Table-5
Crosstab between Food Secure/ Insecure HH and Dalits/ Other Caste

Food Security Status	Dalit Caste Group	Other Castes	Total (N=2026)
Food Insecure (I)	59.5%	21.9%	29.1%
Food Secure (S)	40.5%	78.1%	70.9%
Sub-Total (I+S)	100.0%	100.0%	100.0%
Share of Caste Groups	19.1%	80.9%	100.0%
Pearson's Chi Square Test	Value=215.20, df=1, p=0.00, i.e. <0.05		

Source: Field Survey of WVIN, 2018

Female Headed Households: More than one third of the HHs are headed by women; which is generally unusual in the context of male –dominant society of Nepal. Morever, it is generally speculated that women headed households have weaker economy than male headed HHs; given the limitations that the women have in the patriarchial society. However, the Table-6 here shows that there is very little difference in term of food security between male led and femlae led HHs. Further, both the logit and bivariate tests demonstrate that gender of the hosuehold head cannot predict food security/ insecurity.

Table-6
Crosstab between Food Security/ Insecurity and Male/ Female Headed Households

Food Security Status	Male	Female	Total (N=2026)
Food Insecure (I)	28.7%	29.9%	29.1%
Food Secure (S)	73.3%	70.1%	70.9%
Sub-Total (I+S)	100.0%	100.0%	100.0%
Share of Gender	36.0%	64.0%	100.0%
Pearson's Chi Square Test	Value=0.304, df=1, p=0.58, i.e. >0.05		

Source: Field Survey of WVIN, 2018

4. Discussions

4.1- Food Self-Sufficiency

From the analysis of central tendency, average months of food self-sufficiency of the staple food, from the HH's own production, is like this: Nuwakot: 8.1, Sindhupalchowk: 7.2 and Gorkha: 6.7 months.

To buy the staple food for the deficit periods and to buy other food items for nutritional requirement; the households need to have strong enough economic access. Cash income is primary source of access to food; given 38 % of HHs cannot grow adequate quantity of food for all year round as per the data. More importantly, since the farmers are in the beginning stage of commercialization of the farming, it will be more cost effective to focus on cash crops for marketing purpose rather than producing variety. Therefore transition to commercial farming from subsistence farming will be important.

4.2.- Income and Food Security

With mean analysis, average daily income of the HHs in the research areas is Rs 101 (i.e. USD 0.90) per capita per day (PCPD), on top of the kinds produced at HH. But as per the thresholds set by National Planning Commission in 2011; on Cost of Basic Need (COBN) approach; the thresholds are : a) Rs 19261 PCPY for 'poverty line' (i.e. USD 0.50 PCPD now); b) Rs 11929 for 'food poverty line' (i.e. USD 0.30 PCPD now); and c) Rs 7332 for 'non-food poverty line' (i.e. USD 0.18 PCPD now).

Therefore, when compared to the threshold on COBN for a Nepalese, the average earning of the study area exceeds the threshold. All the same, these average figures cannot tell the situation of the bottom 30 percent people. But analyzing the vulnerability of bottom 30 percent households, average food deficit months is 6.8 months. Futhermore, the average cash income of these bottom 30% is approximately Rs. 30 (USD 0.27) PCPD only. This little earning can hardly can give them option to buy foods to meet household nutritional requirement especially during the food deficit months. Hence, low food self-sufficiency coupled with low income has placed the households into trap of food insecurity.

To conclude, as compared to the national average, the food security in these three districts is stronger; and the proportion of severely food insecure (1.9%) is quite lower than the national average (10%) as per the NDHS. The main reason behind improvement of food security in these communities is due to the supports from INGOs/ NGOs; and the demand in the job market since post earthquake reconsturction has increased. However, questions arise around the sustainability of these benefits or changes.

4.3.- Livelihood Strategies and Food Security

Table-7 presents that almost two thirds of households depend on farming; followed by livestock. However, the logit-test has indicated neither the farming nor livestock-keeping is contributing significantly to food security. However, it is important to recognize the importance of farming for food security. Because, for many of the houses, agriculture is the main source of kind and cash income. From the mean analysis, it is found that 7.5 months of food requirement per annum is covered from the farming in this population. The Table-7 presents the distribution of various livelihood sources of the households in decending order.

Table-7
Proportion of HHs According to Livelihood Sources

Livelihood Sources	No. of HH	Percentage
Farming	1306	64.5%
Livestock incl. poultry	596	29.5%
Salaried Employment	414	20.4%
Unskilled Labour	344	17.0%
Foreign Remittance	321	15.8%
Small/ Micro Off/Non-farm Business	250	12.3%
Skilled Labour	205	10.1%
Others: informal contractor, middle men etc.	117	5.8%
Pension	91	4.5%

 Source: WVIN Field Survey- 2018

Based on the FGDs, farmers resumed their cultivation after a few months of earthquake. Role of individuals to rehabilitate the food security should be recognized. WV supported the farmers with training, agricultural inputs and equipments (FGDs, Gorkha).

Since many cattles were killed and the many cowsheds were damaged by the earthquake, many of the

farmers had difficulty to resume livestock in the previous scale. But some of them were able to either resume or

expand the poultry.

Due to increase in the private and public construction works in the community; it was easy for the

people the job in their communities or in the vicinities. Many of the youth also received vocational trainings

provided by different organizations. This made them either to be employed or self-emplyed (FGDs, Gorkha).

4.4.- Food Availability and Food Utilization

According to small area estimation of food security and undernutrition in Nepal, when the threshold of

2750 kilocalories per adult equivalent per day is not met, the HH falls into the 'undernourished' category

(Haslett, Jones, Isidro, Sefton, 2014). Low kilocalorie intake prevalence are estimated to be 0.382, 0.364 and

0.237 in mountain, hills and Terai respectively. In the context of Nepal, malnutrition is quite heavily associated

with food inadeqecy (FAO, 2016).

From the data of these three districts, the cross-tabulation below shows that almost one forth of the

households with under five children are food insecure. This indicates that significant proportion of children are

at the risk of malnutrition as their households are food insecure.

Table- 8
Crosstab between Food Security/ Insecurity and HHs having Under Five Children

Food Security	HHs with U5 Children	HHs without U5 Children	Total (N=2026)
Food Insecure (I)	25.0%	31.1%	31.2%
Food Secure (S)	75.0%	68.9%	68.8%
Sub-Total (I+S)	100.0%	100.0%	100.0

Source: Field Survey of WVIN, 2018

The pre-disaster situation of calorie intake in the three districts was : Nuwakot - 37 percentage, Gorkha

– 31 percentage, and Sindhupalchowk – 35 percentage (CBS, 2012).

From this research, the data on food consumption is as presented in the table below. The food category on food

consumtion quick survey included : a) Cereal Crops, b) Fruits and Vegetables, c) Pulse and Legumes, d)

Animal sources products. Out of these four categories majority have eaten from two categories; and very low

proportion has eaten from four categories. Only 39.6 percentage has taken from three categories or more.

Table-9 presents the status of food consumption.

Table- 9
Distribution of HHs According to Categories of Food Consumed in the Past 24 Hours

Categories of food	1 type	2 types	3 types	4 types
Number of HH	435	789	659	144
Percentage	21.5%	38.9%	32.5%	7.1%
Cumulative % : 'more than' basis	100.0%	78.5%	39.6%	7.1%

Source: WVIN Field Survey- 2018

As per the further analysis, the most common food is cereals (91%), followed by vegetables and fruits (63%). Overall, the low food dietary diversity is due to low food self-sufficiency at the household level; less variety of crops and low HH income. The other reason is: inadequate awareness about the balanced diet that is required for children, pregnant women, lactating mothers and adults (Joshi, Agho, Dibley, Senarath, & Tiwari; 2012; Taruvinga, Muchenje, & Mushunje; 2013). This scenario triggers that people are yet to be educated regarding the importance of nutrition and food diversity.

4.5.- Remittance as source of income and contributor to food security:

From the regression analysis, the remittance is the second biggest contributor to the food security among the off-farm based livelihood- source. More people would have gone to abroad for foreing employment if the opportunities were not available after the earthquake within the communities, local communiites or vicinities (FGD, Gorkha).

In fact, Nepal is one of the world's highest recipients of remittances, Nepal totaled some US$5.1 billion from Nepalese living abroad in 2012; and yet, almost 80 percentage of remittance income is used for daily consumption, and 7 percentage is used for loan repayment (Nepal Economic Forum, 2012). As a livelihood strategy, remittance is a good contributor to household economy and food security. But the question arise what would the migrant workers do after they return home.

4.6.- Contributrion from INGO (WVIN)

The purpose of this section is to assess the effect of livelihood rehabilitation in improving food security in post disaster context. Farmers are in need of technical advice, agricultural inputs and markets. WVIN implemented Livelihood, WASH, Education, Shelter and Health Programmes during recovery and rehabiliation. The sampled 2026 respondents are the direct beneficiries of one or more projects.

Livelihood Recovery and Rehabilitation Projects implemented by WVIN included farm-based and off-farm training; vocational trainings; distribution of agricultural inputs and equipment's; livestock support; facilitation of business plan; promoting saving groups; market facilitation; cash programming for community assets such as irrigation, foot trail; and so forth.   Evaluation report (section 3.1) tells that 81 percent direct beneficiaries were able to meet the food needs whereas baseline value just two years ago was 60 percent. The evaluation report also captures that 74 percent of the Livelihood Project beneficiaries were able to increase agricultural production during the project phase. The following cross-tabulation provides the analysis on the effect due to support made by WVIN through Livelihood Project. While WVIN aimed to support for the most vulnerable in the community (WVIN, 2018), WVIN support has stood up as a significant determinant to food security in the regression test.

Table- 10
Crosstab between Food Security/ Insecurity and Participants/ Non-Participants of Livelihood Rehabilitation Project

Food Security Status	Participants	Non-participants	Total (N=2026)
Food Insecure (I)	26.1%	73.9 %	31.2%
Food Secure (S)	73.9%	29.1%	68.8%
Sub-Total (I+S)	100.0%	100.0%	100.0
Pearson's Chi Square Test	Value=8.79, df=1, p=0.01, i.e. < 0.05		

Source: Field Survey of WVIN, 2018

5. Conclusions

Food security situation has increased in the earthquake affected areas due to a number of enablers. The enablers include but not limited to efforts of individual households; and service rendered by INGOs (WVIN in its working area) and the supportive role played by the local governments. The role of government was basically on coordination, planning monitoring of work of INGOs and NGOs on top of regular government

services. Moreover, government has been providing financial and technical support to the affected families to build safe houses, in replacement of the damaged houses. Based on FGDs and WVIN (2018), farm-based production has increased among the direct receipients of the Livelihood Project. This succes on Livelihood Project implemented by the INGO also indicates that households can improve their situation if they get the proper technical and material assistance. Therefore it proves how important it is to have agricultural extension programmes focusing on productivity, commercialization and ensuring food security. Lack of inadequate infra-structures especially roads and collection centres is major barrier to marketing of the products. Similarly, livestock is important source of nutrition but the farmers are not able to commercialize it. Unless infra-structures and market networks are established, farming and livestock keeping cannot turn as profitable sector in the long term.

One of strongest factor of food security was off-farm based means of subsistence. But soon after reconstruction of housing will be over in the communities, the demand for the unskilled and skilled labour is likely to decline. Therefore, the government needs to devise strategy to create economic opportunities. On the other side, foreign employment (eg. in gulf countries, Malaysia, India) may not be beneficial long-run; whilst remittance is one of the greatest contributor of food security; especially for 14% of the HHs in the research area. Here again it is important for policy makers to carry out research on commercialization of farming and maximizing economic opportunities in non/ off-farm base.

With the establishment of stable government following the three elections over the past one year, the government's agenda on prosperity sounds a great idea; but it will be important to pay attention to bottom 30%. The new development agenda propounded by Sustainable Development Goals (SDGs), cited 'Leave No One Behind ' has to be embraced by local, federal and central government for the betterment of the bottom segment of society. Furthermore, social campaigns need to be formulated to end caste based discrimation.

It is important to increase household and community resilleince to absorb shocks, adapt to the changing situation and ultimately enable them to quicky recover them from shock. As per Constas, M., Frankenberger, T., & Hoddinott, J., 'Food security = f (vulnerability, resilience capacity, shocks)'(2014, p.6). For the poor

communities, awareness about the preparedness; involvement into different groups and networks such as

producers group, farmers group, saving and credit groups can also increase their resilleince and lower the

vulnerabilities. Service providers needs to provide attention on it.

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