The Maintaining Factors of Subjective Wellbeing Homeostasis and Resilience among the Victims of Recurrent Floods

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By

Chandita Baruah
Roll No: 126141007

Department of Humanities and Social Sciences
Indian Institute of Technology Guwahati
Guwahati 781039, India.

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Declaration

I, Miss Chandita Baruah, hereby declare that the work contained in this thesis entitled "The Maintaining Factors of Subjective Wellbeing Homeostasis and Resilience among the Victims of Recurrent Floods" has been carried out by me under the supervision of Dr. Dilwar Hussain, Associate Professor (Psychology), Department of Humanities and Social Sciences, Indian Institute of Technology Guwahati (IITG). Abiding by the formal practice of reporting observations, due acknowledgements have been made for the citations of other investigations and the sources of secondary data. This work has not been submitted elsewhere for the award of any degree or diploma.

Guwahati
August 2018

Chandita Baruah
Research Scholar
Department of Humanities and Social Sciences
Indian Institute of Technology Guwahati
Guwahati-781039, Assam,
INDIA.

Certificate

This is to certify that the work contained in the thesis entitled "The Maintaining Factors of Subjective Wellbeing Homeostasis and Resilience among the Victims of Recurrent Floods" by Chandita Baruah (Roll No. 126141007), a student of the Department of Humanities and Social Sciences, Indian Institute of Technology Guwahati (IITG), for the award of the degree of Doctor of Philosophy was carried out under my supervision. The results embodied in the thesis have not been submitted to any other university or institute for the award of any degree or diploma.

Guwahati

August 2018

Dr. Dilwar Hussain

Associate Professor (Psychology)

Department of Humanities and Social Sciences

Indian Institute of Technology Guwahati

Guwahati-781039, Assam,

INDIA.

Dedicated to my Parents

(*with Love, Respect and Gratitude*)

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Synopsis

Name of the Student	:	Chandita Baruah
Roll No	:	126141007
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Institute	:	Indian Institute of Technology Guwahati
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Introduction

Floods are quite common among natural disasters and may cause a large amount of physical, social and psychological destructions (Ram & Diaz, 2013). The longstanding aftereffects of floods may exacerbate the stress level during the recovery period. The magnitude of the flood, the extent of loss of resources, fear of future occurrences are quite unpredictable aspects which creates anxiety, panic, depression and adds on to the existing level of stress of the survivors (Stanke, 2012). These flood-related extreme experiences consequently have a subjective component, which negatively affects individual's emotions, cognitions & psychological adjustment as well as hinders physical & social developments (Lock et. al., 2012; Xu & He, 2012; Dodge, 2006). Such extreme events and their psychosocial consequences upon survivors has become a focus of attention in the current research. A careful assessment of the physical, psychological, and social aspects of the survivors is essential to plan out effective help aids and

rehabilitation programs for the at-risk population. The assessment of the basic needs of the survivors after disasters should be done in order to ensure that the survivors have some sense of normalcy and gain some control over their disrupted lives (Ram & Diaz, 2013). Conversely, the existing literature also supports the fact that people are able to come to terms with the consequences of a disaster and return to their previous state of well-being with the help of certain internal mechanisms supported by the external factors as well (Hobfoll, 1989; Cummins, Gullone & Lau, 2002).

This study attempts to explore various factors maintaining subjective well-being homeostasis and resilience among the recurrent flood victims. The data was collected from two severely flood-affected districts of Assam, that is, Majuli Island, and Demaji district. Flood of various magnitudes hits these areas almost every year damaging and destroying a major portion of the livestock, goods, houses, agricultural land and precious lives of the riverine inhabitants. Flood is a recurrent phenomenon in Majuli, and Dhemaji which leads to major psychological sufferings and loss of resources. Despite such adverse impact of floods on the well-being of the survivors, almost negligible amount of psychological research has been conducted on victims of recurrent floods of these districts. The existing literature vigorously studied the devastation caused by floods but scant attention has been given towards the psychological impact that the survivors go through in the aftermath of such recurrent events. Therefore, one of the main objectives of this study is to address this major gap in the literature.

This research includes two studies using both quantitative and qualitative research designs. *Study 1* is a quantitative investigation which tests a proposed integrated theoretical model conceptualized by integrating two broad theories, that is, subjective well-being homeostasis theory and conservation of resources (COR) theory to explore the levels and mechanisms of maintenance of SWB and resilience among the recurrent flood victims. The *study 2* is a qualitative investigation focusing on exploring various traditional and culture-specific coping strategies by which the victims of recurrent floods adapt and cope with floods.

Study 1: Test of Proposed Theoretical Model: A Quantitative Study

Study 1 is a quantitative study that aims to test and extend the SWB homeostasis model in the context of recurrent flood victims by integrating COR theory and resilience.

The theory of SWB Homeostasis states that every person has a genetically set-point for SWB that lie within a narrow range of 70-80%scale maximum (SM) on a standard 0-100 point scale continuum (Cummins et. al., 2002). However, some studies have found that this norm falls slightly at a lower range for the non-western populations; inferring a range of 60-70%SM (Chen & Davey, 2008; Tiliouine, Cummins, & Davern, 2006; Cummins, 1998). The model of SWB homeostasis states that the deviation of the level of SWB from the set-point level are regulated through the process of adaptation, whereby a set of cognitive buffers acts to restore SWB levels to a normal range (Cummins, Gullone, & Lau, 2002). Cummins, Gullone, and Lau (2002) proposed the homeostatic model of SWB where first-order determinants (personality and affect) and second order determinants (control, self-esteem and optimism) helps in restoring and maintaining the level of SWB within the normative range. The model suggests that the second order determinants also acts as internal buffers against stressors by an individual to protect and restore the level of SWB during stress. The SWB homeostatic model focuses upon the stable personality traits and internal factors in the maintenance of SWB.

Apart from the subjective factors, evidence from the existing literature suggests that the objective/external indicators are equally important in determining the level of SWB along with the above mentioned subjective indicators (Guillen-Royo &Velazco, 2006; Smith & Clay, 2010). On the other hand, the basic concept of the COR theory states that an individual's internal and external resources are utilized to maintain the ability to cope with stressors, where continuous resource loss spirals lead to the breakdown of the coping mechanism causing psychological stress. COR theory considers both environmental and internal processes as equally important in the promotion of well-being and prevention of stress (Hobfoll, 1989, 2001). The COR theory talks about three kinds of external resources that can be used to cope with the stress-*object, energy and condition resources.* The Object resources include the material possession which augments the objective quality of life. The energy resources include money, credit, owed favors and knowledge, which are considered to be the significant objective predictor to enhance the quality of life. The condition resources relate to conditions that are valued and sought after that

involves relationships & status such as, being married, having a family, and work seniority and so on.

Therefore, it makes a valid argument to integrate COR Theory into the SWB Theory where the subjective/internal indicators (1st& 2nd order determinants) and the loss-gain spirals of resources (object, condition & energy resources) that represent the objective/external indicators will aid in or diminish the existing level of stress and influences SWB and psychological resilience. The current research focuses on the recurrent flood victims who often go through the resource loss spirals. Hence, both the objective and subjective indicators are likely to be equally important in maintaining and restoring the level of SWB and resilience.

The integration of the two theories is a novel aspect of this study as it will address many research gaps that cannot be explained by one theory alone. Furthermore, most of the empirical evidence of SWB homeostasis model comes from the western sample. The validity of the model in the context of eastern culture warrants further research. Furthermore, this model will provide insights into the mechanisms behind the maintenance of SWB and resilience which might have many applied and theoretical implications.

Proposed Integrated Theoretical Model

The proposed integrated model is an extension of the SWB homeostasis model where environmental stressors and external resource categories from the COR theory were included as additional independent variables. This model also included 'resilience' as a dependent variable along with SWB. Resilience was included in the model primarily because of the similar nature of these constructs. According to Cummins (2010), SWB homeostasis theory suggests that SWB should have a high correlation with other positive and self-referent constructs, such as psychological resilience, as long as the homeostatic control is maintained. It is often argued that both the SWB and psychological resilience have some trait-like properties and is expected to correlate highly with each other due to their shared variance with homeostatically protected mood (Tomyn & Weinberg, 2016). Therefore, it is expected that the same set of variables will influence both SWB and Resilience. The proposed model is shown below-

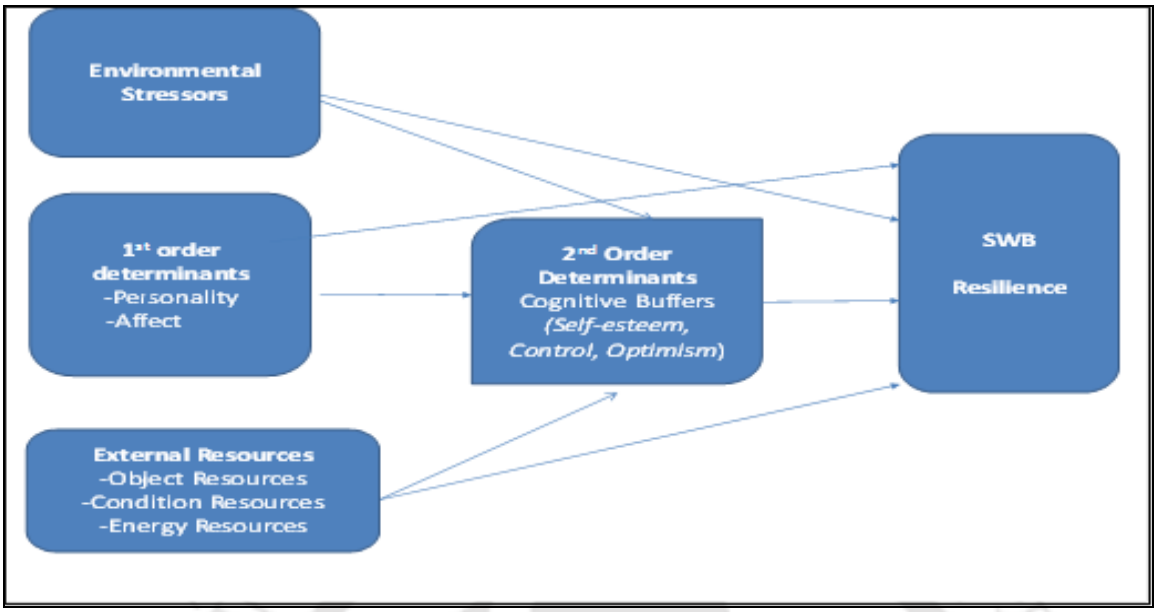

Figure 1. Proposed integrated model of SWB homeostasis and COR theory

Specifically, this study explored the following research questions-

(1) What are the floods related environmental stressors experienced by recurrent flood victims?

(2) What is the level of SWB among the recurrent flood victims? Is it maintained within the normative range as predicted by the SWB homeostasis model? Is there any evidence of SWB domain compensation?

(3) What is the relationship between SWB and resilience? What common and unique factors predict SWB and resilience?

(4) Do the factors predicted by conservation of resources theory improve the predictive power of SWB homeostasis model? Can it be extended to explain resilience?

(a) Do external resource categories of COR theory along with the 1st and 2nd order determinants of SWB homeostasis theory predict both SWB and resilience?

(b) Do cognitive buffers (2nd order determinants) of SWB homeostasis model mediate the relationship between predictors (1st order determinants of personality and affect, external resources, and environmental stressors) and outcomes (SWB and resilience)?

Summary of Results and Discussion

Study 1 included 306 participants (58.50% female, 41.50% male; mean age 38.45 years). Of the 306 participants, 154 participants were from Majuli Island district and 152 individuals participated from Dhemaji district of Assam (a northeastern state of India).

It is clear that respondents have experienced almost all major types of flood-related stressors. The highest percentage of respondents reported property damage (99.7%), negative effect on occupational work (97.7%), exposure to endangered situations (92.2%), and loss of livestock (71.6%).

The mean score of Personal well-being index (PWI) (M=62.40, SD=12.11) and the Global Life Satisfaction (GLS) (M=64.28, SD=20.38) indicate that the SWB homeostasis is maintained within the normative range of 60-90 points on a 0-100 point continuum (Ayers, 2011; Cummins, 2012). The mean score of SWB indicates that the SWB score is falling below the global set point for the western sample which is 70-90%SM but falling at the lower end of the set point range for non-western samples (60-70%SM). This study supports the fundamental proposition of SWB homeostasis theory that the experienced level of SWB is usually maintained within the normative setpoint range. For the present sample, it was found that the SWB is maintained within the normative range. However, the score was falling in the lower end indicating the psychological vulnerability of the sample.

The analysis of dimensions of SWB (in Personal Well-being Index) showed that the level of satisfaction is significantly higher in 'Personal Relationship' (*M*=82.35, *SD*=20.45), 'Community Connectedness' (*M*=75.56, *SD*=21.38) and 'Spirituality/Religion' (*M*=88.89, *SD*=17.84) domains of life satisfaction in the present sample. However, the level of satisfaction is found to be at the lower end in the case of safety (*M*=59.71, *SD*=26.64), standard of living (*M*=60.39, *SD*=24.53), health (*M*=62.25, *SD*= 24.07), future security (*M*=62.35, *SD*=23.49). The present study findings also imply to the phenomenon of *domain compensation* (Kennedy, 2001; Best, Cummins, & Lo, 2000); where dissatisfaction or lower level of satisfaction in safety, standard of living, future security and health life domains of SWB are compensated by the significantly greater level of satisfaction in the domains of spirituality, personal relationship, community connectedness and achievement in life; which helped to maintain the level of SWB.

Results of Path analysis

The path analysis was conducted using SPSS Amos 22.0 version. The theoretical model proposes two sets of pathways among the variables. First, the direct pathways propose that the 1st order determinants (personality, affect), 2nd order determinants (cognitive/internal buffers namely, self-esteem, perceived control, and optimism), environmental stressors, and external resources (object, condition, and energy resources) will directly influence SWB and resilience. Second, the indirect pathways propose that cognitive/internal buffers will mediate the relationship between the predictors (personality, affect, environmental stressors, and external resources) and outcome variables (SWB and resilience).

The results of the direct path model indicates that the significant contributors of SWB include environmental stressors (*safe shelter*); personality traits (*neuroticism, extraversion, openness, and Agreeableness*); external resources (*condition and object resources*); affect (*negative affect*); cognitive buffer (*psychological control, and optimism*) and education. Indirect path model further reveals that 'optimism' is the most significant cognitive buffer that maintains the level of SWB by acting as a mediator between the personality traits, affect, and external resources and SWB.

The factors that were found to be significant contributors of 'resilience' were age, condition resources, and psychological control. The indirect path model further revealed that 'psychological control' is the most significant cognitive buffer that maintains the level of resilience by acting as a mediator between environmental stressors, personality traits (neuroticism), affect (positive and negative affect), external resources (object and energy resources), and 'resilience'.

Therefore, this study provides evidence for the SWB homeostasis theory and its extended integrated model which incorporates COR theory and resilience. However, it was clear that not all specific indicators included in the SWB homeostasis theory and COR theory contribute equally in restoring and maintaining the level of SWB and resilience in the case of recurrent flood survivors. Furthermore, the indirect path model showed that for maintaining SWB, 'optimism' is the most significant cognitive buffer whereas for maintaining resilience, 'psychological control' is the most significant cognitive buffer. It is clear that internal

psychological buffers maintain SWB homeostasis within the normative range. However, various external factors such as environmental stressors and external resources may influence these internal buffers and lead to either break down or maintenance of SWB. In the integrated model, among the internal buffers, 'optimism' and 'psychological control' turned out to be the most significant psychological buffers maintaining SWB and resilience respectively. These internal buffers may be addressed in psychological intervention programs (such as counseling, therapies) for the vulnerable population who are at risk of homeostatic breakdown. Furthermore, external resources particularly object, condition, and energy resources were associated with internal buffers and SWB and resilience. These findings confirm that external resources such as income, material possession, knowledge, and social support could be very crucial factors for increasing SWB and resilience particularly for the underprivileged population such as victims of natural disasters. Interventions for these factors can be addressed by various agencies such as government bodies and NGOs.

Study 2: Traditional Coping Strategies in the Context of Flood Related Disasters: A Qualitative Study in the Majuli Island

A qualitative study was conducted to understand how the inhabitants of Majuli Island cope with recurrent flood-related stressors? Are there any traditional or culture-specific practices which help them to cope with such recurrent stressors?

The Majuli Island has multiethnic societies living within one homogenous culture, thriving and helping altogether to preserve, protect and propagate its Vaishnavite culture (Sahay & Roy, 2017). Apparently, cultural aspects of native history and flood-related experiences along with the values, beliefs and social milieus are often found to exert profound influences upon the applicability of certain approaches (Thieke, Mariani, Longfield, & Vanneuville, 2014). Almost every community has their unique indigenous knowledge and coping styles to deal with the flood hazards (Das, 2014; Thakuria, 2000). According to Das (2014), integrating the community perceptions of floods, local wisdom that has been passed through generations in oral traditions and their indigenous coping techniques with the advanced techno-managerial approaches may rather benefit the entire island to mitigate the flood hazards in a more effective.

The inhabitants of the Majuli Island perceive floods as an imperative phenomenon of their life and thus have adapted to certain structural and non-structural coping mechanisms to deal with these recurrent fluvial disasters (Katyaini, Barua & Mili, 2012). An in-depth understanding of the traditional coping mechanisms is imperative for the disaster preparedness and post-disaster management as well as planning sensitive interventions to mitigate the adversity and ill mental & physical health conditions. Proper acknowledgment and preservation of the community-specific traditional/indigenous coping strategies can significantly contribute to culture & region specific relevant disaster mitigation programs (Fletcher et al., 2013).

The Majuli Island consists of a well-knit community with rich cultural and traditional heritage of knowledge and skills. Consequently, it provided a rare opportunity to study and explore the role of traditional coping strategies in adaptation to recurrent floods. The people of Majuli Island over the years developed and applied their own local and traditional knowledge and skills to deal with recurrent floods every year. This could be one of the main reasons for their survival and successful adaptation.

Summary of Results and Discussion

The data for the study was collected from 22 individuals using semi-structured interviews. Participants included 8 females and 14 males. The age ranged from 26-65 years. The data were analyzed using thematic analysis as described by Braun and Clarke (2006).

The result revealed various traditional coping strategies adopted by the inhabitants of Majuli Island. Major themes included-

(1) Traditional Designs of House and Means of Transportation

The inhabitants of Majuli Island resorts to various structural changes in their houses such as ‘Chang Ghar’ (Stilt houses) which are approximately 7-15 feet above the ground level so that the flood water cannot enter into their houses easily. Apart from these stilt houses, they also prepare adjustable ‘Chang' (platform) made of bamboo and wooden planks which save them during high flood conditions when even their stilt houses are flooded. People use the locally made banana rafts, bamboo boats, county boats (small wooden boats) for transportation in order to adapt to

recurrent floods. Almost, every person regardless of their gender knows how to swim and sail a boat so that they can help themselves as well as others in need during crises.

(2) Food Security and Crop Diversification

The people of Majuli island have been facing food security issues due to recurrent floods and soil erosion. Most of the participants reported that their traditional ways of agriculture and preserving food is helping them at least partially to cope with the issue of food security. One of the major adverse side effects of the recurrent floods is the damage of agricultural produces. Almost every year floods severely damage the paddy fields by destroying the crops and by sand siltation. Therefore, these people have adapted crop diversification as an alternative way of coping strategy against the destructive floods

Apart from the storage of minimal grocery items, some communities use their age-old traditional practices of food hoarding to be used during difficult times. The inhabitants of the disaster-prone areas usually store foods following their traditional practices of food hoarding which help them during disasters. Many communities of the Majuli island stores dry foods like dry fish and dry meat, which is also a good source of protein, to be used during floods.

(3) Migration

The local inhabitants of the Majuli island also use migration as a mode of coping strategy to deal with floods. These migrations could be voluntary or involuntary in nature. It can be within the Majuli island or outside the periphery of this island districts.

(4) Community Bonding and Support

The participants of this study narrated the role of strong family and community bonding and support system in coping with floods. During floods, people staying in a village and nearby areas come forward to help each other. People regardless of their caste, creed, religion, and community come together to deal with the flood hazards.

(5) Traditional/Local Governance and Leadership

The traditional and local governance and leadership systems are also found to be an essential part of the coping strategies. These traditional governance structures of village heads, key leaders and

some significant people (especially the head priest of the monasteries) are a crucial and active part of village life that plays a significant role in flood hazard management and adaptation process.

(6) Religious Beliefs and Rituals

The inhabitants of the Majuli Island are known for their religious faith and involvement in spiritual practices and religious festivals. Engaging in spiritual and religious rituals and festivals also play a predominant role in psychosocial healing and to avert distressing memories of these recurrent flood victims. The head priests of the monasteries and their disciples play a key role in providing psychosocial support to the survivors and their affected families through the means of spirituality and providing material aids as much as possible. It is very clear from the narratives that these faith-based leaders and institutions are one of the major factors that help the victims to build resilience and maintain psychological calm at the face of adversity.

Therefore, the qualitative study clearly reveals the role and importance of various traditional knowledge and cultural values in adaptation to natural disasters particularly floods. It was evident that these traditional knowledge systems are an important part of the life of the inhabitants of Majuli Island and plays a significant role in their adaptation and identity. This study revealed that one of the main reasons for their successful adaptation is the effective use of various traditional coping strategies. Various traditional coping strategies included traditional designs of house and means of transportation, food security and crop diversification, migration, community bonding and support, local governance and leadership, and religious beliefs and rituals. This study provided examples of traditional coping strategies among the inhabitants of close-knit communities that can act as a catalyst in effective disaster mitigation programs. These traditional knowledge strategies, if properly acknowledged and preserved, can be of significant help in forming culturally relevant effective disaster mitigation programs and risk reduction.

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List of Abbreviations

EM-DAT	Emergency Events Database
CRED	Centre for Research on the Epidemiology of Disasters
UNICEF	United Nations Children's Fund
WHO	World Health Organization
QOL	Quality of Life
SWB	Subjective Wellbeing
COR	Conservation of Resources
PWI	Personal wellbeing Index
GLS	Global Life Satisfaction
BRS	Brief Resilience Scale
BFI-10	Big Five Inventory-10
PANAS	Positive and Negative Affect Schedule
RSES	Rosenberg Self-Esteem Scale
PCOISS	Perceived Control of Internal States Scale
LOT-R	Life Orientation Test-Revised
CEI1	Cumulative Exposure Indicator
COR-E	Conservation of Resources Evaluation
SWLS	Satisfaction with Life Scale
ES	Environmental Stressors
OR	Object Resources
ER	Energy Resources
CR	Condition Resources
PA	Positive Affect
NA	Negative Affect
SE	Self-Esteem
OP	Optimism

PC	Perceived Control
RS	Resilience
EFA	Exploratory Factor Analysis
CFA	Confirmatory Factor Analysis
PCA	Principal Component Analysis
SEM	Structural Equation Modeling
PA	Path Analysis
CFI	Comparative Fit Index
NFI	Normal Fit Index
GFI	Goodness-of-fit
RMSEA	Root Mean Square Error of Approximation
CR	Composite Reliability
AVE	Average Variance Extracted
MSV	Maximum Shared Squared Variance
NGO	Non Governmental Organization

Chapter 1
Introduction

1.1 Background of the Study

A sustained rise in climate-related events mainly floods and storms lead to significantly higher and increased number of disaster occurrences recently. The climatic variations, population growth, building in high-risk areas; all of these numerous factors are contributing to making a routine natural hazard into a large scale catastrophe (Wahlstrom & Guha-Sapir, 2015). Amongst the most pervasive natural disasters all over the world, the flood is considered to be the most common catastrophe worldwide, accounting for approximately 40% of all natural disasters (Wahlstrom, Guha-Sapir, 2015; Kalayjian, 1995; Brende, 1998). The worldwide flood statistics reveal that floods account for 26% of disaster-related deaths (Kalayjian, 1995; Brende, 1998). According to Emergency Events Database (EM-DAT) of Centre for Research on the Epidemiology of Disasters (CRED) data, the majority of disasters caused by flooding between 1994 and 2013, accounting for around 43% of all recorded disasters that affected nearly 2.5 billion people (Wahlstrom & Guha-Sapir, 2015).

The world disaster report shows that Asian continent was the highly affected zone by natural disasters, in terms of occurrence, disaster mortality and people affected in the year of 2012 (Kumar & Walia, 2013). Usually, heavy rainfall causes floods resulting in hardship and destruction to human life and obstructs social developments (Kandilioti & Makropoulos, 2012). The Indian sub-continent is enriched with many natural water resources which make it more prone to various magnitudes of flood hazards almost every year. According to Weibe (2006), the

north-eastern region of India alone generates the one-third of the country's total run-off water through the Brahmaputra and the Barak river systems due to the higher amount of rainfall at their upper catchment areas (Sarma, 2013).

The river Brahmaputra is considered to be the lifeline of many riverine communities of the northeastern states of India, particularly Assam. However, the river causes severe flood hazard every year in Assam forcing the people to adapt to a "living with flood" condition (Katyaini, Baruah, & Mili, 2012; Kumar & Walia, 2013). The majestic river turns life-threatening during the rainy season, causing catastrophic floods along with its banks and eroding away large portions of cropland, homestead and livestock (Katyaini, Baruah, & Mili, 2012). Flood hits the area almost every year damaging and destroying a major portion of the livestock, goods, houses, agricultural land and precious lives of the riverine inhabitants (Katyaini, Baruah, & Mili, 2012; Kumar & Walia, 2013). In 2012, the floods claimed 149 precious lives apart from the damaging property and infrastructure in Assam (Kumar & Walia, 2013). One of the most important issues of floods in Assam is that it also takes a toll on erosion, eroding away agricultural land. Floods are recurrent phenomena in Assam, and almost 45% of its total area is prone to floods (Kumar & Walia, 2013). Flood is a recurrent phenomenon in many districts of Assam particularly in Majuli Island district and Dhemaji districts which leads to major physical, social as well as psychological sufferings and loss of resources every year.

1.2 The Study Areas

This study attempts to explore subjective well-being homeostasis and resilience among the recurrent flood victims. The samples were selected from two specific districts of Assam (a northeastern state of India)-the Majuli Island district and the Dhemaji district. These areas are specifically chosen for the study keeping in view of the severity, intensity, type of destruction

and peculiarity of the flood events. The Majuli Island district is considered to be the largest river island of the world and is the only island district of India. It is the core place for the Assamese Neo-Vaishnavite Culture and 'Satriya Heritage' of Assam (Sharma & Singh, 2016; Sahariah et al., 2013). Unfortunately, this largest river island is suffering from serious threats of land erosion every year during floods. The majestic river Brahmaputra becomes life-threatening during monsoon which has already eroded a number of villages and district circles completely or partially while destroying most of the paddy fields with sand siltation (Sarma, 2013; Katyaini, Baruah, & Mili, 2012). On the other hand, the Dhemaji district is severely suffering from sand siltation after floods than land erosion (Bordoloi & Muzaddadi, 2015). Two of the major rivers 'Jia Dhal' and 'Gai' create massive destructions during floods as the flood waters carry a huge amount of sands which destroy the paddy fields. Also, the course of these river waters are quite unpredictable, and creates a condition of the flood when there is a heavy rain in the upper catchment areas of these rivers. The floods may occur without any prior indication and in a short span of time leaving the survivors with almost no time to prepare (Bordoloi & Muzaddadi, 2015; Das, 2012).

A brief description of Majuli Island and Demaji districts are given below-

1.2.1 Majuli Island

Majuli or Majoli is a major river island at the heart of the Brahmaputra river of Assam. It was considered to be the largest river island in the world and the first island to be made as a district in India in 2016 ("Majuli", 2018). Unfortunately, this largest river island is suffering from serious threats of land erosion every year during floods. The majestic river Brahmaputra becomes life-threatening during monsoon which has already eroded a number of villages and district circles

completely or partially while destroying most of the paddy fields with sand siltation (Sarma, 2013; Katyaini, Baruah, & Mili, 2012). The island had a total area of 1,250 square kilometers (483 sq mi) at the beginning of the 20th century, but having lost extensively to erosion it had an area of only 352 square kilometers in 2014 ("Majuli", 2018). The island is surrounded by the river Brahmaputra and one of the anabranches of the mainstream river, the Kherkutia Xuti, in its southern part that merge with the Subansiri River in the north. The Majuli Island was formed due to the rapid changes of its course of the mainstream river Brahmaputra and its tributaries, primarily the Lohit. Initially, the island was a long piece of land with narrow width termed as Majuli; that refers to the middle land of two parallel rivers in local Assamese language, which had Brahmaputra and Burhidihing Rivers flowing in the north and south directions respectively, until Lakhu where both the rivers merged. According to the historical texts and folklores, recurrent earthquakes during the period of 1661–1696 led to the disastrous flood in the year 1750 that lasted for almost 15 days. This catastrophic flood event resulted in the formation of the Majuli Island since the river Brahmaputra was split into two different anabranches,-one flowing along with the original channel and other following the route of the Burhidihing channel ("Majuli", 2018).

The Brahmaputra basin in India is frequently affected by different types of water induced hazards like flood, flash flood, river-bank erosion and sand casting (high amount of sand deposition by flood water) (Das, Chutia, & Hazarika, 2009). Majuli, located on the floodplains of Brahmaputra, is not an exception and the problem of flood and riverbank erosion in this area is one of the most serious concerns. The area has experienced quite a lot of large flood events such as; in the years 1962, 1983, 1984, 1988, 1998, 2004, 2008 and 2012 among which 1998 and

2012 were the largest (Sarma, 2013; Das et. al., 2009). The whole Island of Majuli is highly susceptible to flood hazard as it is located on the floodplains of the river Brahmaputra basin (Sarma, 2013). Despite the fact that there are not many reports of loss of lives due to flooding in the area, a huge loss of livestock and agricultural production are associated with every flood event (Sarma, 2013).

The inhabitants of the villages of the island include tribal, non-tribal and the scheduled castes comprising of about 144 villages with a population of over 150,000 and a density of 300 individuals per square km ("Majuli", 2018). Most of the population are usually Assamese and tribal folk, mostly belonging to the Mishing tribe from Arunachal Pradesh (Chetia, 2014). Apart from them, the indwellers are also from the Deori and Sonowal-Kacharis tribes. The dialects of this community are Mishing, Assamese, and Deori. Agriculture being the prevailing industry and paddy is the chief crop of the island, with verities of rice grown. Apart from agriculture; fishing, dairy, pottery, handloom, and boat-making are other dominant economic activities. Many of the classic skills of art and craft including pottery making, weaving and mask-making have been preserved still untouched by the modern expertise ("Majuli", 2018). Handloom, mostly non-commercial, is a prime line of work among the female population. The people of the Majuli Island is still practicing the classic skills of pottery making from beaten clay burnt in driftwood fired kilns in the similar manner as it was carried out by the people of the ancient Harappa civilization ("Majuli", 2018).

Majuli has been regarded to be the cultural capital of Assamese civilization for the past five hundred years. Initiated around the 15th century by the revered Assamese saint Srimanta Sankardeva and his disciple Madhavdeva, this island had been rendered with the core of Assamese Vaishnavite culture. Sixty-five out of the six hundred and sixty-five original *satras*

(monasteries)in Assam were situated in Majuli. However, out of the original sixty-five, only twenty-two Satras still survive. Many *Satras* or Vaishnav monasteries established by the saint still survive and represent the richness of the colorful Assamese culture. Some of the major existing satras are Dakhinpat Satra, Garamurh Satra, Auniati Satra, Kamalabari Satra, Benegenaati Satra and Samaguri Satra. These Satras are the actual treasure houses of the songs and dances initiated by Shri. Sankardeva. Many of the antiques of great cultural significance are preserved by these *satras* like weapons, utensils, jewellery and other items depicting richness of Assamese culture. The main festivals of Majuli include Rasleela, which is a three-day festival generally held during mid-November, Misings, Ali-ai-ligang, a festival of the Mishing tribe celebrated during February-March, the Bathow Puja, a festival of the Sonowal-Kacharis tribe and Paal Naam of Auniati Satra.

1.2.2 Dhemaji District

Situated in the remote corner of North East India, the Dhemaji district is located at the north bank of the river Brahmaputra. The district is surrounded by the hilly ranges of Arunachal Pradesh to the North and the East, Lakhimpur district in the West and the river Brahmaputra in the Southern part (Dhemaji District Administration, n.d). Located at the easternmost part of Assam, Dhemaji happens to be one of the most remote districts of India, a relatively small town at the foothills of the lower Himalayas. The name "Dhemaji' is believed to be originated from a pair of Assamese words "dhal" meaning flood and "dhemali" meaning "play" (Dhemaji District Administration, n.d). The place has many big and small rivers flowing through it and to name some of them are Jiadhal, Gainodi, and Cemen. The river Subansiri flows by its western border (Dhemaji District" Wikipedia, 2018; Dhemaji District Administration, n.d.). Being in a

confluence zone of rivers with the majestic river Brahmaputra edging the area and its numerous tributaries running through the district, the region is severely affected by recurrent floods. The Dhemaji district is severely suffering from sand siltation after floods than land erosion (Bordoloi & Muzaddadi, 2015). Two of the major rivers 'Jia Dhal' and 'Gai' create massive destructions during floods as the flood waters carry a huge amount of sands which destroy the paddy fields. Also, the course of these river waters are quite unpredictable and creates a condition of the flood when there is a heavy rain in the upper catchment areas of these rivers. The floods may occur without any prior indication and in a short span of time leaving the survivors with almost no time to prepare (Bordoloi & Muzaddadi, 2015; Das, 2012).

According to 2011 census, the total population of the Dhemaji district is 686,133; out of which 98% of the populations live in rural areas ("Dhemaji District" 2018; "Dhemaji", n.d.). The population is mostly comprised of communities such as Ahoms, Chutiyas, Konches and a small portion of populations includes schedule tribes including Misings, Sonowal-Kacharis, Bodos, Deoris, Lalungs, Hazongs and so on ("Dhemaji", n.d.). The primary languages of communication of this region are Assamese, Mishing, Bodo, and Bengali. Majority of the population belongs to Hindu religion followed by Christianity and Islam ("Dhemaji", n.d.). The major source of occupation of this region is agriculture. Other prominent livelihoods include small-scale sericulture, fishing, and driftwood business and so on ("Dhemaji", n.d.).

1.3 A Brief Theoretical Overview and Rationale of the Study

Floods are quite common among natural disasters and may cause a large amount of physical, social and psychological destructions (Ram & Diaz, 2013). The longstanding after-effects of floods may exacerbate the stress level during the recovery period. The magnitude of the flood,

the extent of loss of resources, fear of future occurrences are quite unpredictable aspects which creates anxiety, panic, depression and adds on to the existing level of stress of the survivors (Stanke, 2012). The assessment of the basic needs of the survivors after disasters should be done in order to ensure that the survivors have some sense of normalcy and gain some control over their disrupted lives (Ram & Diaz, 2013). Conversely, the existing literature also supports the fact that people are able to come to terms with the consequences of a disaster and return to their previous state of well-being with the help of certain internal mechanisms supported by the external factors as well (Hobfoll, 1989; Cummins, Gullone & Lau, 2002).

In this study, data was collected from two severely flood-affected districts of Assam, that is, Majuli Island, and Demaji district (description of these districts are already given in the previous sections). Flood of various magnitudes hits these areas almost every year damaging and destroying a major portion of the livestock, goods, houses, agricultural land and precious lives of the riverine inhabitants. Flood is a recurrent phenomenon in Majuli, and Dhemaji which leads to major psychological sufferings and loss of resources. Despite such adverse impact of floods on the well-being of the survivors, almost negligible amount of psychological research has been conducted on victims of recurrent floods of these districts. The existing literature vigorously studied the devastation caused by floods but scant attention has been given towards the psychological impact that the survivors go through in the aftermath of such recurrent events. Therefore, one of the main objectives of this study is to address this major gap in the literature.

This research includes two studies. *Study 1* is a quantitative investigation which tests a proposed integrated theoretical model conceptualized by integrating two broad theories, that is, subjective well-being homeostasis theory and conservation of resources (COR) theory to explore the levels and mechanisms of maintenance of SWB and resilience among the recurrent flood

victims. The *study 2* is a qualitative investigation focusing on exploring various traditional and culture-specific coping strategies by which the victims of recurrent floods adapt and cope with floods.

The broad objective of the *study 1* is to test and extend the SWB homeostasis model in the context of recurrent flood victims by integrating COR theory and resilience. The theory of SWB Homeostasis states that every person has a genetically set-point for SWB that lie within a narrow range of 70-80%scale maximum (SM) on a standard 0-100 point scale continuum (Cummins, Gullone & Lau, 2002). However, some studies have found that this norm falls slightly at a lower range for the non-western populations; inferring a range of 60-70%SM (Chen & Davey, 2008; Tiliouine et. al., 2006; Cummins, 1998). The model of SWB homeostasis states that the deviation of the level of SWB from the set-point level are regulated through the process of adaptation, whereby a set of cognitive buffers acts to restore SWB levels to a normal range (Cummins, Gullone, & Lau, 2002). Cummins, Gullone and Lau (2002) proposed the homeostatic model of SWB where first-order determinants (personality and affect) and second order determinants (control, self-esteem, and optimism) helps in restoring and maintaining the level of SWB within the normative range. The model suggests that the second order determinants also acts as internal buffers against stressors by an individual to protect and restore the level of SWB during stress. The SWB homeostasis model focuses upon the stable personality traits and internal factors in the maintenance of SWB. Apart from the subjective factors, evidence from the existing literature suggests that the objective/external indicators are equally important in determining the level of SWB along with the above mentioned subjective indicators (Guillen-Royo & Velazco, 2006; Smith & Clay, 2010). On the other hand, the basic concept of the COR theory states that an individual's internal and external resources are utilized to maintain the ability to cope with

stressors, where continuous resource loss spirals lead to the breakdown of the coping mechanism causing psychological stress. COR theory considers both environmental and internal processes as equally important in the promotion of well-being and prevention of stress (Hobfoll, 1989, 2001). The COR theory talks about four kinds of external resources that can be used to cope with the stress-object, condition and personal characteristics and energy resources. The object resources include the material possession which augments the objective quality of life. The condition resources relate to conditions that are valued and sought after that involves relationships and status such as, being married, having a family, and work seniority and so on. The personal characteristics resources include psychological traits such as social competence, self-esteem, personal control and so on. The energy resources include money, credit, owed favors, and knowledge, which are considered to be the significant objective predictor to enhance the quality of life. (Hobfoll, 1989, 2001).

Therefore, it makes a valid argument to integrate COR Theory into the SWB Theory where the subjective/internal indicators (1st and 2nd order determinants) and the loss-gain spirals of resources (object, condition and energy resources) that represent the objective/external indicators will aid in or diminish the existing level of stress and influences SWB and psychological resilience. The current research focuses on the recurrent flood victims who often go through the resource loss spirals. Hence, both the objective and subjective indicators are likely to be equally important in maintaining and restoring the level of SWB and resilience.

The integration of the two theories is a novel aspect of this study as it will address many research gaps that cannot be explained by one theory alone. Furthermore, most of the empirical evidences of SWB homeostasis model come from the western sample. The validity of the model in the context of eastern culture warrants further research. Furthermore, this model will provide

insights into the mechanisms behind the maintenance of SWB and resilience which might have many applied and theoretical implications.

Study 2 will address another very significant research gap, which is to explore various traditional and culture-specific coping strategies used by these recurrent flood victims in Majuli island district of Assam. As Majuli island is known for its rich cultural heritage and traditional practices, this study will further provide insights into the culture-specific coping methods used by recurrent flood victims. This will have further significant theoretical and applied implications.

1.4 Research Questions

Following specific research questions are investigated in this study-

1. What are the floods related environmental stressors experienced by recurrent flood victims? How they cope with such stressors? Are there any traditional or culture-specific practices which help them to cope with such recurrent stressors?

The first part of the above research question will be investigated by the quantitative research method while the later part dealing with traditional adaptive coping strategies will be explored with a separate qualitative study (Chapter 6).

The following questions will be investigated using the quantitative research method.

2. What is the level of SWB among the recurrent flood victims? Is it maintained within the normative range as predicted by the SWB homeostasis model? Is there any evidence of SWB domain compensation?

3. What is the relationship between SWB and resilience? What common and unique factors predict SWB and resilience?
4. Do the factors predicted by conservation of resources theory improve the predictive power of SWB homeostasis model? Can it be extended to explain resilience?
   (a) Do external resource categories of COR theory along with the 1st and 2nd order determinants of SWB homeostasis theory predict both SWB and resilience?
   (b) Do cognitive buffers (2nd order determinants) of SWB homeostasis model mediate the relationship between predictors (1st order determinants of personality and affect, external resources, and environmental stressors) and outcomes (SWB and resilience)?

1.5 The Structure of the Thesis

The outline of the thesis includes the following chapters:

Chapter 1: Introduction

The introductory chapter includes the brief overview of the study, description of the study areas, the rationale and the research questions of the present study.

Chapter 2: Review of Literature, Gap Analysis, and Proposed Theoretical Model

The basic introduction chapter is followed by the review of the literature. This chapter offers a brief description of the theories and variables of the present study supported by the existing literature, assessment of gaps in the existing literature followed by the proposed integrated theoretical model for the present study.

Chapter 3: Study 1- Test of Proposed Theoretical Model: A Quantitative Study

This chapter includes the description of the sample, questionnaires and data collection procedure for the quantitative study.

Chapter 4: Study 1- Results

This chapter offers the detailed statistical analysis and the results of the data collected using SPSS and SPSS Amos.

Chapter 5: Study 1- Discussion

In this chapter, the results obtained from the result chapter is further interpreted and discussed in detail on the basis of the existing literature.

Chapter 6: Study 2- Traditional Coping Strategies in the Context of Flood Related Disasters: A Qualitative Study in the Majuli Island

This chapter describes the sample, the method used for the qualitative analysis (Thematic Analysis), and the data collection procedure for the qualitative study.

Chapter 7: Study 2- Result

This chapter deals with exploring, identifying, understanding and further interpreting the individual narratives to generate appropriate themes.

Chapter 8: Study 2- Discussion

This chapter includes further interpretation and detailed discussions of the themes generated from the individual narratives in light of the existing literature.

Chapter 9: Conclusions, Limitations, and Future Directions

The last chapter of this thesis includes the conclusion, limitations, and probable future directions of the study.

Chapter 2

Review of Literature, Gap Analysis, and Proposed Theoretical Model

This chapter reviews literature related to all the relevant variables in the study followed by the analysis of the gaps in the existing literature and the proposed theoretical model.

2.1 Flood Related Environmental Stressors

The natural hazards have become quite common phenomena across the world in the recent decades. The climatic variations, population growth, building in high-risk areas; all of these numerous factors are contributing to making a routine natural hazard into a large scale catastrophe (Wahlstrom, & Guha-Sapir, 2015). People experience rapid and extensive changes in their lives and the worlds in which they live when they are exposed to extreme adversity and disasters. The inherent aftereffects of these extreme events may lead to enormous stress to people, families, and communities, such as causing short-term fear of death and exposure to traumatic events because of the recurrent events that take place (Lock et. al., 2012). The occurrence of the natural disaster is considered to be a large-scale environmental stressor for an individual as well as for the whole community. The altered environment force people to adapt quickly to the new set of circumstances, often facing the loss of friends, family, and possessions (Lock et. al., 2012). Recurrent conditions and prolonged negative circumstances may even affect the ability to regulate, identify, and express emotions and could negatively affect an individual's core identity and ability to relate to others (Xu & He, 2012).

Adaptation to the changed circumstances helps in effective psychosocial recovery after disasters or extreme events. In some situations, the personal and social meanings derived from individual experiences of an extreme event have a strong psychosocial impact than the actual event (Lock et. al., 2012). An Individual's own physical, psychological and social characteristics, and also the support from their families and communities helps in restoring the abilities to re-build, recover and adapt in the aftermath of a disaster (Lock et. al., 2012).

The World Health Organization (WHO) (2001) states that the psychological consequences of floods have not yet been entirely addressed by the disaster preparedness and service delivery agencies working in the field of disaster risk reduction and mitigation; even though it is commonly recognized that natural calamities, such as earthquakes, floods, and hurricanes, significantly affects the mental health of the survivors, and the majority of whom usually belongs to the developing countries that have limited capacity to take adequate measures for these problems(Ahern, Kovats, Wilkinson, Few, & Matthies, 2005; Sayers, 2001). In a report published by UNICEF in 2010 states that the climatic variations in the Asia and the Pacific region will lead to increased rates of disaster mortality and injury along with heightened risk of water scarcity, food insecurity, vector-borne diseases, population migration and decreased scope of livelihoods (as cited in Urbano, Maclellan, Ruff & Blashki, 2010). According to Stanke et al., (2012), people of all ages are affected by flood incidences that may further provoke or worsen the negative mental health consequences. A study conducted by Ahern et al., (2005) on global health impacts of flooding, found that flooding most often leads to increased depression, anxiety and distress among adult victims, and children survivors tend to show the symptoms of aggression, bedwetting and moderate to severe degree of psychological distress. Flood events often evoke significant social as well as welfare difficulties that last much longer than the actual

event of flooding (the primary stressor) that increases the risk of the secondary stressors (for example, financial stress associated with reconstruction, medical treatment and so on) that often challenges the psychosocial resilience of the victims (Lock et al., 2012; Stanke et al., 2012). A study conducted by Luechinger & Raschky (2009) to evaluate the monetize utility losses due to floods including 16 European countries from 1973 to 1998 found that flood events exert a sizable, robust and significant negative influence on life satisfaction.

The development of the effective flood risk communication and mitigation strategies requires an in-depth understanding of the factors such as flood awareness, risk perception and preparedness of the at-risk population (Burningham, Fielding & Thrush, 2008). The recent researches have often documented that the populations belonging to the lower social strata are more likely to reside in high flood-prone zones and not likely to be fully aware of the upcoming danger because of low education/illiteracy, absence of proper awareness programs and so on (as cited in Burningham, Fielding & Thrush, 2008). Incorporating or taking into account the local perspectives of flood risk seriously and engaging the native people of an area and their informal knowledge systems into the process of disaster preparedness may further aid into the development of more effective strategies to mitigate the negative aftereffects of the flood events (Parker & Handmer, 1998). According to Fletcher et al. (2013), proper acknowledgment and preservation of the community-specific traditional/indigenous coping strategies can significantly contribute to culture and region specific relevant disaster mitigation programs.

2.2 Gender and Disasters

The sudden changes in the way a family usually functions after disasters can be a significant source of distress for its members in the form of relationship breakdown, reduced reciprocation

of love and support or abuse between partners, parental conflicts and so on (Lock et al., 2012; Schumacher & Coffey, 2010). Research suggests that children, young adults, and older people are at high risk because they are often dependent upon the working adults of the family, and their responses to flooding effects the entire family (Stanke et al., 2012). Often female survivors suffer more negative effects than male and adults ranging from 40-60 years and children are likely to be more distressed after disasters (Ram & Diaz, 2013). Women of poor socioeconomic households are more vulnerable to flood hazards as they need to struggle with the dominating aversive conditions at the primary level including caring for their children and elderly at home, managing the food and cooking fuel and maintaining the basic hygiene (Katyaini, Baruah, & Mili 2012).

Disasters are often found to impact women victims more than the male as they are usually deprived in terms of habits, social identity, direct relief aids, emergency relief facilities and so on (Spring, 2008). The evaluation of the distribution of relief aids, during the tsunami relief in Asia and the earthquake cleanup drive in Pakistan, revealed that men were more privileged being the head of the family in terms of receiving help aids and many of them were found to misuse the aid-money for alcohol; whereas, women victims were deprived of direct disaster relief aids (as cited in Spring, 2008). According to Neumayer and Plümper (2007), “A vulnerability approach to disasters would suggest that inequalities in exposure and sensitivity to risk as well as inequalities in access to resources, capabilities, and opportunities systematically disadvantage certain groups of people, rendering them more vulnerable to the impact of natural disasters” (p.1). Their study over the period of 1981 to 2002 including 141 countries found that the natural disasters apparently decrease the life expectancy of women as compared to men; the lower the socioeconomic status of women and higher the disaster intensity, stronger the gap of gender in life expectancy (Neumayer & Plümper, 2007). The disaster relief agencies have not yet

considered gender as a conscious criterion to be taken into account for effective disaster assistance to the victims. The limited resources during a crisis period often bring into notice the apparent gender discriminations among the vulnerable groups, especially in the developing countries (Wiest, Mocellin & Motsisi, 1994).

2.3 Subjective Wellbeing

Since ages, the concept of "Happiness" has continued to capture the attention of many people around the globe, that drives a long yearn for a means to measure it. The trend changes around the 1950s when psychologists who were until then mainly interested in negative emotional states such as depression and anxiety; came forward to show their interest in positive emotions and well-being (Hagerty et al., 2001). The study of subjective quality of life sprang out of the desire to understand the human experiences and evaluations of the quality of life. The concept of quality of life grew out from the recognition by American research on social indicators in 1960's, that subjective indicators of social wellbeing were equally important as the objective economic indicator to measure the social change and prosperity of the nation (Cook, 2003; Hagerty et al., 2001).

The optimum level of psychological functioning and experience is commonly referred to as well-being. Just as negative affect is not the opposite of positive affect, likewise absence of mental illness does not equate to well-being (Ryan & Deci, 2001; Cacioppo & Berntson, 1999). Generally, there are two perspectives to define well-being. According to the clinical perspective, well-being is merely the absence of negative conditions and the psychological perspective terms well-being as the prevalence of positive attributes (Deci & Ryan, 2008; Cook, 2003; Ryan & Deci, 2001).

The Scope of empirical inquiry into well-being revolves around two distinct philosophies, Hedonism and Eudaimonism. The first perspective can be broadly labeled as ***Hedonism*** (Kahnemen et al., 1999) which emulates the view that well-being is comprised of pleasure or happiness. The central focus of the hedonic approach is on happiness and it defines well-being in terms of pleasure attainment and pain avoidance (Deci & Ryan, 2008; Kahnemen et al., 1999). While the second view delineates that well-being consists of more than just happiness. Instead, it draws on to the actualization of human potentials. This second perspective of well-being, known as ***Eudaimonism*** (Waterman, 1993), channels the idea that well-being is comprised of fulfilling or recognizing one's daimon or real nature/self and defines well-being in terms of the extent to which an individual is fully functional (Ryan & Deci, 2001).

The principal view among hedonic psychologists is that well-being encompasses subjective happiness and focuses on the experience of pleasure versus displeasure, largely interpreted to include all judgments about the positive and negative components of human life (Deci & Ryan, 2008; Diener, Sapyta & Suh, 1998). Therefore, Happiness cannot be constricted to physical hedonism only, as it can be achieved through the attainment of goals or valued outcomes in wide-ranging domains (Diener et al., 1998). The assessment of ***subjective well-being (SWB)*** has become the prime area of research within the hedonic psychology (Diener & Lucas, 1999). SWB consists of three components: ***life-satisfaction***, ***the presence of positive mood***, and ***the absence of negative mood***, which often altogether synopsized as happiness (Diener, 2000; Myers & Diener, 1996).

The Subjective well-being (SWB) is all about an individual's appraisal of his/her life. These assessments can be more focal (e.g., nuptial satisfaction, or satisfaction with one's car) or wider (e.g., life satisfaction or satisfaction with the self or life as a whole). Furthermore, these

evaluations may be cognitive in the matter of satisfaction judgments or could be more affective (moods and emotions, the emotional reactions to the life events) (Lucas, 2008). Therefore, it gives the impression that subjective well-being is comprised of at least three major components: pleasant emotions and moods, lack of negative emotions and moods and life satisfaction or satisfaction judgments. SWB is a central domain encompassing a vast collection of constructs narrating the individuals' subjective appraisement of the quality of their lives (Lucas, 2008; Cook, 2003; Myers & Diener, 1996).

2.3.1 Subjective Wellbeing and Natural Disasters

Most of the existing works of literature based on natural disasters were conducted on the direct damages at the macroeconomic level such as damages to fixed assets and capital, raw materials, natural resources, death, morbidity and so on (Berlemann, 2016; Cavello & Noy, 2011). However, in recent years a significant number of the emerging researches in the field of natural disasters attempt to focus more on microeconomic level dealing with the self-reported individual well-being (Berlemann, 2016). Natural disaster may affect an individual's level of subjective wellbeing directly by influencing one's health, job security/employment, loss of wealth and income and so on or indirectly through increased anxiety/fear causing distress about the risk of future occurrences hampering individual living conditions (Berlemann, 2016; Xu & He, 2012). In a study conducted by Rehdanz, Welsch, Narita, and Okubo (2015) on the Japan Fukushima disaster found a significant drop in the life happiness of the people living close by and the tsunami-affected areas. Studies have found that the life satisfaction ratings decrease based on their disaster experience and perceptions despite insurance compensations and public post-disaster relief funds (Möllendorff & Hirschfeld, 2016; Xu & He, 2012).

The developed nations all over the world have adopted various standardized indicators to measure the quality of life within their societies ranging from home ownership, labour force participation, violent crime rates, to the level of sulfur dioxide in the air, per capita water consumption and so on (Diener, Lucas, Schimmack & Helliwell, 2009). According to Dolan and White (2007), at the macro level, such government policies constantly try to increase various possibilities for people by raising average incomes and liberalizing public services that are necessary for a good society. But, these policies are largely based upon objective indicators that put little emphasis on the subjective feelings of the people (Diener, Lucas, Schimmack & Helliwell, 2009; Dolan & White, 2007). Sen (1990), in his revolutionary work on poverty; suggested that economic growth cannot be the sole indicator of progress and the concept of poverty cannot simply be defined in terms of money only.

Although these objective social indicators provide useful information; because of their inherent limitations, these indicators ignore the vital aspects that can substantially influence an individual's quality of life (Diener, Lucas, Schimmack & Helliwell, 2009). Most of the policies are planned for the optimum collective functioning of a society under normal conditions; however, societies should also essentially prepare for the unpredictable events such as natural calamities that often disrupt the normal functioning for a longer period of time (Diener, Lucas, Schimmack & Helliwell, 2009). The SWB measures can help develop effective policies to ameliorate the misery caused by the natural disasters; for example, evaluation of the satisfaction with the effectiveness of more tangible resources such as early warning systems or satisfaction with the emergency relief measures may further help in planning more effective disaster mitigation policy approaches (Diener, Lucas, Schimmack & Helliwell, 2009; Luechinger & Raschly, 2009).

2.3.2 Subjective Wellbeing Homeostasis Theory

According to the SWB homeostasis theory, the level of SWB experienced is stable and maintained at a set point, and any conditions that increase or decrease SWB are adapted to over a short period of time in order to reinstate the stable level of SWB (Cummins, Gullone, & Lau, 2002). It is a common false notion that the experienced amount of SWB is limitless. The theory of SWB Homeostasis states that every person has a genetically set-point for SWB that lie within a narrow range of 70-80% scale maximum (SM) on a standard 0-100 point scale continuum (Cummins, Gullone, & Lau, 2002). The average consistency of the findings for the set point of SWB is 75% SM with 70-80% SM as the normal range in western cultures (Lai, Cummins, & Lau, 2013; Tiliouine, Cummins, & Davern, 2006; Cummins, Gullone, & Lau, 2002). Although the recent literature of SWB suggests a distribution of 70-90% SM with an average score of 80% SM to be the positive (above neutral) levels of wellbeing of population distribution for western cultures (Cummins & Wooden, 2014; Chen & Davey, 2008). Whereas, this norm falls slightly at a lower range for the non-western populations; inferring a range of 60-70%SM (Chen & Davey, 2008; Tiliouine, Cummins, & Davern, 2006; Cummins, 1998).

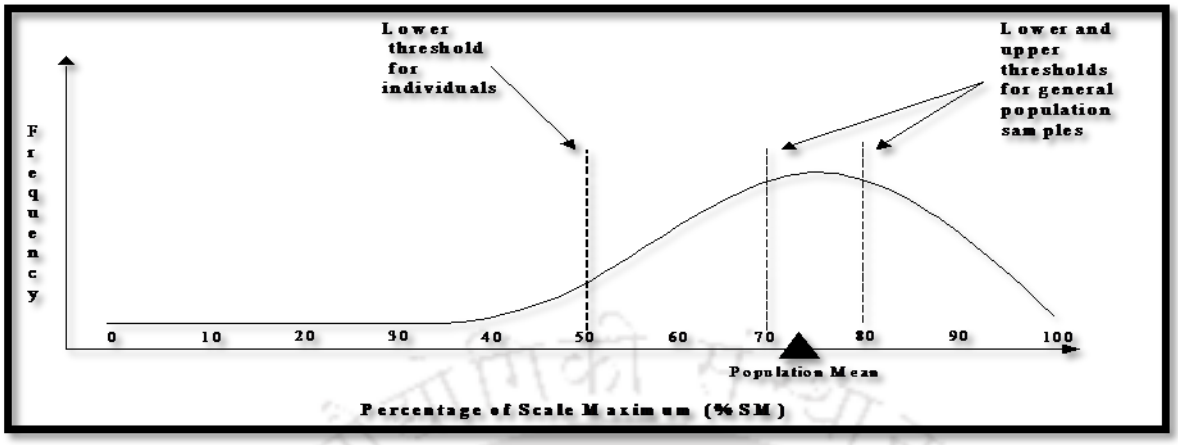

*Figure 2.1.*The Normal Distribution of Subjective Wellbeing (Cummins, Gullone & Lau, 2002).

The theory of SWB homeostasis suggests that there is an equilibrium level of SWB which is basically determined by the "homeostatically protected mood" (HPMood) (Ayers, 2011; Cummins, 2010). The HPMood is a primitive, biologically determined mood state, an unchanging positive mood state with no cognitive component. This biologically driven mood has been found to approximate the set point for SWB (Cummins, 2013). Although SWB can increase or decrease in response to the emotions associated with life events, it generally remains positive, stable and within an individual's adaptive set point range at the level of HPMood. In addition to HPMood, the homeostatic system involves a set of buffers or resources that become activated when challenging life events threaten SWB homeostasis (Cummins & Wooden, 2014; Cummins, 2013).

2.3.2.1 Maintenance of SWB Homeostasis

The model of SWB homeostasis states that the deviation of the level of SWB from the set-point level are regulated through the process of adaptation, whereby a set of cognitive buffers acts to restore SWB levels to a normal range (Cummins, Gullone, & Lau, 2002). A model proposed by

Cummins, Gullone, and Lau (2002) shows the influence of personality, affect and cognitive/internal buffers as the regulating mechanisms of SWB. According to this model, personality and affect are considered as 1st order determinants and cognitive/internal buffers are considered as the 2nd order determinants. More specifically, cognitive buffers include three variables, that is, self-esteem, perceived control, and optimism. Under the conditions of chronic negative circumstances that are too severe or prolonged to be successfully moderated by internal homeostatic mechanisms, homeostatic breakdown can occur. Figure 2.2 shows the SWB homeostatic model.

Cummins, Gullone, and Lau (2002) further proposed certain specific predictions based on the theoretical understanding of the kind of relationship between extrinsic conditions and SWB homeostasis, that is,

- *Under maintenance condition, where there is no threat to homeostasis, the level of SWB is controlled by homeostatic mechanism and not by extrinsic conditions.*
- *Under non-maintenance conditions, where the homeostatic system is defeated, extrinsic conditions become the dominating force by defeating homeostasis and hence exerting control over SWB by causing it to rise or fall off the set point range.*
- *Objective conditions and many of the objective indicators such as chronic poverty, friendlessness, lack of safety, etc., will have the power to control or cause an increase or decrease in SWB in the conditions of marked deficit* (as cited in Cook, 2003, p.72).

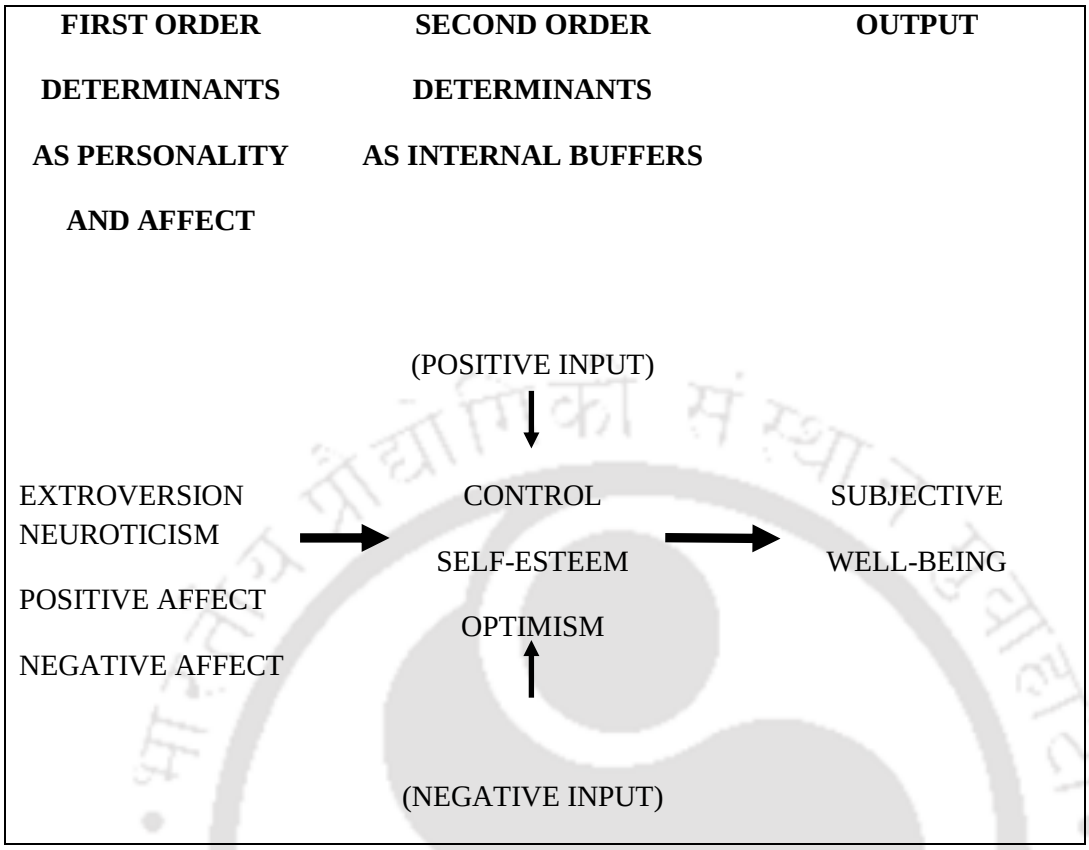

Figure 2.2. A Homeostatic Model for Subjective Wellbeing (Cummins, Gullone, & Lau, 2002).

(i) First Order Determinants of SWB

The satisfaction with one's life is considered to be a crucial aspect for sustained motivation towards life (Veenhoven, 1994). In order to understand the SWB homeostatic maintenance, it is important to understand the underlying determining forces that act as a barrier in between SWB and life stressors. Cummins (2000) proposed that the underlying mechanisms for SWB homeostasis consist of two levels of determining factors. The first order determinants basically refer to the enduring genetic capacities that are relatively stable in nature which includes personality and affect (Cook, 2003; Cummins, Gullone & Lau, 2002). The genetic properties determining personality and the trait-like properties of positive & negative affect determining the

propensity to experience positive or negative mood states make these two factors considered to be the strongest determinants of SWB (Cook, 2003; Cummins, 2000).

Personality

The American Psychological Association (2018), defines personality as a characteristically difference pattern of an individual in their thoughts, feelings, and behavior. According to Diener (1988), personality is both genetically and environmentally based 'characteristic response tendencies' of an individual. One of the most approved upon and widely used topology of personality is the 'five-factor model of personality' that includes extraversion, neuroticism, openness to experience, conscientiousness and agreeableness (Goldberg, 1992; McCrae & Costa, 1992).

The decades of research on SWB shows that SWB has a potential ability to be stable over time and recovers after major life stressors and often found to be strongly correlated with the enduring personality traits (Diener, Oishi & Lucas, 2003; DeNeve & Cooper, 1998). The studies conducted on monozygotic twins reared apart showed greater similarities in SWB scores than dizygotic twins reared apart or stayed together (as cited in Cook, 2003).

Many theories assume that the tendencies to perceive the experienced life events as positive or negative are strongly determined by an individual's inherited genetic dispositions of their personality (as cited in Cook, 2003). According to Lu (1999), personality traits are close correlates of SWB. Some of the researchers suggest that "having a coherent sense of one's personality and acting in accordance with that personality are positively related to well-being" (as cited in Diener, Oishi, & Lucas, 2003, p.407). In the meta-analytic study conducted by DeNeve and Cooper (1998) involving 148 separate studies over 137 personality traits and 42,171

respondents produced an overall weighted correlation of .19 between personality and SWB, where neuroticism accounts for -.22 and extraversion correlates with .17 supporting the inference that personality is a consistent and reliable predictor of SWB.

Among all the five-factor traits of personality, studies concerning SWB primarily focused on the traits of extraversion and neuroticism (Diener, Oishi & Lucas, 2003; Cook, 2003; Headey & Wearing, 1992; Clark & Watson, 1992). Due to the consistency of the research findings, many researchers have suggested that the primary connection between personality and SWB is governed by the individual traits of extraversion and neuroticism (Diener, Oishi & Lucas, 2003; Lucas & Fujita, 2000). However, DeNeve & Cooper (1998) argued that the sole focus upon these two traits may distort the multifaceted relationship pattern between personality and SWB. Further research is warranted in this area for the better understanding of this intricate relationship.

Affect

Personality and affect are considered to be the two key components that influence an individual's disposition to various experiences of emotional events which partially determines the level of set-point of SWB (Headey & Wearing, 1989). According to Shmotkin (1998), the construct of SWB includes the two-factor model of positive and negative affect, and happiness is a product of the maintained balance between these two affects. Positive affect refers to the extent to which an individual is enthusiastic, active, alert, optimistic and avows a zest for life, whereas negative affect represents the feelings of subjective distress and unpleasant arousal that includes a variety of mood states such as anger, contempt, disgust, guilt, fear, nervousness and so on (Watson & Clark, 1988; Watson & Tellegen, 1985).

The ground-breaking work of Davern et al., (2007), put forth the strong empirical support towards the proposition that SWB is predominantly governed by the affective construct, along with the independent influence of cognition. They argued that the core affect is the key factor in SWB maintenance rather than personality as opposed to the generally reported previous literature (e.g., Headey & Wearing, 1989, 1992; Vittersø, 2001; Vittersø & Nilsen, 2002). According to Davern et al., (2007)"the major implication of this finding is that core affect may be driving the relationship between personality and SWB and since core affect is driving both personality and SWB, individual differences in set-point levels of core affect may be causing personality and SWB to correlate" (as cited in Tomyn, 2008, p.12). The core affect reflects a relatively enduring and stable characteristic pattern that encourages pleasant affect which not only provides the motivation for living but also is accountable for regulating the stability of SWB set points (Tomyn, 2008; Davern et al., 2007).

(ii) Second Order Determinants (Cognitive Buffers)

Human beings have evolved with a set of complex cognitive structure lies deep within the homeostatic mechanism that helps us prevent psychological harm from external circumstances and maintain SWB within its normative range (Tomyn, 2008; Cummins & Nistico, 2002; Cummins, Gullone & Lau, 2002). These devices often termed as internal buffers or second order determinants come into action when SWB is threatened (Cummins & Nistico, 2002). The potential life challenges or disturbances must be controlled in order to achieve the optimum level of successful adaptation of SWB set points (Tomyn, 2008). During the initial simple level, these mechanisms use an automatic process of adaptation and habituation to ward off the daily life stressors that threaten an individual's self-perception (Cummins, Lau, Mellor& Stokes, 2009; Tomyn, 2008; Cummins, Gullone & Lau, 2002). The process of adaption is usually faster for

strong positive events; however, prolonged and strong negative life events may result in SWB homeostatic breakdown (Cummins, Lau, Mellor & Stokes, 2009). These underlying processes are supported by a set of cognitive buffers that restructure an individual's perception of reality in ways that intent to protect SWB from the conscious and maladaptive thought process and function to minimize the impact of inevitable adverse experiences (Cummins, Lau, Mellor & Stokes, 2009, Tomyn, 2008; Cummins & Nistico, 2002). These protective factors are often termed as the 'positive cognitive biases' (Cummins & Nistico, 2002). According to Cummins and Nistico (2002), these internal positive cognitive buffers contribute to a counteracting potency to the stressors that ensures the maintenance of SWB. The second order determinants mentioned in the SWB homeostasis theory involves three positive cognitive biases termed as 'cognitive buffer system' includes- *self-esteem* (the feelings representing self-worth); *control* (generalized belief in self-competence); and *optimism* (positive expectations regarding oneself in the future despite objective circumstances) (Cook, 2003; Cummins & Nistico, 2002; Cummins, Gullone & Lau, 2002; Thompson et al., 1998; Peterson, 2000). These cognitive biases of self-esteem, control, and optimism have many significant features. First, they are not specific to any skills, abilities or attributes which enables negative self-assessment against some external criteria. Second, it involves abstract notions that are disconnected from reality (for example, the self-belief of being more smarter, good looking, luckier or popular, liked by others and so on). Third, these biases are far from empirical confirmation (for example, it cannot be proved that one person is more fortunate than the rest of the people) (Cummins & Nistico, 2002; Tomyn, 2008).

Self-esteem

Self-esteem may be defined as an individual's sense of self-worth or value of oneself that denotes the degree to which a person values, admires, appreciates, honors, or loves their own self

(Blascovich & Tomaka, 1991). One of the most accepted definitions of self-esteem was given by Rosenberg (1965), defining it as "a favorable or unfavorable attitude toward the self" (P.15).

Satisfaction with one's own self is found be one of the robust predictors of SWB (Tomyn, 2008). A host of previous literature documented a strong positive correlation between self-esteem and SWB (Diener & Diener, 1995; Campbell, 1981). According to Diener, Lucas, Oishi, and Suh (1992), happy people usually report being satisfied with their own self, while people who are unhappy are more often found to report low satisfaction ratings about oneself. In a study conducted by Diener and Diener (1995) across 31 nations on 13,118 college students found that self-esteem and SWB were positively correlated with a correlation statistics of .47 for the total sample. Likewise, Cummins and Nistico (2002) reviewed six studies assessing the relationship between self-esteem and SWB found an average correlation ranging from 0.54-0.77. Cummins, Gullone, and Lau (2002) stated that self-enhancement is the key resource for both self-esteem and to its buffering effect in SWB homeostatic maintenance. The increased degree of association of oneself with direct forms of self-enhancement through the means of positive outcomes and positive identities often leads to the higher amount of self-esteem resulting in greater satisfaction with life (Tomyn, 2008; Cummins, Gullone & Lau, 2002). Self-esteem is considered to be a stable construct similar to the personality dimensions of extraversion and neuroticism, however, it is also vulnerable to temporary changes caused by deliberate interventions or life events (as cited in Tomyn, 2008).

Perceived Control

Control or perceived control is another major category of cognitive buffers of SWB homeostasis theory. The control can be thought of as an individual's conviction of the extent to which the

outcomes of significant events can be controlled by them (Cook, 2003). It can be defined as "a generalized belief of an individual concerning the extent to which he or she can control outcomes of importance" and "as a situational appraisal of the possibilities of control in a specific stressful encounter" (Folkman, 1984, p. 839). According to Folkman (1984), the second perspective of control focuses on the situation-specific appraisals of personal competence which can further be divided into primary and secondary appraisals. The primary appraisal enables an individual to evaluate the importance of a particular transaction in connection to wellbeing; while, the secondary appraisal assists an individual to evaluate coping resources and available possibilities (Folkman, 1984).

The perceived control and SWB shares a rather complex yet positive bond of association (Tomyn, 2008). One of the widely accepted general conceptualization of control includes internal and external locus of control (Rotter, 1966). The prime characteristics of an individual with an internal locus of control is their belief that circumstances or events are under their immediate control; whereas, individuals with external locus of control perceive situations and outcomes to be triggered by uncontrollable factors such as dominant others or luck and so on (Cummins, Gullone & Lau, 2002). According to Thomson et al., (1998), perceived control may also refer to an individual's perception of his/her capabilities to protect themselves from misfortune. These belief systems are found to exert significant influence on human being as people with a higher sense of perceived control over a stressful event showcases less anxiety, higher pain tolerance, better performance and stable emotional outcomes (Thompson & Spacapan, 1991). Cummins and Nistico (2002) found an average correlation between high perceived control and SWB that varies from .35 to .53. Whereas, the absence of perceived control is often found to be associated with a range of maladaptive behaviors that may eventually

lead to depression and a range of cognitive impairments (Peterson, Maier, & Seligman, 1993). Hence, perceived control is recognized to be an important indicator of positive psychological adjustment and SWB of an individual (Tomyn, 2008; Cummins, Gullone & Lau, 2002).

Optimism

The third component of the cognitive buffer system is optimism. Optimism can be considered as an artifact of personality and refers to an optimistic belief about oneself in the future events (Cook, 2003). According to Scheier and Carver (1985), optimism refers to the general expectancy of more favorable than unfavorable occurrences in life.

According to Robinson and Ryff (1999), the evaluation of wellbeing and optimism are closely associated with biases of self-enhancement, and a lack of absolute factual information about the future occurrences set the bases of an ideal prospect for predicting the best opportunities for oneself in future. Optimists are capable of adapting effective coping strategies depending on the controllability of the event (Scheier, Weintraub & Carver, 1986). According to Baumeister (1989), the optimum level of psychological functioning is often found to distort an individual's self-perception from mild to moderate degree in order to maintain the maximum level of positive cognitive biases. It is reasonably intuitive that a positive attitude towards life would be positively correlated to SWB (Tomyn, 2008). As a matter of fact, optimism has quite often been found to correlate with life satisfaction commonly between .40 and .77 (Diener, Suh, Lucas, & Smith, 1999; Lucas, Clark, Georgillis, & Diener, 1996). Moreover, in the meta-analytic study of 137 personality construct, DeNeve (1999) found that the characteristically explained optimistic and adaptive tendencies to explain life are the prime qualities of the happiest people. Optimism is found to be a close correlate of positive affect, self-esteem, mastery and internal

locus of control; whereas, it shares a negative strength of association with negative affect, and other indicators of poor psychological wellbeing such as anxiety and neuroticism (Scheier & Carver, 1992). Thus, optimism is not simply an irrational belief about one's future outcomes but is a crucial mechanism that garners positive mental health and promotes SWB (Cook, 2003).

2.3.3 SWB Domain Satisfaction and Domain Compensation

The existing literature so far have emphasized mainly upon the broad measure of SWB, which is "How satisfied are you with your life as a whole?", however, this single item SWB measure was often criticized for its lower reliability (Kennedy, 2011; Diener, Emmons, Larsen & Griffin, 1985). Diener, Emmons, Larsen & Griffin (1985) proposed another method of measuring SWB; a five-item satisfaction with life scale (SWLS). The five-item SWLS are summed up to measure the level of SWB of an individual. Yet, another widely used alternative way of SWB measurement considers this construct as a collection of separate life domains that contribute to the overall judgment of "Satisfaction with life as a whole" (Cummins, 1998).

The Personal Wellbeing Index (PWI) (International Wellbeing Group, 2006), is a close associate of SWLS that approximately contributes 50% of the variance in the question of overall life satisfaction (International Wellbeing Group, 2006).Unlike the single item satisfaction with life as a whole or SWLS, the PWI is an 11-point comprehensive measure of satisfaction rating with eight major domains of an individual's life (Kennedy, 2011). Each of these domains contributes to the unique variance of satisfaction with life as a whole. These domains include,- standard of living, health, achievement in life, safety, community connectedness, future security, personal relationships, and religion/spirituality (International Wellbeing Group, 2006). The aggregation and average of this domain wise satisfaction results collectively represent a single

stable factor or PWI mean score (Cummins et al., 2003). PWI is hence considered as a useful tool in the measurement of SWB so as to recognize the presence of homeostatic mechanisms that function at the domain level through the process of domain compensation (Best, Cummins & Lo, 2000).

The theory of *domain compensation* purports that dissatisfaction or lower levels of satisfaction in one or more domains of life will be compensated by the higher levels of satisfaction ratings in other life domains so as to maintain the homeostatic equilibrium (Best, Cummins & Lo, 2000). According to Cummins (2000b), the phenomenon of domain compensation generally gets activated with SWB approaching the proposed lower threshold of 70 points. However, the ability of domain compensation has its own constraints/limitations in terms of the number of available compensatory domains and the nature and extent of the challenging agent (Kennedy, 2011; Cummins, 2000a; Cummins 2000b). According to Cummins et al. (2009), "the compensatory domains are often the last remaining points of resistance against external challenges, a decrease in satisfaction with these domains increases opportunities for the challenging agent to overwhelm any remaining positive mood, resulting in a rapid decline in SWB" (as cited in Kennedy, 2011, p.32). Thus, the phenomenon of domain compensation may provide crucial insights into the strengths and weaknesses of the SWB homeostasis in a particular target sample (Kennedy, 2011).

2.4 Resilience

Individuals differ in ways they react to various life events; some people might get overwhelmed with the daily life hassles whereas, others may react positively to the most threatening experiences of life (Fletcher & Sarkar, 2011; Bonanno, 2004). The process through which individuals exposed to chronic adversity or distressing events experiences positive adaptation to

the altered set of circumstances over time is called as resilience or psychological resilience (Southwick, Bonanno, Masten, Panter-Brick, & Yehuda, 2014; Smith et. al., 2008). According to the American Psychological Association (2014), resilience is "the process of adapting well in the face of adversity, trauma, tragedy, threats or even significant sources of stress". Resilience is a dynamic psychosocial process which tends to differ across age, gender and culture in its expression (Smith et. al., 2008). There is still not an agreed upon definition of resilience whether it is a trait, a process or an outcome. However, findings show that resilience is more likely exists on a continuum that may be present to differing degrees across multiple domains of life (Southwick et. al.,2014).

The conception of resilience first emerged in the 1970's from studies conducted in the field of psychopathology, traumatic stress, and poverty (Santos, 2012). While studying the effects of "risk factors" upon children development (factors that increase the possibility of poor or negative development), it was discovered that a number of children who were exposed to severe and/or chronic stressors did not experience negative developmental outcomes. These unanticipated findings set the basis for decades of further research to examine those factors and processes that enabled children and youth to not only survive but flourish in spite of risk (Santos, 2012; Luther, Cicchetti & Becker, 2000). Resilience is a dynamic combination of cognitive as well as behavioral tendencies which reflects enduring character traits and distinctive learned behavioral patterns as a result of experiences (Hornor, 2016; Burns & Anstey, 2010).

Another set of research literature described resilience as a combination of three primary components,-

- *Resilient Qualities* that determine the psychosocial qualities of resilient individuals.

- *Resiliency Process* portrays how an individual adapts to the distressing event.
- *Innate Resilience* consists of the identification of motivational elements that may exert influence over an individual's response to traumatic events (Ballenger-Browning & Johnson, 2010).

Despite the extensive research literature on resilience, there is a little accord on a single definition of resilience among scholars. In fact, the construct has been defined in multiple ways by different scholars (Santos, 2012). These variations in the definition of resilience include the *absence of adverse symptoms following adversity*, *persistent performance during a severe physical or psychological challenge* or *maintenance of a positive outlook at the face of significant trauma* (Ballenger-Browning & Johnson, 2010). In a broader sense, resilience can be explained in terms of a two-dimensional construct that includes *the extent of exposure to adversity* and *positive adaptation outcomes as a result of the distressing event* (Luther, Cicchetti & Becker, 2000).

Resilience is often misunderstood with the concepts of *recovery* or *posttraumatic growth*. The term recovery indicates the presence of a degree of psychopathology for a period of time following a traumatic event before gradually returning to pre-trauma levels, whereas resilience reflects the ability of an individual to sustain relatively stable mental functioning all through the course of the event (Ballenger-Browning & Johnson, 2010). On the other hand, Posttraumatic Growth (PTG) may be defined as positive changes resulting from the struggle with the trauma (Calhoun & Tedeschi, 2006). The process of PTG is gradual and coexists with continuing distress and extends beyond human resilience by transforming and building upon the experience to construct a positive outlook. PTG occurs as a result of the struggle with the traumatic event, whereas, resilience refers to the characteristics acquired prior to the traumatic event that helps an

individual to maintain a relatively stable mental functioning at the face of adversity (Calhoun & Tedeschi, 2006; Ballenger-Browning & Johnson, 2010).

2.4.1 Factors Influencing Resilience

The existing literature found a significant influence of personality trait on resilience. Womble, Labbé, and Cochran (2013) found that resilience is significantly positively correlated with the personality dimensions of extraversion, agreeableness, conscientiousness and negatively correlated with neuroticism. Campbell-Sills, Cohan, and Stein, (2006) also found that resilience was positively correlated with extraversion and conscientiousness and negatively correlated with neuroticism. These findings indicate that certain personality factors are found to play a significant role in enhancing the resilience capacity of an individual.

Apart from personality traits, an individual's affective state also exerts significant influence upon resilience. Loh, Schutte, and Thorsteinsson (2014), in their longitudinal study on 217 adult participants, found that resilience fully mediated the relationship between positive affect and change in depression and partially mediated the effects of negative affect and variation in depression. According to Xing and Sun (2013), "Individuals who experience frequent positive affect thrive through various challenges not simply because they feel good, but because they have resources that they can utilize to deal with these challenges" (p.935).

In a study conducted on 37-years of follow up period of 224 male military service personnel of Vietnam War from the 1960s through early 1970s found that optimism acts as an underlying protective factor against trauma and a strong predictor uniquely associated with resilience (Segovia, Moore, Linnville, Hoyt, & Hain, 2012).

According to Rutter (2013), intimate relationships and social support including close familial bonding and warmth, positive family environment promote resilience. The existing literature documents the presence of certain mental abilities such as planning, self-reflection, determination, self-confidence, control in resilient individuals (as cited in Hornor, 2016). Social support is found be a vital aspect for promoting physical health and psychological resilience against genetic, developmental and environmental risks from infancy through old age (Ozbay, Fitterling, Charney, & Southwick, 2008; Ozbay et al., 2007).

2.4.2 Subjective Wellbeing and Resilience

According to some literature, strong psychological resources are likely to garner strong external resources, thereby enhancing resilience. If and for how long, a particular challenge will move experienced affect outside each set-point range will depend on the strength of the challenging agent matched against resilience (Southwick et. al., 2014; Cummins & Wooden 2014; Cummins, 2013). Provided that resilience is sufficiently strong, SWB may either continue to be maintained within the normal range or will range briefly. If the strength of the challenge exceeds the capacity of resilience to counter such challenge, the homeostatic system will forfeit control to the challenging agent, resulting in either a drop or a rise in SWB beyond its set point range (Cummins & Wooden, 2014). Resilience is thought to be a key factor or a process that accords resources in order to maintain well-being (Southwick et. al., 2014; Panter-Brick, Grimon, Eggerman, 2014). Cummins and Wooden (2014) stated that the resilience is the power of psychological homeostasis that retains control of SWB and, secondly, restores the dominance of mental equilibrium following excursion of the affective experience outside the set-point range. A study conducted by Wu, Li, and Zu (2001) on earthquake victims found a significant positive

correlation between resilience and life satisfaction. He, Cao, Feng, and Guan (2013), in their study on 410 burn patients, also found a significant positive correlation between these two constructs. However, the relationship between SWB and resilience remains inconclusive and warrants further research.

2.5 Conservation of Resource (COR) Theory

The stress has been alternatively anticipated as an external, environmental as well as an internal, psychological phenomenon. The conservation of resources (COR) theory can be considered as an integrative stress theory that takes into account both environmental as well as internal processes with relatively equal measure (Hobfoll, 2001; 1989). The basic precept of COR theory (Hobfoll, 2001, 1998, 1989) states that every individual has an innate as well as a learned drive to create, foster, conserve, and protect the quality and quantity of their resources. The fundamental concept of the COR theory states that an individual's internal and external resources are utilized to maintain the ability to cope with stressors, where continuous resource loss spirals lead to the breakdown of the coping mechanism causing psychological stress. COR theory considers both environmental and internal processes as equally important in the promotion of well-being and prevention of stress (Hobfoll, 1989, 2001). According to the theory "Stress occurs when people's psychological or material resources are threatened with loss, are actually lost, or when individuals must invest resources without obtaining reasonable resource gain" (Hall et. al., 2008, p.23). It defines stress as a result of the environment where there is a perceived threat of net loss of resources, actual loss of resources, or a perception that an investment of resources is not producing or adding on to the net gain (Gorgievski & Hobfoll, 2008; Cook, 2003; Hobfoll & Stephens, 1990).

Among many different things that can be considered as resources, the COR theory emphasizes on those that are crucial to survival and well-being (e.g., shelter, social attachments, self-esteem), or the things that help create and maintain the key resources (e.g., money, credit) (Hobfoll, 1989).

2.6.1 Resource Categories

According to the COR theory, there are four kinds of resources whose loss/gain spirals may lead to distress or wellbeing of an individual (Hobfoll, 1989). These are object, condition, personal characteristics and energy resources.

Object resources are the first resource category within COR theory that includes the material possession which augments the objective quality of life, for example, a home providing shelter, a mansion adding value to the social status and so on (Hobfoll, 1989).

Conditions resources relate to conditions that are valued and sought after that involve relationships and status such as being married, having a family, and work seniority and so on. The model of conservation of resources proposes that an assessment of the degree to which conditions are valued by individuals or groups may throw light into their stress-resistance prospective (Hobfoll, 1989).

Personal characteristics resources include internal, psychologically based aspects such as personal traits and skills that help stress resistance. Some of the key personal characteristics resources are job skills, social competence, self-esteem, personal mastery or control and so on (Cook, 2003; Hobfoll, 1989).

Energy resources are the last resource category and include resources such as money, credit, owed favors, and knowledge, which are considered to be the significant objective predictor to enhance the quality of life. These resources are recognized in terms of aiding to the procurement of other kinds of resources rather than their intrinsic value (Cook, 2003; Hobfoll, 1989).

Environmental circumstances often threaten or cause a depletion of people's resources. They may threaten people's status, position, economic stability, loved ones, basic beliefs, or self-esteem. These losses may have their impact on two important levels. "*First,* resources may have instrumental value to people, and *second,* they have the symbolic value which may help define people their identity" (Hobfoll, 1989, p.517). The multiple events of resource loss may evoke stress (e.g., divorce leading to income loss, break-up of other relationships, and childcare difficulties). Conversely, a chain of positive events or challenges that are successfully met produce stress inoculations (as cited in Hobfoll, 1989). Research suggests that "stress is likely to ensure only when loss is evidenced: change, transitions, and challenge are not of themselves stressful" (Hobfoll, 1989, p. 518).

Following are some of the basic principles of COR theory well illustrates the relationship between stress and resources (Hobfoll, 1989).

- *Resource loss is disproportionately more salient than resource gain.*
- *Resources must be invested to protect against resource loss, recover from loss and gain resources.*

- *The theory assumes that those individuals with greater resources are vulnerable to resource loss and more capable of resource gain, and in contrast, those who lack resources are more vulnerable to resources loss and less capable of resource gain. (as cited in* Cook, 2003, p.169).

COR theory predicts that resource loss is the principal component in the stress process. However, at each stage of the stress process, people are increasingly vulnerable to negative stress sequel where such ongoing cycles of resource loss and resource investment often lead to rapid and impactful loss spirals (Hobfoll, 2001, 1989). COR theory is perceived as exceptional to the appraisal-based stress theories as it counts more centrally on the objective and culturally built nature of the environment in determining the stress process, rather than the individual's personal elucidation (Hobfoll, 2001).

Thus, the COR theory is an integrative stress theory that emphasizes on the needs of accruing, maintaining and mobilizing resources so as to cope with the stressors encountered in life. The four categories of resources; object, condition, personal characteristics, and energy, allow an individual to cope with stress either by investing resources or by gaining other resources (Cook, 2003; Hobfoll, 2001, 1989). Yet, prolonged stress will inevitably lead to resource depletion, leaving the person vulnerable to loss spirals leading to the increased amount of stress and psychological breakdown (Cook, 2003; Hobfoll, 2001).

2.6 Integration of SWB Homeostasis Theory and COR Theory

In the present study, two theories, the theory of SWB homeostasis (Cummins, Gullone & Lau, 2002) and the COR theory (Hobfoll, 1988, 1989) have been integrated to understand the dynamics of SWB and resilience among the recurrent flood victims. These two theories have emerged from different sets of literature. COR theory emerged from the stress literature and

SWB homeostasis theory from the quality of life literature (Cook, 2003). It is perceptible that both theories share a common origin of framework as well as values. The basic concept of the COR theory states that an individual's internal and external resources are utilized to maintain the ability to cope with stressors, where continuous resource loss spirals lead to the breakdown of the coping mechanism causing psychological stress (Hobfoll, 1989, 2001). COR theory considers both environmental and internal processes as equally important in the promotion of well-being and prevention of stress (Hobfoll, 1989, 1988). Likewise, SWB homeostasis theory elucidates the psychological determinants that act as buffers against external stressors to protect homeostatic failure and maintain the level of SWB within the set point range (Cummins, Gullone & Lau, 2002; Cook 2003). However, SWB homeostasis model only focuses on cognitive/internal buffers as determinants of SWB. Although external resources were not included in the homeostasis model directly, the role of factors such as wealth and personal relationships are acknowledged in maintaining SWB homeostasis (Cummins, 2013; Tiliouine, Cummins, & Davern, 2006).

There is some significant amount of commonality exists between the factors that are seen as fundamental in COR and SWB homeostasis theories. The object resources are the first resource category within COR theory that includes the material possession which augments the objective quality of life. Again, the second category of resources, that is, the energy resources include money, credit, owed favors and knowledge, which are considered to be the significant objective predictor to enhance the quality of life (Cummins, 2013). The influences of these factors are considered to be pivotal in SWB literature, but these factors are not incorporated directly within the SWB homeostasis model (Cook, 2003). The third category of resources within COR theory is the condition resources that relate to valued and sought after conditions of

human life which involves relationships and status such as being married, having a family, and work seniority and so on (Hobfoll, 1989; Cook, 2003). A consistent body of literature showed that the perceived social support is found to be a significant predictor of SWB with a positive direction of association between social support and SWB (Cummins, 2013; Cook, 2003). This factor is also not conceptualized within SWB homeostasis model and further inclusion of this factor into the theory would benefit the future measurements. The fourth category of resources within COR theory is the personal characteristics which include intrinsic, psychologically based aspects; where self-esteem and control are two factors that are widely measured in the existing literature (Cook, 2003). The personal characteristics resources generally aid to the stress resistance (Hobfoll, 1989). These two factors of self-esteem and control, with the accumulation of optimism, altogether comprise the cognitive buffers which represent the second order determinants of SWB homeostasis theory (Cook, 2003). Optimism is also closely related to control as it helps an individual to set the predilection to perceive events or circumstances in a positive or negative manner (Scheier & Carver, 1992, Cook, 2003). Hence, a significant amount of overlap is observed in the measurement of this domain between the theories which indicates a clear scope of integration of both the theories.

Additionally, the stable individual personality dispositions and affect are not incorporated in the COR model as the framework is based upon the simple conceptualization of the relationship between resources and stress (Cook, 2003). Although the influences of these individual difference factors on stress are rampant and cannot be overlooked (Cook, 2003). These stable dispositional factors of personality and affect play a major role in identifying other less stable factors such as optimism, control, and self-esteem (Cummins, Gullone, & Lau, 2002; Cook, 2003). These factors may, in turn, influence the way the stressors are perceived, the way

coping techniques are used to deal with stressors and the odds of experiencing stressors or aversive life events (Cook, 2003).

Both the above-mentioned theories talk about individual defense against environmental and lifestyle stressors, although they differ in referring the specific term to define system failure or breakdown. The COR theory refers to it as an experience of stress while SWB homeostasis theory defines it as homeostatic failure or dissatisfaction as the outcome (Cook, 2003). Psychological resilience was also integrated into the model. In their article, Cummins and Wooden (2014) stated that “resilience is the power of homeostasis, first to retain control of SWB and, second, to restore the dominance of HPMood following excursion of the affective experience outside the ‘attractor region' (set-point range)" (p.232). The existing literature suggests that psychological devices underlying the maintenance of homeostasis are reinforced by external buffers, the most influential of which are an intimate relationship and income. Strong psychological resources help in acquiring strong external resources, thus enhancing resilience (Cummins & Wooden, 2014). The above-mentioned rationale to a degree fulfills a laudable argument to integrate both COR and SWB Homeostasis theories to study the combined effect of factors of both the theories in maintaining the level of SWB and resilience. Thus, the factors proposed in both the theories are complementary to each other and an integrative model incorporating both theories will definitely enhance the explanatory power of the model. A detailed description of the integrated model is proposed in the following section.

2.7 Proposed Integrated Theoretical Model

The proposed integrated model is an extension of the SWB homeostasis model where environmental stressors and external resource categories from the COR theory were included as

additional independent variables. This model also included 'resilience' as a dependent variable along with SWB. Resilience was included in the model primarily because of the similar nature of these constructs. According to Cummins (2013), SWB homeostasis theory suggests that SWB should have a high correlation with other positive and self-referent constructs, such as psychological resilience, as long as the homeostatic control is maintained. It is often argued that both the SWB and psychological resilience have some trait-like properties and is expected to correlate highly with each other due to their shared variance with HPMood (Tomyn & Weinberg, 2016). Therefore, it is expected that the same set of variables will influence both SWB and resilience.

The first order determinants of the hypothesized integrated model include personality and affect mentioned in the homeostasis theory, which are considered as predisposed factors and quite stable in nature. The second order determinants are the cognitive buffers mentioned in the SWB theory, that is, self-esteem, perceived control and optimism. This category of determinants subsequently overlaps with the personal characteristics resources of the COR theory. Therefore, in the model, the personal characteristics resources are submerged with the 2nd order determinants without considering it as a separate resource category. Furthermore, external resource categories mentioned in the COR theory namely, condition, energy and object resources were included as additional independent variables. The environmental stressors are included in the model as it is considered to be an influential factor affecting cognitive buffers and also capable of influencing the level of SWB directly during extreme events.

Thus, the theoretical model (see Fig. 2.3) proposes two sets of pathways among the variables. First, the direct pathways propose that the1st order determinants (personality, affect),

2nd order determinants (cognitive/internal buffers namely, self-esteem, perceived control, and optimism), environmental stressors, and external resources (object, condition, and energy resources) will directly influence SWB and resilience. Second, the indirect pathways propose that the 1st order determinants (personality, affect), environmental stressors, and external resources (object, condition, and energy resources) will influence 2nd order determinants (cognitive/internal buffers namely, self-esteem, perceived control, and optimism) which in turn will influence SWB and resilience. More specifically, in the indirect model, it is hypothesized that cognitive/internal buffers will mediate the relationship between the predictors (personality, affect, environmental stressors, and external resources) and outcome variables (SWB and resilience).

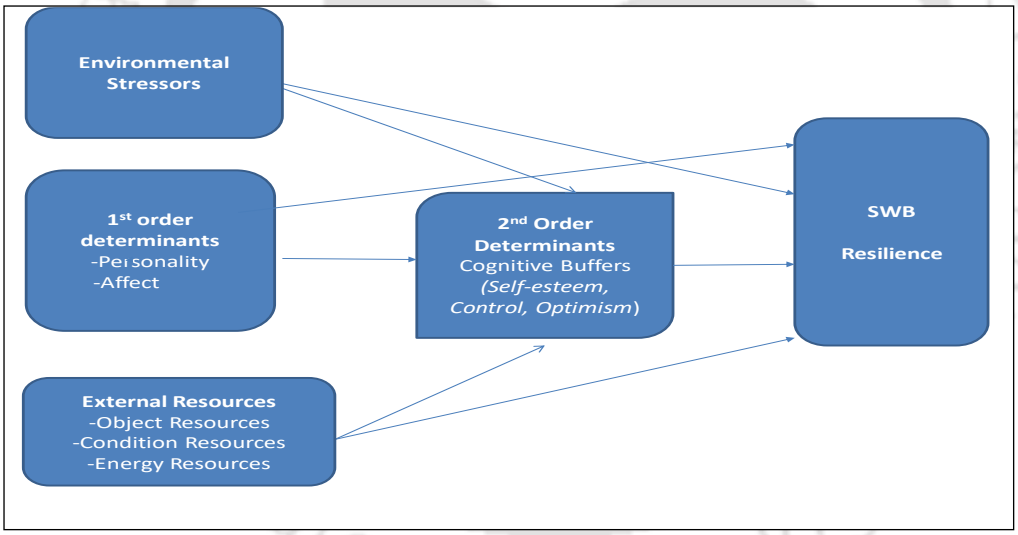

Figure 2.3. Proposed integrated model of SWB homeostasis and COR theory

2.8 Gap Analysis of the Literature Review

Flood is a recurrent phenomenon in Majuli Island and Dhemaji districts which lead to major physical, social as well as psychological sufferings and loss of resources. Flood hits these areas almost every year damaging and destroying a major portion of the livestock, goods, houses,

agricultural land and even precious lives of the riverine inhabitants (Katyaini, Baruah, & Mili, 2012; Kumar & Walia, 2013). These kinds of extreme experiences consequently have a subjective component, which negatively affects individual's emotions, cognitions and psychological adjustment as well as hinders physical and social developments (Lock et. al., 2012; Xu & He, 2012; Dodge, 2006). Despite such adverse impact of floods on the well-being of the survivors, almost negligible amount of psychological research has been conducted on victims of recurrent floods of these districts. Therefore, one of the main objectives of this study is to address this major gap in the literature.

The scientific research of SWB dragged the attention of the modern research forum with the publications of Andrew and Withey (1976) and Campbell, Converse and Rogers (1976) that suggested the possibility of reliable measurement of SWB using linear statistics (as cited in Cummins, 2007). Yet, this research area has faced many grave challenges in terms of defining the terminology and measuring the construct (Cummins, 2007; Diener, 2006). Literature focusing on the populations' data on the level of SWB found that it does not fit a normal curve, but are rather consistently negatively skewed which led to the conclusion that the level of SWB is governed and regulated by a mechanism called "SWB Homeostasis", maintaining the satisfaction level within the positive range. (Cummins, Gullone & Lau, 2002; Cummins, 1998; 1995). Headey and Wearing (1989) first proposed the presence of a probable 'set-point' for SWB. The average consistency of the findings for the set point of SWB is found to be 75% SM with 70-80% SM as the normal range in western cultures (Lai, Cummins, & Lau, 2013; Tiliouine, Cummins, & Davern, 2006; Cummins, Gullone, & Lau, 2002). However, some research shows that this norm falls slightly at a lower range for the non-western populations; inferring a range of 60-70%SM (Chen & Davey, 2008; Tiliouine, Cummins, & Davern, 2006;

Cummins, 1998). However, this normative range for the non-western culture warrants further research to reaffirm as well as validate this set-point level across various non-western cultural contexts. This study made an attempt in this direction.

The SWB may be broadly defined as a multifaceted construct that is comprised of an individual's affective responses and the subjective evaluations of domain-based as well as comprehensive judgments of life satisfaction (Lai & Cummins, 2013; Cummins, Gullone & Lau, 2002; Diener et al., 1999). The growing literature in the field of SWB suggests that along with the cognitive buffers that consist of the internal psychological resources, certain external resources also play a dominant role in maintaining and protecting the level of SWB (Tomyn et al., 2017; Choong, 2016; Cummins, 2013; Cummins, 2000). Wealth and personal relationships are considered to be the most important external resources (Tomyn et al., 2017; Cummins, 2013). However, such proclamations, although based on a host of arbitrary research literature, lack studies conducted on the grounds of proper theoretical background. Therefore, despite considerable empirical research, the findings are often inconclusive. This research attempts to explore the incremental value of psychological variables, objective resources and other socio-demographic variables in predicting SWB with the help of an established theoretical framework. This study attempted to explore the role of both external and internal resources in the maintenance of SWB and resilience using a proper theoretical framework.

Most of the empirical support for the SWB homeostasis model has come from the western population. A lot more research needs to be conducted in the context of the non-western population. This study attempted to validate and extend the SWB homeostasis model by integrating resilience and conservation of resources theory. The integration of the two theories is

a novel aspect of this study as it will address many research gaps that cannot be explained by one theory alone. Furthermore, this model will provide insights into the mechanisms behind the maintenance of SWB and resilience which might have many applied and theoretical implications.

The psychological resilience is a process through which individuals exposed to chronic adversity or distressing events experience positive adaptation to the altered set of circumstances over time (Southwick et. al., 2014). The existing literature suggests that psychological resources help in acquiring external resources (Alarcon, Bowling & Khazon, 2013; Segerstrom, 2007), thus enhancing psychological resilience. The strength of the challenging agent to shift the experienced affect beyond each set-point range is thought to be dependent upon the individual level of psychological resilience that determines whether and for how long the shift will occur (Cummins & Wooden, 2014; Cummins, 2013). The level of SWB may either be maintained within the normal range or will briefly vary beyond its set-point if endowed with sufficiently strong level of resilience. The homeostatic breakdown occurs if the strength of the challenge exceeds the capacity of the individual level of the psychological resilience, where challenging agent becomes the dominating force which may result in either a drop or a rise in SWB beyond its set point range (Cummins & Wooden, 2014). Although the connection between set-point and resilience is still not clear, some researchers supported a positive correlation between SWB and resilience (Cummins & Wooden, 2014; Graham & Oswald, 2010). Research literature showcases a number of psychosocial variables to be associated with predicting and nurturing resiliency during and after distress/adversity that also lack a robust theoretical framework. Hence, to bridge these gaps in the literature; the present study attempts to explore the dynamics of the relationship between SWB and resilience.

According to Das (2014), the phenomenon of flooding cannot be solely understood based upon the techno-managerial approaches. Integrating the community perceptions of floods, local wisdom that has been passed through generations in oral traditions and their indigenous coping techniques with the advanced techno-managerial approaches may rather benefit in mitigating the flood hazards (Das, 2014). Almost every community has their unique indigenous knowledge and coping styles to deal with the flood hazards (Das, 2014; Thakuria, 2000). The Majuli island (one of the study site) has multiethnic societies living within one homogenous culture, thriving and helping altogether to preserve, protect and propagate its core Vaishnavite culture (Sahay & Roy, 2017). They perceive floods as an imperative phenomenon of their life and thus have adopted many traditional structural and non-structural traditional coping strategies to deal with recurrent floods. These traditional knowledge systems and skills play a vital role in their well-being and adaptation. They may have far-reaching implications in rehabilitation, counseling and other culturally relevant flood-related mitigation policies. Therefore, this research also investigated various traditional coping strategies used by the inhabitants of Majuli Island community. (**Traditional coping strategies were explored in a separate qualitative study discussed in chapter 6).**

Chapter 3

Study 1: Test of the Proposed Theoretical Model: A Quantitative Study

3.1 Introduction

Study 1 is a quantitative study that aims to test and extend the SWB homeostasis model in the context of recurrent flood victims by integrating COR theory and resilience. Specifically, this study explored the following research questions-

(5) What are the floods related environmental stressors experienced by recurrent flood victims?

(6) What is the level of SWB among the recurrent flood victims? Is it maintained within the normative range as predicted by the SWB homeostasis model? Is there any evidence of SWB domain compensation?

(7) What is the relationship between SWB and resilience? What common and unique factors predict SWB and resilience?

(8) Do the factors predicted by conservation of resources theory improve the predictive power of SWB homeostasis model? Can it be extended to explain resilience?

(c) Do external resource categories of COR theory along with the 1st and 2nd order determinants of SWB homeostasis theory predict both SWB and resilience?

(d) Do cognitive buffers (2nd order determinants) of SWB homeostasis model mediate the relationship between predictors (1st order determinants of personality and affect, external resources, and environmental stressors) and outcomes (SWB and resilience)?

3.2 Method

3.2.1 Sample

This study included the sample of severely flood-affected areas of Assam (a north-eastern state of India). The participants were randomly selected from two separate districts of Assam. The first set of data was collected from Majuli Island district, the largest River Island in the river Brahmaputra, Assam. The second set of data was collected from the Jia Dhal and Gai River areas of Dhemaji district of Assam. The total number of data collected for the present study is 306, out of which 154 respondents were from Majuli Island and 152 participants were from Dhemaji District. There is 179 female (58.5%) and 127 male (41.5%) respondents participated in the survey interview. The age range of the participants was from 18-86 years (M = 38.45, SD = 13.59). Most of the respondents included under this study were from the severely flood-affected areas (N = 269, 87.9%) and remaining sample (N = 37, 12.1%) included respondents residing in moderately flood-affected areas due to relocation and modified housing structures. The sample is almost equally distributed in the three categories of the monthly individual income range, that is, 1000/- to 4999/- (N = 97, 32%), 5000/- to 9999/- (N = 106, 34%), 10,000/- and above (N = 103, 34%).

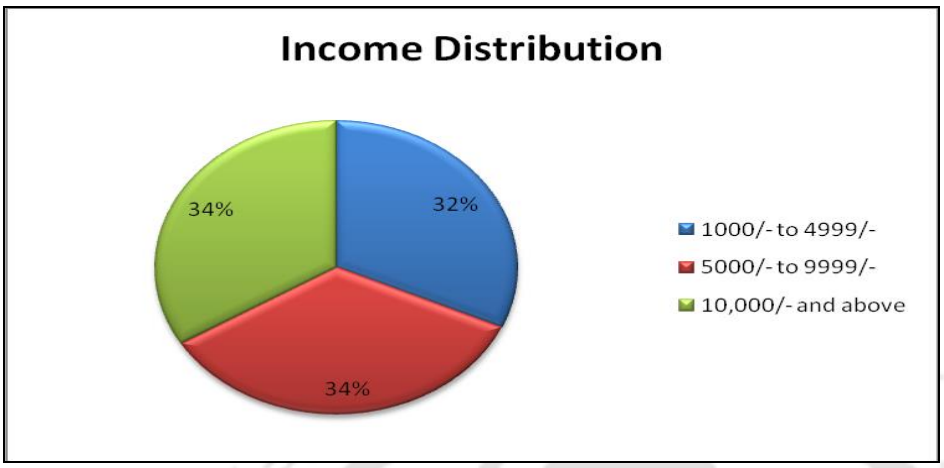

Figure 3.1. Income distribution of the Population Sample.

Out of 306 respondents, 21(7%) respondents attended elementary school, 137 (45%) respondents attended high school, 55 (18%) respondents completed senior secondary school, 9 (3%) respondents were college dropouts, 37 (12%) respondents were college graduates and 6 (2%) respondents were master degree holders and doctorate degree holders; whereas 41 respondents (13%) never attended any school and are illiterate.

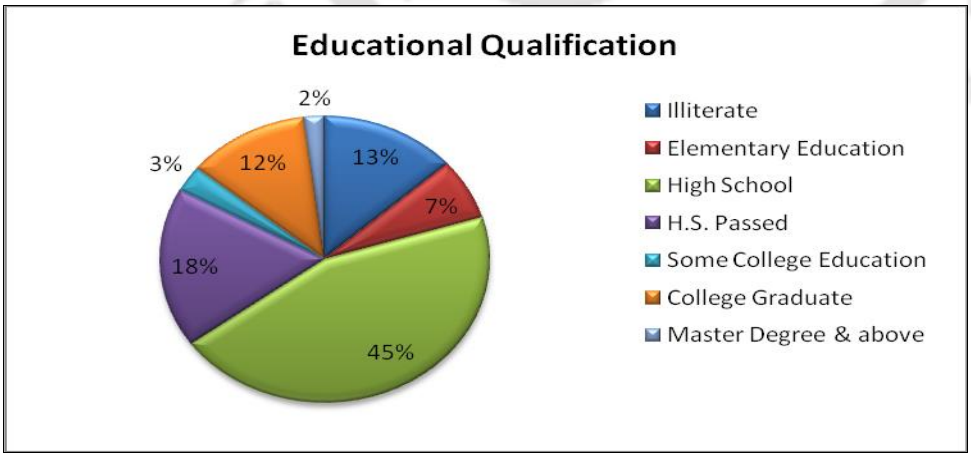

Figure 3.2. Educational Qualification of the Population Sample.

3.2.2 Procedure

Ethical concerns related to the study were approved by the Doctoral Review Committee of the Institution. Informed consent was also taken from the appropriate authority personnel and participants. Confidentiality about the identity of the participants has been maintained throughout the study. The randomly selected samples of severely affected recurrent flood victims of Majuli Island and Dhemaji Districts of Assam, India were included in the study. The questionnaire set was translated from English into the vernacular language (Assamese) followed by back translation method by independent bilingual translators who were blind to the original version of the questionnaires. A rapport was build and each participant was briefed about the purpose of the study. For illiterate participants, the questionnaire was administered by an interviewer. Most of the interviews took place at the participants' home or work/office premises depending on the ease of the respondents. A pilot study was conducted on 33 samples to ensure the suitability and validity of the measures selected for the present study. Each questionnaire took approximately 30-45 minutes to complete.

3.2.3 Measures

The assessment tools used for data collection are mentioned below.

Demographic variables

The demographic information associated with age, gender, education, marital status, occupation, income and proximity to the epicentre were measured.

Personal Wellbeing Index (PWI)

The Personal Wellbeing Index (PWI) scale is a comprehensive scale of Quality of Life (QOL) (International Wellbeing Group, 2006). The scale contains seven domains of personal wellbeing and each domain corresponds to the domains of QOL. The Cronbach Alpha of the scale lies between .70 and .85 in Australian population as well as Overseas (Cummins, 2013). These seven domains include,- Standard of Living, Health, Achievements in Life, Personal Relationships, Safety, Community Connectedness and Future Security. The respondents need to rate their level of satisfaction on an 11-point Likert Scale, ranging from 0 (No satisfaction at all) to 10 (Completely Satisfied) (Cummins, 2013, Cook, 2003).

The Brief Resilience Scale (BRS)

The Brief Resilience Scale (BRS) has six items where items 1, 3 and 5 are positively worded and items 2, 4 and 6 are negatively worded (Smith et al., 2008). Respondents rate their answers on a 5-point Likert Scale, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). The BRS has three reverse coding items (2, 4 & 6). The total scoring is done by calculating the mean score of these six items. The Cronbach Alpha of the scale ranged from .80 to .91 indicating a good internal consistency.

Big Five Inventory-10 (BFI-10)

The BFI-10 is an abbreviated version of the Big Five Inventory (BFI-44) personality measure, developed by Rammstedt and John (2007). The BFI-10 has 2 items each for every Big Five dimensions of personality i.e. Extraversion, Agreeableness, Conscientiousness, Neuroticism and Openness. However, the dimension of Agreeableness has an additional optional item with true score. Every dimension of the scale has one true scoring (2, 6, 8, 9 &10) and one reverse scoring

(1, 3, 4, 5& 7) item. The test-retest reliability (.75) and convergent validity (.67) scores indicate that the scale possesses acceptable psychometric properties. The respondents rate their feelings on a 5-point Likert Scale, ranging from 1 (Disagree Strongly) to 5 (Agree Strongly) (Rammstedt & John, 2007).

The Positive and Negative Affect Schedule (PANAS)

The Positive and Negative Affect Schedule (PANAS), developed by Watson, Clark, and Tellegen (1988), is a self-report measure consists of 20 items indicating positive and negative affect. The PANAS has a reliability score, as measured by Cronbach Alpha, .89 for positive affect and .85 for negative affect. The respondents rate their feelings on a 5-point Likert Scale, ranging from 1 (Very slightly or Not at All) to 5 (Extremely) (Watson, Clark, & Tellegen, 1988; Crawford & Henry, 2004).

Rosenberg Self-Esteem Scale (RSES)

The Rosenberg Self-Esteem Scale (Rosenberg, 1965) is a 10-item self-report instrument measuring the global self-worth. The scale measures both positive and negative feelings about the self and a higher score represent a higher level of self-esteem. The items are answered using a 4-point Likert scale response format, ranging from 1 (Strongly agree) to 4 (Strongly disagree). This scale is widely used because of its adequate internal consistency (Cronbach Alpha=.77 and .88) and higher test-retest reliability (r=.82) (Cook, 2003; Rosenberg, 1965).

Perceived Control of Internal States Scale (PCOISS)

The Perceived Control of Internal States Scale (Pallant, 2000) is an 18-item inventory that provides a measure of the extent of an individual's self-control over their internal states (emotions, thoughts, physical reactions). The PCOISS measures the "participant's perceptions of

their ability to influence their internal states and moderate the impact of aversive events on their emotions, thoughts, and physical wellbeing" (as cited in Cook, 2003, pp.196). A low score on PCOISS indicates a higher amount of self-reported anxiety, depression, negative mood states, perceived stress, and physical symptom levels (Pallant, 2000). The scale follows a 5-point Likert Scale response format ranging from 1 (Strongly disagree) to 5 (Strongly agree). The scale has a good internal consistency (Cronbach Alpha=.92) and a high construct validity (r=.60).

Life Orientation Test-Revised (LOT-R)

The Life Orientation Test-Revised (LOT-R) measures the extent of an individual's favorable expectations or optimistic outlook on their life (Scheier & Carver, 1985; Cook, 2003). The scale has 10 items with 5-point Likert rating scale ranging from 0 (Strongly disagree) to 4 (Strongly agree) and the higher score indicates the higher level of optimism. The LOT-R has a high internal consistency with a Cronbach Alpha level of .82 (Scheier, Carver & Bridges, 1994).

Cumulative Exposure Indicator (CEI1)

The Cumulative Exposure Indicator1 (Verger et. al., 2003) is a measure that assesses the cumulative stress from natural disasters. CEI1 identifies seven categories of stressors that usually occur during floods, which includes: Physical Presence with Safe Shelter, Property Damage, Effect on Work, Endangerment Situations, Assistance during the Flood, Evacuation from Home, Loss of Pets. The CEI1 is a mix method rating scale including both dichotomous and Likert-Type scoring. The two of the CEI1 items; Property damage and evacuation from home have a 4-point Likert scale scoring and the rest of the items follow the dichotomous rating scale (yes/no). For the present study dichotomous rating was used for all the items. One additional item ‘death of loved ones’ was added based on its relevance for the present sample.

Conservation of Resources Evaluation (COR-E)

The Resources Questionnaire is drawn from the Conservation of Resources Evaluation (COR-E). The COR-E was developed by Hobfoll and Lilly (2007), which has a list of 74 resources that people respond to as their degree of loss and gain, on a 5-point Likert-type rating scale ranging from 0 (not at all/ not applicable) to 4 (To a great degree). Based upon literature review and suitability with the population sample of the present study, 14 items were carefully selected from the original version of COR-E. The resources questionnaire used in the present study is a 14 items measure; five items for each of the category of object, and energy resources and four items for the condition resource respectively following the same Likert scale rating pattern.

Chapter 4

Study 1: Results

4.1 Preliminary Data Screening and Assumptions Testing

This chapter includes the analysis of the quantitative data using SPSS version 20.0 and SPSS Amos 22.0 version. The entire dataset was screened using the FREQUENCIES option in SPSS before proceeding for the further analysis. The data set was inspected to find missing data and outliers. There were no incomplete data or outliers in the data set; hence the entire data is retained for the statistical analysis.

All the study variables were tested for the assumptions of normality, linearity, multicollinearity, and outliers. The inspection of Histogram indicated a normal distribution of the variables under study. One of the widely used rule of thumb for testing normality is that the violation of normality occurs if the Skewness and/or Kurtosis exceeds more than 2.5 times of its standard error (Leech, Barrett & Morgan, 2005). However, following this rule of thumb, usually most of the variables of large sample study would be non-normal as standard error depends on the sample size. According to another simple guideline to meet the assumption of normality, a variable is thought to be at least approximately normally distributed if the Skewness is less than plus minus one (<±1) (Gaskin, 2016). For Kurtosis, Sposito et al., (1983) recommended an overall score of 2.200 or less (rather than 1.00) for an approximately normal distribution (as cited in Gaskin, 2016). Although, according to Tabachnick and Fidell (2001), the essential effect of skewness does not hold if the sample size is sufficiently large and the variance underestimation due to positive and negative kurtosis becomes insignificant in 100 and 200 sample sizes

respectively. The present data was found to be approximately normally distributed following the general norm of skewness and/or kurtosis to be within the range of ±1.96 (Field, 2012).The transformations of the scores were not done as the data of the present study were well within the acceptable range of the assumptions of normality. The inspection of the Z-score indicated that there were no extreme outliers exist in the data set as the calculated Z-value for all the variables were below 3.29 (Field, 2012). The skewness and kurtosis values are shown in Table no 4.1.

4.2 Descriptive Statistics

All the variables of the study were tested for the descriptive statistics, that is, mean, standard deviation (SD), range, skewness, and kurtosis. The data was found to be approximately normally distributed. Therefore, all cases were retained in the data set. Table 4.1 shows the detail descriptive statistics of the variables under study.

Table 4.1

Descriptive Statistics of All Study Variables

Variables	Range	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis
Age	68	18	86	38.45	13.59	0.79	0.26
Cumulative Exposure Indicator	8	3	11	7.43	1.47	-0.03	0.46
Object Resources	16	4	20	10.08	2.78	0.43	0.61
Condition Resources	15	0	15	7.34	2.87	-0.12	-0.28
Energy Resources	19	1	20	8.41	2.65	0.54	0.90
Positive Affect	29	13	42	29.19	4.88	0.22	0.12
Negative Affect	23	10	33	16.95	4.58	0.82	0.52
Extraversion	8	2	10	7.5	1.79	-0.24	-0.81
Agreeableness	7	7	14	9.93	1.53	0.09	-0.66
Conscientiousness	7	3	10	7.39	1.77	-0.23	-0.79
Neuroticism	8	2	10	4.36	1.91	0.57	-0.33
Openness	6	3	9	5.5	0.94	0.69	1.35
Self-Esteem	17	21	38	29.55	3.71	0.45	-0.29
Optimism	23	15	38	26.5	4.17	0.09	-0.33
Perceived Control	54	32	86	66.48	10.36	-0.69	0.21
Resilience	20	6	26	19.22	4.12	-1.44	1.44
Subjective Well-being	59	31	90	62.4	12.11	-0.08	-0.42

4.3 Flood Related Stressors

The results of the present study indicated that respondents experienced various flood-related stressors. Percentages of respondents who have experienced these stressors are shown in table 4.2. It is clear that respondents have experienced almost all major types of flood-related stressors. The highest percentage of respondents reported property damage, negative effect on occupational work, exposure to endangered situations, and loss of livestock.

Table 4.2
Frequency of Flood Related Stressors

Flood related stressors	**Sample percentages**
Lack of safe shelter	56.2
Property damage	99.7
Negative effect on work	97.7
Endangerment Situation	92.2
Evacuation from Home	40.8
Death of loved ones	6
Loss of Livestock	71.6

4.4 Subjective Well-being Scores and Domain Satisfaction

The mean score of subjective well-being is 62.40 (*SD* = 12.11) and the Global Life Satisfaction (GLS) is 64.28 (*SD* = 20.38). The mean score of SWB for the present sample indicates that the SWB homeostasis is maintained within the normative range (60-90%SM), but falling below the minimum score of the western sample which is 70-90%SM (Cummins, 2012; Ayers, 2011).

However, it is very clear that the SWB score of the present sample falls at the lower end of the continuum.

The analysis of dimensions of SWB (in Personal Well-being Index) showed that the level of satisfaction is significantly higher in 'Personal Relationship' (*M* = 82.35, *SD* = 20.45), 'Community Connectedness' (*M* = 75.56, *SD* = 21.38) and 'Spirituality/Religion' (*M* = 88.89, *SD* = 17.836) domains of life satisfaction in the present sample. However, the level of satisfaction is found to be at the lower end in the case of safety (*M*=59.71, *SD*=26.64), standard of living (*M* = 60.39, *SD* = 24.53), health (*M* = 62.25, *SD* = 24.07), future security (*M* = 62.35, *SD* = 23.49). Table 4.3 below shows the descriptive statistics of SWB domains.

Table 4.3
Descriptive Statistics of SWB domains

Items	Mean	Std. Deviation
Standard of Living	60.39	24.53
Health	62.25	24.07
Achievement in Life	68.17	21.82
Personal Relationship	82.35	20.45
Safety	59.71	26.64
Community Connectedness	75.56	21.38
Future Security	62.35	23.49
Spirituality/Religion	88.89	17.84
Global Life Satisfaction (GLS)	64.28	20.38
SWB Total	62.40	12.11

Above result also demonstrates the concept of '*Domain Compensation'* where dissatisfaction with one or more life domains is compensated by higher satisfaction with other life domains in order to maintain SWB in the normative range.

4.5 Factor Analysis of Scales

The Factor Analysis can be defined as "A multivariate technique for identifying whether the correlations between a set of observed variables stem from their relationship to one or more latent variables in the data, each of which takes the form of a linear model" (Field, 2012, p.875). There can be two types of factor analysis- exploratory and confirmatory.

The factor analysis of all the scales was conducted by randomly splitting the sample into two halves. *Exploratory factor analysis was conducted on one half (N = 153) and confirmatory factor analysis was conducted on the other half (N = 153).*

4.5.1 Exploratory factor analysis

The two tests of Kaiser-Meyer-Olkin (KMO) test of sampling adequacy and Bartlett's test of Sphericity, were conducted to test the sample accuracy for factor analysis (Anderson & Herbertsson, 2003). A KMO value less than .50 is considered as unacceptable, above .60 is considered as mediocre, above .70 is middling, above .80 is meritorious and a value is marvelous when it is above .90 (Kaiser & Rice, 1974; Hutcheson and Sofroniou, 1999; Field, 2012). The KMO test score for the conservation of resources evaluation scale (COR-E) is .838; for positive and negative affect scale (PANAS) is .809; for big five inventory (BFI-10) is .603; for Rosenberg self-esteem scale (RSES) is .909; for life orientation test revised (LOT-R) is .837; for perceived control of internal states scale (PCOISS) is .919; for brief resilience scale (BRS) is .910 and for PWI is .811. The KMO values indicated that the current sample meets the adequacy

criterion set by Kaiser and Rice (1974) for factor analysis. The Bartlett's test of Sphericity shows if there is a difference between the sample correlation matrix and an identity matrix where all correlations are too small and close to zero (Field, 2012). A significant test score is desired to reject the null hypothesis of no difference between the sample correlation matrix and the identity matrix (Field, 2012). The results showed that the Bartlett's test of Sphericity is significant ($p<.001$) for all the measures indicating that the overall correlations between variables are significantly different from zero fulfilling the criterion for factor analysis (Field, 2012).

Conservation of Resources Evaluation (COR-E)

The Conservation of Resources Evaluation (COR-E) questionnaire used in the present study has three resource categories; Object (5 items), Energy (5 items) and Condition resources (4 items) and a total of 14 items. Factor analysis was conducted for COR-E using principal component analysis with varimax rotations. Item loadings above .40 were retained for the factors (Field, 2012). Three factors emerged out with 62.36% of variance after the analysis.

Table 4.4

Factor Loadings of COR-E

Items	Components		
	1 (OR)	2 (CR)	3 (ER)
Transportation	.644		
Home Furnishing	.777		
Food	.570		
Financial Assets	.708		
Housing Needs	.774		
Marital Relationship		.493	
Work Status		.952	
Stable Employment		.955	
Intimacy and Support from co-worker		.710	
Organize Task			.662
Savings			.733
Adequate Income			.801
Financial Stability			.813
Money for Advancement			.763
Total Variance Explained	62.36%		
Eigen Values	5.47	1.42	1.42
Percentage of Variance	35.95	14.52	11.89
Cummulative Percentage	35.95	50.47	62.36

Note. OR= Object Resource, CR=Condition Resource, ER= Energy Resource

Positive and Negative Affect Scale (PANAS)

The PANAS is a self-report measure consists of 20 items indicating positive and negative affect (Crawford & Henry, 2004). Factor analysis was carried out for all the items of PANAS using principal component analysis with varimax rotation. Those items having a factor loading above

.40 were retained in each factor (Field, 2012). After the analysis, two factors emerged out with 56.77% of variance.

Table 4.5

Factor Loadings of PANAS

Items	Components	
	Positive Affect	Negative Affect
Interested	.734	
Distressed		.573
Excited	.526	
Upset		.638
Strong	.739	
Guilty		.566
Scared		.757
Hostile		.411
Enthusiastic	.719	
Proud	.474	
Irritable		.601
Alert	.622	
Ashamed		.432
Inspired	.753	
Nervous		.585
Determined	.731	
Attentive	.526	
Jittery		.642
Active	.658	
Afraid		.708

Total Variance Explained	56.77%	
Eigen Values	5.089	2.706
Percentage of Variance	38.972	20.521
Cummulative Percentage	38.97	56.77

Big Five Inventory-10 (BFI-10)

The BFI-10 is an abbreviated version of the Big Five Inventory (BFI-44) personality measure, developed by Rammstedt and John (2007). The shorter version has 2 items each for every Big Five Dimensions of personality i.e. Extraversion, Agreeableness, Conscientiousness, Neuroticism and Openness. Factor analysis with principal component analysis method using varimax rotation was carried out and only those factors having a loading of .40 and above were retained further (Field, 2012). The items loaded on five different factors and accounted for 68.14% variance.

Table 4.6

Factor Loadings of BFI-10

Items	Components				
	1 Extraversion	2 Agreeableness	3 Conscientiousness	4 Neuroticism	5 Openness
Reserved	-.905				
Trusting		.970			
Lazy			-.671		
Relaxed				-.731	
Few Artistic Interest					-.889
Sociable	.405				
Find Fault with Others		-.766			
Does a thorough job			.667		
Nervous				.801	
Active Imagination					.796
Considerate and Kind		.785			
Total Variance Explained	68.14%				
Eigen Values	2.31	1.77	1.39	1.26	1.15
Percentage of Variance	16.881	15.797	13.332	12.924	9.213
Cummulative Percentage	16.88	32.6	46.01	58.93	68.14

Rosenberg Self-Esteem Scale (RSES)

The Rosenberg Self-Esteem Scale (Rosenberg, 1965) is a 10-item self-report instrument measuring the global self-worth. Factor analysis was carried out for all the items of RSES using principal component analysis with varimax rotation. Those items having a factor loading above .40 were retained in the factor (Field, 2012). All the items were loaded on a single factor and accounted for 54.34% of variance.

Table 4.7

Factor Loadings of RSES

Items	Component
	1
Self Satisfaction	.750
No good at all	.726
Have Good Qualities	.533
Able to do things	.668
Not Proud	.583
Feel Useless	.653
Person of Worth	.747
Self Respect	.702
Failure	.732
Positive Attitude	.602
Total Variance Explained	54.34%
Eigen Values	5.43
Percentage of Variance	54.34
Cummulative Percentage	54.34

Perceived Control of Internal States Scale (PCOISS)

The Perceived Control of Internal States Scale (Pallant, 2000) is an 18-item inventory that provides a measure of the extent of an individual's self-control over their internal states (emotions, thoughts, physical reactions). Factor analysis was carried out for all the items of PCOISS using principal component analysis with varimax rotation. Those items having a factor loading above .40 were retained in the factor (Field, 2012). All the items were loaded on a single factor and accounted for 55.39% of variance.

Table 4.8

Factor Loadings of PCOISS

Items	Components
	1
Emotional Control	0.708
Hard to snap out from bad mood	0.719
Stable Feelings	0.539
Talk out of bad feelings	0.451
Emotional Coping	0.714
Good techniques to cope	0.714
Thinking of Problems	0.484
Think nicer in worry	0.693
Stop Silly Thoughts	0.622
Control my thoughts	0.754
Silly thoughts will better of me in future	0.748
Techniques to think clearly and rationally	0.774
Calm and Relaxed under Pressure	0.755
Techniques to stay relaxed	0.721
Can't relax when anxious/uptight	0.744

Can't do much to relax when uptight	0.729
Have ways to relax	0.705
Have things to help myself in Stress	0.744
Total Variance Explained	38.24%
Eigen Values	1.57
Percentage of Variance	38.24
Cummulative Percentage	38.24

Life Orientation Test Revised (LOT-R)

The Life Orientation Test-Revised (LOT-R) is a 10 item scale to measures the extent of individual's favorable expectations or optimistic outlook about their life (Scheier & Carver, 1985; as cited in Cook, 2003). Factor analysis with principal component analysis method using varimax rotation was carried out and only those factors having a loading of .40 and above were retained further (Field, 2012). A single factor structure emerged in accounting for 69.37% of variance.

Table 4.9

Factor Loadings of LOT-R

Items	Component
	1
Usually except the best	.742
Easy to Relax	.620
Go wrong for me	.762
Optimistic about Future	.597
Enjoy Friends	.481
Important to Keep Busy	.430
Hardly except things to go my way	.693
Don't Upset easily	.612
Count on Good Things	.592
Expect more good things than bad	.602
Total Variance Explained	69.37%
Eigen Values	6.93
Percentage of Variance	69.37
Cummulative Percentage	69.37

Brief Resilience Questionnaire (BRS)

The Brief Resilience Scale (BRS) is a six items measure to assess resilience. The factor analysis was carried out for this unidimensional scale with principal component analysis using varimax rotation. Items having a factor loading of .40 and above are retained in the factor (Field, 2012). None of the items are deleted as all the items were above the set criterion. All the components

emerged on a single factor explaining 79.05% variance. The table below shows the results of the factor analysis of BRS.

Table 4.10

Factor Loadings of BRS

Items	Component
	1
Tend to bounce back quickly	.861
Have a hard time making through Stress	.886
Does not take long to recover	.893
Hard to snap back	.885
Come through with little trouble	.904
Take long time to get over set-backs	.907
Total Variance Explained	79.05%
Eigen Values	4.74
Percentage of Variance	79.05
Cummulative Percentage	79.05

Personal Wellbeing Index (PWI)

The Personal Wellbeing Index (PWI) scale is a comprehensive scale of Quality of Life (QOL) that contains eight domains of personal wellbeing including one optional item of spirituality and religion and one additional item of life as a whole; each domain corresponds to the domains of QOL. These eight domains include Standard of Living, Health, Achievements in Life, Personal Relationships, Safety, Community Connectedness, Future Security and Spirituality or Religion

(optional item) (International wellbeing Group, 2006). Factor analysis was conducted for all the eight items PWI scale using principal component analysis with varimax rotation. The items having a factor loading of .40 and above were retained (Field, 2012). The factor analysis result shows that the factor loadings were well above .40 and hence no items were deleted. All the eight items emerged on a single factor accounting for 49.00% variance. The total variance explained by the PWI domains is consistent with previous findings (Lorbergs, 2012; Lau, Cummins & McPherson, 2005).

Table 4.11

Factor Loadings of PWI

Items	Component
	1
Standard of Living	.617
Health	.683
Achievement in Life	.586
Personal Relationships	.673
Safety	.611
Community Connectedness	.553
Future Security	.773
Spirituality and Religion	.781
Total Variance Explained	49.00%
Eigen Values	1.057
Percentage of Variance	49
Cummulative Percentage	49

4.6 Bivariate Analysis

The bivariate analysis refers to the analysis of exactly two variables. It includes scatter plots, t-test, correlation analysis, simple regression and so on. The Independent sample t-test compares the mean difference between two different groups of units (Field, 2012). The significant value of less than .05 indicates the existence of a group difference rejecting the null hypothesis of no difference for the sample (Field, 2012).

4.6.1 Gender difference

The present study results indicated the significant existence of gender difference; t (304) = 1.88, $p < 0.05$, t *(304)* = 2.89, $p < 0.01$, in the experience of SWB and resilience respectively. Male respondents (M = 63.94, SD = 12.55) are found to be higher on the experienced level of SWB than the female respondents (M = 61.30, SD = 11.70). Similarly, the male respondents (M = 23.28, SD = 4.51) are found to be more resilient to the recurrent flood related adversities than the female participants (M = 21.74, SD = 4.81).

4.6.2 Correlations

The Pearson Product Moment Correlation (Table 4.12) was carried out to test the strength of association and direction of the relationship among the predictor and the outcome variables. A correlation coefficient of .80 and above suggests the risk of the existence of inflated correlations or multicollinearity (Field, 2012).

The correlation matrix shows that Subjective Wellbeing (SWB) is significantly positively correlated with object resources (r =.32, $p < .01$), positive affect (r = .29, $p < .01$), agreeableness (r = .25, $p < .01$), conscientiousness (r = .23, $p < .01$), self-esteem (r = .35, $p < .01$), optimism (r

= .45, $p < .01$) and perceived control ($r = .36$, $p < .01$). Whereas, negative affect ($r = -.29$, $p < .01$) and neuroticism ($r = -.17$, $p < .01$) are significantly negatively correlated with SWB.

The Correlation between predictor variables and Resilience shows that, Resilience shares a significant positive correlation with age ($r = .20$, $p < .01$), positive affect ($r = .24$, $p < .01$), conscientiousness ($r = .14$, $p < .05$), self-esteem ($r = .24$, $p < .01$), optimism ($r = .32$, $p < .01$) and perceived control ($r = .44$, $p < .01$). Two of the predictor variables; negative affect ($r = -.23$, $p < .01$) and neuroticism ($r = -.28$, $p < .01$), are significantly negatively correlated with resilience. The Correlation matrix further shows that there is a strong positive correlation between both the predictor variables.

4.6.3 The Relationship between SWB and Resilience

The correlation show that SWB and resilience ($r = .16$, $p < .01$) shares a significant positive relationship. Although the value of *'r'* is significant, the strength of association is not very high.

Table 4.12

Correlation Matrix of All Variables

	Age	ES	OR	CR	ER	PA	NA	Extra	Agree	Consc	Neuro	Open	SE	OP	PC	RS	SWB
Age	**1**																
Environmental Stressors	**.120***	**1**															
Object resources	**.143***	**-.297****	**1**														
Condition Resources	**.130***	**-.094**	**.167****	**1**													
Energy Resources	**.102**	**-.415****	**.671****	**.347****	**1**												
Positive Affect	**.108**	**-.102**	**.212****	**.249****	**.246****	**1**											
Negative Affect	**-.100**	**.202****	**-.201****	**-.091**	**-.186****	**-.324****	**1**										
Extraversion	**.035**	**-.008**	**.034**	**.158****	**.076**	**.132****	**-.177****	**1**									
Agreeableness	**.033**	**-.047**	**.036**	**.023**	**.053**	**.251****	**-.079**	**.056**	**1**								
Conscientiousness	**.200****	**-.079**	**.175****	**.257****	**.188****	**.367****	**-.340****	**.197****	**.102**	**1**							
Neuroticism	**-.298****	**.066**	**-.081**	**-.262****	**-.185****	**-.392****	**.505****	**-.251****	**-.052**	**-.454****	**1**						
Openness	**.047**	**-.021**	**.020**	**.021**	**.059**	**.098**	**-.093**	**.551****	**.144***	**.059**	**-.033**	**1**					
Self-Esteem	**.007**	**-.273****	**.339****	**.165****	**.269****	**.489****	**-.276****	**.001**	**.221****	**.274****	**-.258****	**.047**	**1**				
Optimism	**.083**	**-.155****	**.267****	**.125***	**.226****	**.609****	**-.379****	**.101**	**.252****	**.405****	**-.435****	**.045**	**.675****	**1**			
Perceived Control	**.182****	**-.184****	**.241****	**.254****	**.240****	**.614****	**-.539****	**.188****	**.178****	**.384****	**-.654****	**.081**	**.448****	**.645****	**1**		
Psychological Resilience	**.202****	**-.054**	**.099**	**.059**	**.091**	**.238****	**-.225****	**.087**	**.034**	**.143***	**-.283****	**.015**	**.240****	**.321****	**.441****	**1**	
Subjective Wellbeing	**.078**	**-.062**	**.317****	**.066**	**.102**	**.299****	**-.287****	**.097**	**.245****	**.225****	**-.166****	**-.002**	**.366****	**.451****	**.362****	**.155****	**1**

Note. *p< .05.**p<.01.***p< .001.

Note. ES = Environmental Stressors, *OR* = Object Resources, *CR* = Condition Resources, *ER* = Energy Resources, *PA* = Positive Affect, *NA* = Negative Affect, *Extra* = Extraversion, *Agree* = Agreeableness, *Consc* = Conscientiousness, *Neuro* = Neuroticism, *Open* = Openness, *SE* = Self-Esteem, *OP* = Optimism, *PC* = Perceived Control, *RS* = Resilience, *SWB* = Subjective Wellbeing.

4.7 Structural Equation Modeling (SEM)

The Structural Equation Modeling (SEM) can be defined as a statistical approach to test the hypothesized relationships among observed and latent variables (Byrne, 2016; Teo et al., 2013). It is a statistical method to test a structural theory based on some phenomenon following the confirmatory or hypothesis-testing approach (Byrne, 2016). The SEM is comprised of a collection of methods for modeling the inter-variable multivariate relationships. This method is considered to be an integration of regression and factor analysis and also known as Covariance-Based Structural Analysis or Simultaneous Equation Modeling (In'Nami & Koizumi, 2013). According to Byrne (2016), the two important procedures of SEM include,-

(i) The causal processes under study are represented by a series of structural (that is; regression) equations, and,

(ii) *These structural equations can be modeled pictorially to enable clearer conceptualizations of the theory under study.* (Byrne, 2016, p.3).

Several additional aspects make SEM superior to the older generation of multivariate procedures. *First,* SEM adopts a confirmatory-hypothesis testing instead of exploratory approach to analyze the data. *Second,* SEM provides explicit estimates/modeling of error variance parameters in order to achieve bias free relationship estimates between variables. *Third,* the conventional data analysis methods are based on observed variables only. While, the SEM procedures incorporate both unobserved (that is, latent) and observed variables in the analysis. *Fourth*, the SEM facilitates complex multivariate modeling of direct relations or indirect effects that are not usually applied elsewhere (Byrne, 2016; In'Nami & Koizumi, 2013).

4.7.1 Measurement and Structural Model

A structural equation model is comprised of both the measurement as well as the structural model. The measurement model or the 'CFA Model' includes all the observed responses/factors; specifying the relations among the latent variables and the regressions between the latent variables and the observed variables. Basically, a measurement model specifies the shared relationship between observed and latent variables (Teo et al., 2013). On the other hand, the structural models define the relationship among the latent variables and emphasize on the nature and magnitude of the relationship between the constructs (Teo et al., 2013). James, Mulaik, and Brett (1982) proposed a two step approach to define the relationship between a measurement and structural model in SEM analysis. According to the two-step approach, the measurement and the structural models are the two conceptually different but related models; and the initial testing of the specified theoretical model may be meaningless until the measurement model holds (Teo et al., 2013; Joreskog & Sorbom, 1982).

5.7.2 Types of Models in SEM

There are different types of structural equation models that are used in various researches. However, not all models are frequently used. Raykov and Marcoulides (2006) listed out four of the most commonly used SEM models in literature:

(i) Confirmatory Factor Analysis Model (CFA)

The Confirmatory Factor Analysis models are used to test the patterns of interrelationships among different constructs. The constructs are measured by observed variables and no specific directionality of relationship is assumed between these constructs as they are correlated with each other only.

(ii) Path Analysis Model (PA)

The Path Analytic models focus only on observed variables and follow the same underlying processes of model testing and fit indices.

(iii) Structural Regression Model (SR)

The Structural Regression models are usually used to test the proposed theories involving certain explanatory relationships (that is, latent regression) among constructs. These models are built on the basis of CFA models, by hypothesizing some specific explanatory relationships among constructs.

(iv) Latent Change Model (LC)

The Latent Change models are used to test the longitudinal data where the model focuses on specific patterns of growth, decline, or both over a period of time. This kind of model enables researchers to measure/examine the patterns of intra and inter-variable differences of change patterns over time.

4.7.3 Model Fit Indices

The degree to which the data fits into the model is indicated by the model fit indices in SEM analysis. The SEM attempts to estimate the population parameter by minimizing the difference in variance/covariances between observed and model-implied matrices and a smaller difference is desired for a better model (In'Nami & Koizumi, 2013). Various types of fit indices are used to evaluate these differences. A statistically non-significant chi-square (X^2) value indicates a good fit. It suggests that a statistically non-significant difference exists between the observed and model-implied variance/covariance matrices indicating that the proposed model is precise and cannot be rejected (Byrne, 2016; In'Nami & Koizumi, 2013). However, chi-square tests have

limitations in large samples where minor differences may be considered as statistically significant (Byrne, 2016; Kline, 2011). Even though, the non-significant chi-square values are desired, because of its high sensitivity to the sample size, a relative chi-square (Chi-square/degrees of freedom) value is estimated. The recommended value for the relative chi-square should not be greater than 3 (Singh et al., 2011; Kline, 1998). However, to overcome this problem, the following four different types of fit indices were widely used in the literature,-

- ***Incremental or Comparative fit indices***

  It compares the improvement of the model with the null model where no covariances among the variables exist. It includes Comparative fit index (CFI), the normal fit index (NFI), and the Tucker-Lewis index (TLI). Usually, values that approach 1.0 indicates a good fit model (Teo et al., 2013; In'Nami& Koizumi, 2013)

- ***Absolute fit indices***

  Absolute fit indices analyze the fit of the proposed model by calculating the shareof variance explained in the variance/covariance matrix without matching it with the null model. It includes the Goddness-of-fit (GFI) and the Adjusted Goddness-of-fit (AGFI). The GFI and AGFI values may range from 0 to 1.00 where values approaching 1.00 indicates a good fit model (Byrne, 2016, In'Nami& Koizumi, 2013).

- ***Residual fit indices***

  The average difference between the observed and model-implied variance/covariance matrices is evaluated by the residual fit indices. It includes standardized root mean square residual (SRMR) and the Root mean square error of approximation (RMSEA). The

SRMR values range from 0 to 1.00 where a value of .05 or less is indicative of a good fit model (Byrne, 2016). A RMSEA value of .08 to .10 is indicative of an average fit and a value greater than .10 indicates a poor fit (Byrne, 2016). A RMSEA value of .07 or below indicates a good fit (Teo et al., 2013).

- ***Predictive fit indices***

  The predictive fit indices "examines the likelihood of the model to fit in similarly sized samples from the same population" (In'Nami& Koizumi, 2013, p.28). It includes the Akaike information criterion (AIC), the consistent Akaike information criterion (CAIC) and the Expected cross-validation index (ECVI) (Byrne, 2016; In'Nami& Koizumi, 2013).

4.8 Path Analysis

The SEM can be conducted in two different approaches (Hair, Anderson, Tatham, & Black, 1995); first, the process includes simultaneous estimations of both structural and measurement model called the 'Single-Stage-Approach', and second, to process the measurement model followed by the structural model estimation, called the 'Two-Stage-Approach' (as cited in Zeidan, 2006). The present study uses the two-stage-approach method as it is considered to be the best possible way of accurate representation of reliability of the indicators of each construct since it is conducted separately to avoid any kind of interactions between measurement and structural model (Hair et. al., 1995). According to Bagozzi (1981) and Anderson and Gerbing (1982), the performance of the measurement model is required before analysing the causal relationship in the structural model as the measurement model represents a condition that needs

to be satisfied in a logically argued way which forms the basis for the theoretical model (as cited in Zeidan, 2006).

The software package of the SPSS Amos 22.0 version was used to analyze the data. The present study follows Gerbing and Hamilton (1996) recommendation of the two-stage-process method. The initial step is to conduct exploratory factor analysis (EFA). Following EFA, the second step is to evaluate the derived model using confirmatory factor analysis (CFA) (Zeidan, 2006). The factor analysis was conducted by randomly splitting the sample into two halves. Exploratory factor analysis was conducted on one half (N = 153) and confirmatory factor analysis was conducted on the other half (N = 153). The factor analysis section above includes the results of EFA using principal component analysis (PCA) with varimax rotation. The convergent and discriminant validity of the constructs were calculated using CFA. Along with the descriptive statistics and the standard regression weights/factor loadings, the model fit indices of the goodness-of-fit index (GFI), comparative fit Index (CFI), normed fit index (NFI), and root mean square error of approximation (RMSEA) of each scale used in the present study were obtained. The items with loadings below .40 were eliminated (Field, 2012; Singh et. al., 2011). This step is necessary to identify and exclude, if necessary, the items that had extremely poor loadings/weights and to restate convergent validity of the items within each construct (Singh et. al., 2011). The entire model fit indices of GFI, CFI, and NFI was above the recommended limit of .90, suggesting a good fit of the items to its constructs (Teo et al., 2013). RMSEA is also below .07 for all the constructs (Teo et al., 2013). The Cronbach's alphas of all the items were greater than .60 which again suggests a good internal consistency of the items in each construct (Nunnally, 1967).

The analysis of the SEM is presented in three parts- (i) The summary of the measurement models, (ii) The direct path model and (iii) The indirect path model (The integrated hypothesized model).The table 4.13 below shows the detail statistics of the measurement models of all the constructs under study.

4.8.1 Confirmatory Factor Analysis (CFA), Reliability and Validity of the Scales

The results of CFA, reliability, and validity of all the scales used in the study are shown in Table 4.13. Confirmatory factor loadings of all scales ranged from .50 to .92. As mentioned above, CFA was conducted on the half of the sample after randomly splitting the entire sample into two equal halves. The small factor loadings can be considered significant in large sample sizes as the significance of a factor loading depends upon the sample size (Field, 2012). The substantive importance of a factor is merely indicated by the significance of a factor loading (Field, 2012). Stevens (2002) produced a table of statistical significance of loadings against sample sizes. According to his recommendations; for a sample of 50, a loading of .722 should be considered significant, the loading should be greater than .512 for a sample size of 100, the loading should be greater than .364 for a sample of 200, for a sample size of 300 it should be greater than .298, the loading should be greater than .21 for a sample size of 600 and a loading greater than .162 is considered significant for a sample size of 1000 (Field, 2012; Stevens, 2002).

The entire model fit indices of GFI, CFI, and NFI were above the recommended limit of .90, suggesting a good fit of the items to its constructs (Khine, 2013). RMSEA is also below .07 for all the constructs (Teo et al., 2013). The Cronbach's alphas of all the items were greater than .60 which again suggests a good internal consistency of the items in each construct (Nunnally, 1967). The convergent and discriminant validity of the constructs were tested using confirmatory factor analysis (Singh et. al., 2011). The composite reliability (CR) values for all the constructs

were above the recommended range of .70 (Khine, 2013). The average variance extracted (AVE) of all the scales were well above .50 (Khine, 2013). The maximum shared squared variance (MSV) for COR-E, PANAS and BFI-10 were less than their concurrent AVE values, ensuring the discriminant validity of the constructs (Khine, 2013). The Cronbach's alpha and CFA score for the Cumulative Exposure Indicator1 Scale (CEI1) is not calculated as the questionnaire uses dichotomous response scale.

Table 4.13

Shows the Reliability, Validity, and CFA of the Scales

Sl No	Variable	No. of Items	No. of Items Retained	*M*	*SD*	Cronbach's*α*	Composite Reliability	*AVE*	*MSV*	*CMIN/DF*	*GFI*	*CFI*	*NFI*	*RMSEA*	Factor Loading Range
1	COR	14	13							2.92	0.92	1	0.9	0.07	.53 to .84
	a. Object Resources	5	5	10.08	2.78	0.77	0.78	0.76	0.65						
	b. Condition Resources	4	3	5.08	2.56	0.73	0.76	0.56	0.42						
	C. Energy Resources	5	5	8.41	2.65	0.85	0.86	0.77	0.65						
2	PANAS	20	17						0.078	1.61	0.94	0.96	0.9	0.04	.50 to .91
	a. Positive Affect	10	9	26.37	4.59	0.84	0.84	0.79		1.93	0.97	0.98	1	0.05	.50 to .74
	b. Negative Affect	10	8	13.77	4.12	0.79	0.75	0.72		0.20	0.98	0.98	1	0.05	.52 to .92
3	BFI-10	11	10							2.11	0.98	0.97	1	0.07	.56 to .76
	a. Extraversion	2	2	7.5	1.78	0.76	0.78	0.77	0.69						
	b. Openness	2	2	6.45	1.38	0.85	0.86	0.81	0.58						
	C. Agreeableness	3	2	9.93	1.53	0.76	0.79	0.78	0.4						
	d. Conscientiousness	2	2	7.39	1.77	0.74	0.78	0.76	0.68						
	e. Neuroticism	2	2	4.36	1.91	0.78	0.77	0.87	0.56						
4	Self-Esteem	10	10	29.55	3.71	0.86	0.87	0.6		2.53	0.94	1	0.9	0.07	.57 to .72
5	Optimism	10	10	26.50	4.17	0.78	0.81	0.65		2.88	0.94	0.9	0.9	0.07	.52 to .76
6	Perceived Control	18	16	60.45	9.76	0.92	0.92	0.76		2.65	0.90	1	0.9	0.07	.50 to .87
7	Resilience	6	6	22.38	4.73	0.94	0.94	0.741		0.01	1	1	1	0.01	.81 to .89
8	Subjective Well-being	8	8	55.97	10.85	0.74	0.74			1.35	0.97	1	0.9	0.05	.62 to .75

Note. M = Mean, *SD* = Standard Deviation, *CR* = composite reliability, *AVE* = average variance extracted, *MSV* = maximum shared variance, *GFI* = goodness-of-fit index; *CFI* = comparative fit index; *NFI* = normed fit index; χ^2/df = chi square/degrees of freedom; *RMSEA* = root mean square error of approximation.

4.8.2 Predictors of Subjective Wellbeing and Resilience

The structural equation modeling using SPSS Amos 22.0 with maximum likelihood method was carried out to analyze the direct path model. A direct path model was tested with all the predictor variables along with the control variables in order to evaluate the direct effect of the predictor variables on the outcome variable.

Predictor variables included *personality dimensions* (Big five dimensions), *affect* (Positive and Negative affect), *cognitive buffers* (Self Esteem, perceived control and optimism), *resource categories* (Object, condition and energy resources) and *environmental stressors*. The dependent variables were *subjective wellbeing* and *resilience*. The demographic variables of age, education, income were entered into the model as control variables. As discussed in the literature review, these variables were identified primarily from the two major theories, that is, SWB homeostasis theory and conservation of resources theory. The full model is depicted in figure 4.1. The reduced final model is depicted in figure 4.2. Table 4.14 shows the regression weights of all the paths of the model and table 4.15 shows model fit indices. Model fit indices of the reduced model are within the recommended limit.

4.8.2.1 Predictors of SWB

The results of the direct path model showed that among all other socio demographic variables, only *education* predicted SWB. However, education shared a negative direction of association with SWB in the present sample.

Among the environmental stressors, *safe shelter* was found to be a significant predictor of SWB. Among the personality dimensions, four of the Big Five dimensions of personality, that is, *extraversion, neuroticism, agreeableness, and openness* emerged as significant predictors. Neuroticism negatively predicted SWB. Among the resource categories, *object and condition*

resources played a significant role in SWB. Of the three cognitive buffers, only *optimism and perceived control* were found to be the significant positive predictor of SWB. Furthermore, negative affect turned out to be a significant negative predictor of SWB.

4.8.2.2 Predictors of Resilience

The results of the direct path model showed that among all other socio demographic variables, only *age* was found to be a significant predictor of psychological resilience. The *condition resources* and *perceived control* are found to be the only significant predictors of psychological resilience among all other independent variables. Personality dimensions and affect did not predict resilience.

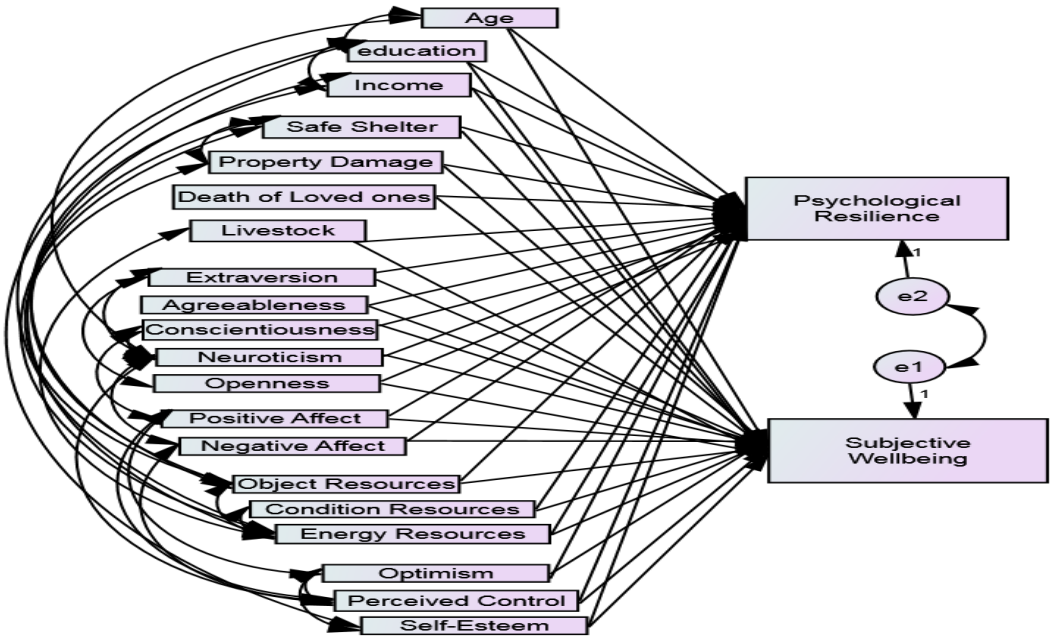

Figure 4.1. Full Direct Path Model

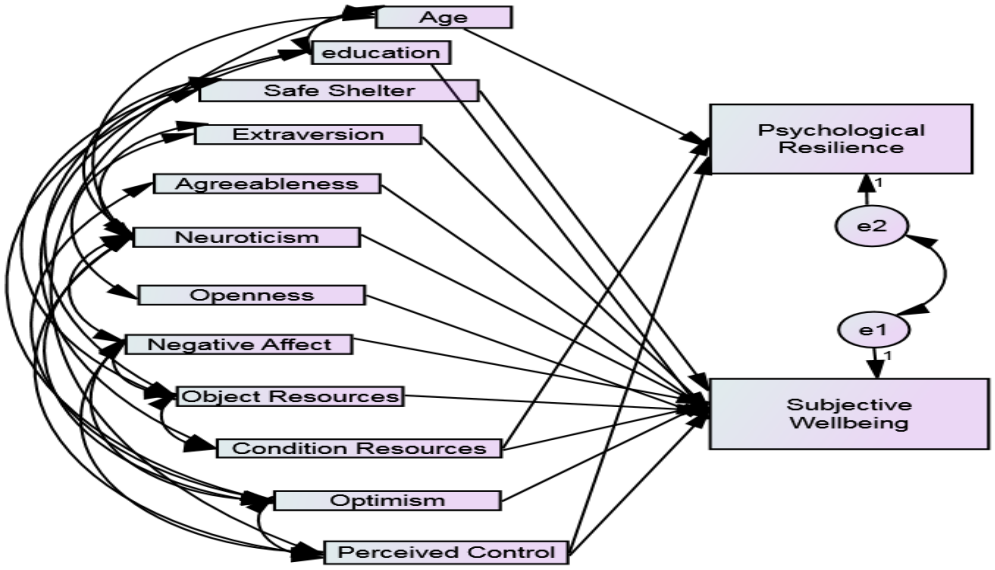

Figure 4.2. Reduced Direct Path Model

			Standardized Estimates
SWB	<---	education	-0.14**
SWB	<---	Safe Shelter	0.13**
SWB	<---	Extraversion	0.13*
SWB	<---	Neuroticism	-0.11*
SWB	<---	Agreeableness	0.17***
SWB	<---	Openness	0.13*
SWB	<---	Negative Affect	-0.14*
SWB	<---	Object Resources	0.21***
SWB	<---	Condition Resources	0.09*
SWB	<---	Optimism	0.26***
SWB	<---	Perceived Control	0.15*
Resilience	<---	Age	0.11*
Resilience	<---	Perceived Control	0.44***
Resilience	<---	Condition Resources	0.09*

Note. *$p < .05$.**$p <. 01$.*** $p < .001$.

Table 4.15

Model Fit Summary

Sl No	Variable	*CMIN/DF*	*p*	*GFI*	*CFI*	*NFI*	*RMSEA*
1	Full Model	4.41	0.001	0.79	0.74	0.69	0.11
2	Reduced Model	2.46	0.001	0.94	0.93	0.89	0.06

Note. GFI = goodness-of-fit index; *CFI* = comparative fit index; *NFI* = normed fit index; *CMIN/DF* = chi square/degrees of freedom; *RMSEA* = root mean square error of approximation.

4.8.2.3 Common and Unique Predictors of SWB and Resilience

For the present sample, both SWB and Resilience share a positive relationship (as indicated in Table 4.12). Direct path models further indicated some common and unique predictors of both the dependent variables. Among the external resource variables, only *condition resource* and

among the cognitive buffers, only *perceived control* turned out to be common significant predictors of both SWB and resilience. Other variables related to personality dimensions, affect, and environmental stressors did not predict resilience. However, environmental stressors (*safe shelter*), four personality dimensions (*extraversion, neuroticism, agreeableness, and openness)* and negative affect predicted SWB. Chronological age is a unique predictor of resilience, whereas it did not predict SWB.

4.9 Analysis of Indirect Path Model (Integrated Theoretical Model)

The purpose of this section of result is to empirically examine the hypothesized integrated model of SWB homeostatic theory, COR theory, resilience and environmental stressors using path analysis. This model proposes that both SWB and Resilience is maintained by different sets of determinants. The determinants include 1st order (personality and affect), 2nd order (cognitive buffers), and external resources. Furthermore, flood related environmental stressors were included as separate predictors given the nature of the present sample. The pathways of the model are proposed based on the SWB homeostasis model. Specifically, pathways propose that personality, affect, resources and environmental stressors will influence internal cognitive buffers (self-esteem, perceived control, and optimism) which in turn will influence both SWB and resilience. Therefore, cognitive buffers are considered as mediators between predictors (personality, affect, resources, and environmental stressors) and outcome variables (SWB and resilience).

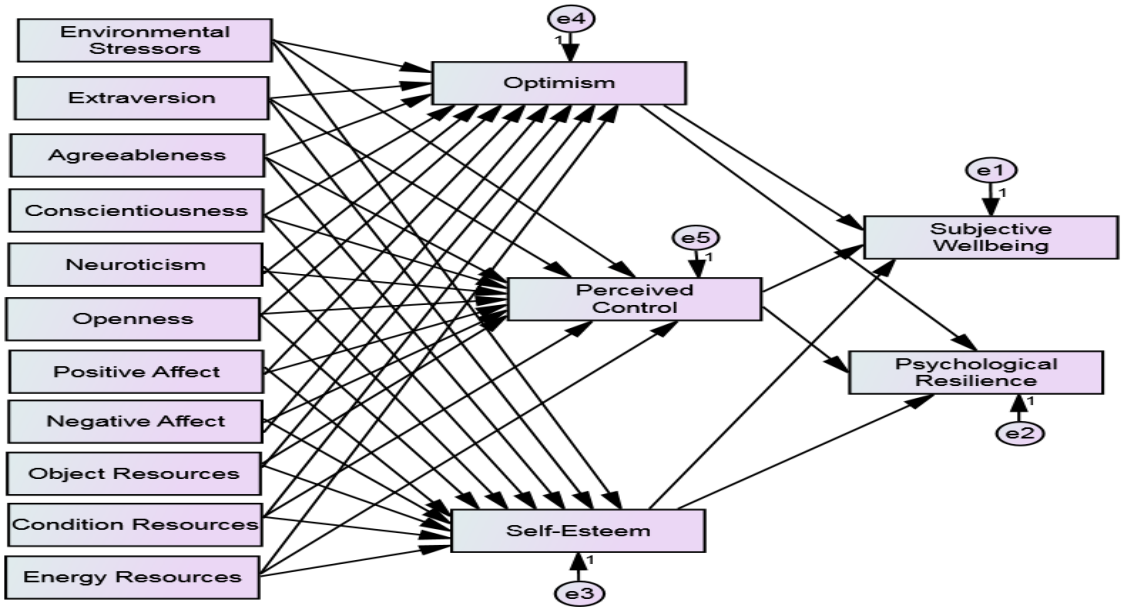

Figure 4.3. Full Integrated Model

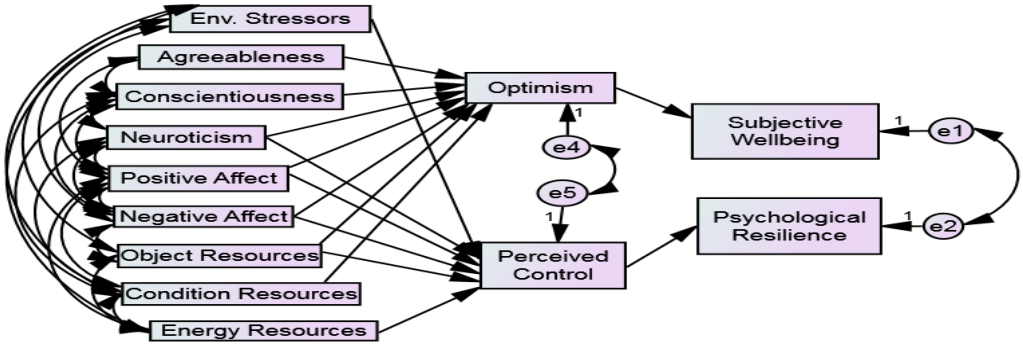

Figure 4.4.Revised Integrated Model

The integrated hypothesized model with indirect path was run in Amos using the maximum likelihood method. The results of the reduced model indicated that among the three cognitive buffers, only optimism significantly mediated the relationship between some predictors (personality dimensions of neuroticism, agreeableness, and conscientiousness; positive and negative affect; condition and object resources) and *SWB* as the outcome variable. On the other hand, among the three cognitive buffers, only perceived control mediated the relationship between some predictors (personality dimensions of neuroticism; positive and

negative affect; object and energy resources; and environmental stressors) and *resilience* as the outcome variable.

Thus, the analysis of the integrated theoretical model shows that optimism is the most significant cognitive buffer for maintaining SWB among the victims of recurrent flood victims. Furthermore, personality (neuroticism, agreeableness, and conscientiousness), affect (positive and negative affect), and resources (condition and object resources) significantly impacts optimism. However, perceived control turned out to be the most significant cognitive buffer for maintaining psychological resilience. Furthermore, personality dimensions of neuroticism, affect (positive and negative affect), resources (object and energy resources) and environmental stressors significantly predicted perceived control. It was found that self-esteem has no direct path with any of the dependent variables (SWB and resilience), and hence deleted from the reduced model. The model summary of both the models and the results of mediation and indirect effects are shown as follows-

Table 4.16

Shows the Regression Weights of the Revised Mediation Model

			Standardized Estimates
Perceived Control	<---	Neuroticism	-0.44***
Perceived Control	<---	Positive Affect	0.35***
Perceived Control	<---	Negative Affect	-0.22***
Perceived Control	<---	Object Resources	0.12**
Perceived Control	<---	Env. Stressors	-0.07*
Perceived Control	<---	Energy Resources	0.08*
Optimism	<---	Agreeableness	0.11**
Optimism	<---	Negative Affect	-0.09*
Optimism	<---	Conscientiousness	0.14**
Optimism	<---	Neuroticism	-0.17**
Optimism	<---	Positive Affect	0.44***
Optimism	<---	Object Resources	0.14***
Optimism	<---	Condition Resources	0.11**
Psychological Resilience	<---	Perceived Control	0.44***
Subjective Wellbeing	<---	Optimism	0.44***

Note. *p< .05.**p<.01.***p< .001.

Table 4.17

Model Fit Summary

Sl No	Variable	*CMIN/DF*	*p*	*GFI*	*CFI*	*NFI*	*RMSEA*
1	Full Model	2.09	0.001	0.96	0.96	0.94	0.06
2	Reduced Model	2.51	0.001	0.95	0.95	0.92	0.07

Note. *GFI* = goodness-of-fit index; *CFI* = comparative fit index; *NFI* = normed fit index; *CMIN/DF* = chi square/degrees of freedom; *RMSEA* = root mean square error of approximation.

4.10. Significance of the Indirect Effects and Mediation

The SOBEL test and bootstrapping method were used to test the significance of the indirect effect and mediation in the indirect path model. The result of the SOBEL and bootstrapping test is shown in Table no 4.18 to 4.21

Both the test shows that 'Optimism' is a significant mediator variable between IVs (Agreeableness, Conscientiousness, Neuroticism, Object Resources, Condition Resources) and SWB. Whereas, 'Perceived control' is a significant mediator between IVs (Environmental Stressors, Neuroticism, Positive Affect, Negative Affect, Object Resources, Energy Resources) and Resilience.

Sl no.	Paths	Test Statistics
1	Agreeableness-Optimism-SWB	2.40**
2	Conscientiousness-Optimism-SWB	2.79**
3	Neuroticism-Optimism-SWB	-2.97**
4	Positive Affect-Optimism-SWB	6.24***
5	Negative Affect-Optimism-SWB	-1.79*
6	Object Resource-Optimism-SWB	2.98**
7	Condition Resource-Optimism-SWB	-2.49**

Note. *p< .05.**p<.01.***p< .001.

Table 4.19

Mediation Analysis of SWB (with Bootstrapping Method)

Sl No.	Paths	Indirect Effect
1	Agreeableness-Optimism-SWB	0.03**
2	Conscientiousness-Optimism-SWB	0.04**
3.	Neuroticism-Optimism-SWB	-0.05*
4.	Positive Affect-Optimism-SWB	0.13**
5.	Negative Affect-Optimism-SWB	-0.03*
6.	Object Resource-Optimism-SWB	0.04**
7.	Condition Resource-Optimism-SWB	-0.03*

Note. *p< .05.**p<.01.***p< .001.

Sl no.	Item	Test Statistics
1	Stressors-Control-Resilience	-1.91*
2	Neuroticism-Control-Resilience	-6.61***
3	Positive Affect-Control-Resilience	6.28***
4	Negative Affect-Control-Resilience	-4.49***
5	Object Resource-Control-Resilience	2.59**
6	Energy Resource-Control- Resilience	-1.64**

Note. *p< .05.**p<.01.***p< .001.

Table 4.21

Mediation Analysis of Resilience (with Bootstrapping Method)

Sl No.	Hypothesis	Indirect Effect
1.	Stressors-Control-Resilience	-0.04*
2.	Neuroticism-Control-Resilience	-0.23**
3.	Positive Affect-Control-Resilience	.18**
4.	Negative Affect-Control-Resilience	-0.11**
6.	Object Resource-Control-Resilience	0.06**
7.	Energy Resource-Control-Resilience	-0.04*

Note. *p< .05.**p<.01.***p< .001.

Chapter 5

Study 1: Discussion

This study attempted to investigate psychological dimensions of recurrent flood survivors in one of the most severely flood-affected state of India (Assam). The significance of this study lies in its attempt to study an under-studied population. Despite high frequency and severity of natural disasters particularly floods in Assam, almost negligible amount of academic research is available addressing the psychological dimensions of recurrent flood victims. This study is an attempt to address this gap in research.

This study focuses on the maintenance of the level of subjective well-being (SWB) homeostasis and resilience during and post-flood conditions by the survivors of the recurrent flood events of Assam. Two theories, that is, SWB homeostasis theory and conservation of resources theory (COR theory) are explicitly integrated in order to increase the illustrative power of the factors that influence both SWB and resilience among the recurrent flood survivors. The COR theory refers to the usual outcome of such atrocities as the experience of stress while SWB homeostasis theory defines it as homeostatic failure or dissatisfaction (Cook, 2003). According to the hypothesized model, under the conditions of chronic/severe distress, both internal and external resources help ward off the negative feelings thereby maintaining the homeostatic equilibrium. A direct and an indirect path model were tested to identify the major predictors as well as mechanisms for the maintenance of SWB and psychological resilience among these recurrent flood survivors. The following sections deliberate on the details of results.

5.1 Losses and Flood Related Environmental Stressors

It is clear that respondents have experienced almost all major types of flood-related stressors. The highest percentage of respondents reported property damage, negative effect on occupational work, exposure to endangered situations, and loss of livestock. Many participants also reported lack of safe shelter, loss of loved ones, and evacuation from their homes were also major stressors during the floods. The participants of the present study have been experiencing these losses and stressors repeatedly almost every year and sometimes more than once in a year. Such stressors may have a cumulative effect and have long-term repercussions for their physical and mental health. These disaster-related experiences such as property damage, bereavement, and the threat of death may be viewed as loss or threatened loss of resources that induce significant psychological distress affecting an individual's psychological equilibrium (Stanke et al., 2012; Verger et al., 2003; Hobfoll, 2001). Implications of such experiences will be further discussed in the upcoming sections.

5.2 Gender Difference in SWB and Resilience

The results indicated a significant gender difference in SWB. Male respondents reported a higher level of SWB as compared to female respondents. These findings are consistent with some previous studies showing male participants experiencing a higher level of SWB than female (Mahmood & Ghaffar, 2014). The relationship between gender and SWB is quite challenging as a host of research findings also suggests women to be higher on personal wellbeing (Tiliouine, 2009; Tomyn & Weinberg, 2016). While other studies found no gender difference in SWB (Tomyn et. al., 2016). Koo, Rie & Park (2004) found that women are often found to report lower levels of emotional wellbeing and SWB. A plausible reason for this difference could be the cultural variations or the cultural response biasness (Lau et. al., 2005); it

is quite apparent in some suburb Indian societies where female respondents are still found to be less confident in independent or autonomous decision making (Nussbaum, 2000). India is predominantly a masculine society where the traditional societies consider men for the primary status of power and authority, and women are placed in secondary positions in terms of power, status, decision-making, allocation of food, health, education and/or earnings for their family (Suar & Gochhayat, 2016; Søndergaard & Hofstede, 2001). Nussbaum (2000) stated that in developing countries like India; adaptation is the usual phenomenon where women are often getting used to deprivation and constrained liberties. The low literacy rate or illiteracy among female respondents could also be one of the major reasons for such gender differences.

The results indicated a significant difference of gender in the score of psychological resilience. The male respondents are found to be more resilient than the female participants supporting some previous research findings (Tomyn & Weinberg, 2016). Literature shows inconsistent findings regarding the presence of gender difference in resilience studies as well (Smith et. al., 2013). It is apparent in the present sample that the male participants were more exposed to the life-threatening situations during floods as they often have to go out for the arrangement of the goods and services to fulfill the basic needs of their family as well as for the livestock. Having a prime exposure to the disastrous floods could be a likely reason for men being more resilient than women in the present sample. According to Jabeen (2012) women are often found to play a passive role in the external activities and rather play an active role in the household necessities which leads to the lesser exposure to the disaster-related hardships as compared to their male counterparts (as cited in Mahmood & Ghaffer, 2014). However, the low literacy rate and the cultural response biasness (Lau et. al., 2005) could also be the likely causes for such gender differences in the current sample.

5.3 The Relationship between Subjective Wellbeing and Resilience

According to Cummins (2013), SWB homeostasis theory suggests that SWB should have a high correlation with other positive and self-referent constructs, such as psychological resilience, as long as the homeostatic control is maintained. As SWB falls below its narrow range of set point, the relationship between SWB and psychological resilience might become a very weak one (Tomyn & Weinberg, 2016). Cummins and Wooden (2014) coined the term "Homeostatic Resilience" which they defined as "the power of homeostasis, first to retain control of SWB, and, second, to restore the dominance of HPMood following excursion of the affective experience outside the 'attractor region' (set point range)" (p.232). Henceforth, based on this definition, psychological resilience can be defined as "the process by which the set point for wellbeing is recovered following a departure from its usual resting state" (as cited in Tomyn& Weinberg, 2016, p.3). Thereby, it is often argued that both the SWB and psychological resilience have some trait-like properties and is expected to correlate highly with each other due to their shared variance with HPMood (Tomyn& Weinberg, 2016). The results showed that there is a significantly positive correlation between SWB and psychological resilience. The results are consistent with the previous literature (Tomyn & Weinberg, 2016; Mahmood & Ghaffar, 2014; Heet. al., 2013). Mahmood & Ghaffar (2014) argued that the positive nature of these two constructs could be the plausible reason for this positive correlation. While Tomyn and Weinberg (2016) suggested that the trait-like properties and shared variance of SWB and psychological resilience with HPMood as the root cause of this positive correlation.

5.4 SWB Set point, Domain Satisfaction and Domain Compensation

The theory of SWB Homeostasis states that every person has a genetically set-point for SWB that lie within a narrow range of 70-80%scale maximum (SM) on a standard 0-100 point scale

continuum (Cummins, Gullone & Lau, 2002). The average consistency of the findings for the set point of SWB is 75%SM with 70-80%SM as the normal range in western cultures (Lai et. al., 2013; Tiliouine et. al., 2006; Cummins, Gullone & Lau, 2002). However the recent literature of SWB suggests a distribution of 70-90%SM with an average score of 80%SM to be the positive (above neutral) levels of wellbeing of population distribution for western cultures (Cummins & Wooden, 2014; Chen & Davey, 2008). Whereas, this norm falls slightly at a lower range for the non-western populations; inferring a range of 60-70%SM (Chen & Davey, 2008; Tiliouine et. al., 2006; Cummins, 1998).

The mean score of subjective well-being for the present sample is 62.40 and the Global Life Satisfaction (GLS) is 64.28. If we compare with the available norms of set-point, the mean score of SWB indicates that the SWB score is falling below the global set point for the western sample which is 70-90%SM but falling at the lower end of the set point range for non-western samples (60-70%SM). The results conform to the previous studies conducted in non-western cultures such as China, Singapore, Taiwan and Macau (Chan & Davey, 2008). This result also reflects that the present sample is likely to be vulnerable for SWB homeostatic breakdown given the mean score of SWB at the lower end and the nature of their life experiences. SWB homeostatic defeat may occur under the conditions of prolonged or recurrent stress or adverse factors as in the case of the present sample (recurrent floods). However, such homeostatic defeat is usually regulated through the process of adaptation, whereby cognitive buffers restore SWB levels to the normal range (Cummins, Gullone & Lau, 2002).

The analysis of domains of SWB showed that the level of satisfaction is significantly higher with the 'Personal Relationship' (M = 82.35, SD = 20.446), 'Community Connectedness' (M = 75.56, SD = 21.375) and 'Spirituality/Religion' (M = 88.89, SD = 17.836) domains of life

satisfaction in the present sample. However, the level of satisfaction is found to be relatively lower in the case of safety (*M* = 59.71, *SD* = 26.641), standard of living (M=60.39, SD=24.53), health (M=62.25, SD=24.07), and future security (M=62.35, SD=23.49). The present sample reported more satisfaction with their spiritual/religious aspects of life, personal relationships, and community connectedness. Repeated exposure to environmental stressors might lead to lower satisfaction levels in dimensions such as standard of living, safety, and security of life. This is a clear case of '*Domain Compensation'* where dissatisfaction with one or more life domains are compensated by higher satisfaction with other life domains in order to maintain SWB in the normative range (Best, et al., 2000).

5.5 SWB Homeostasis Model (Direct and Indirect Path Models)

Since ages, the concept of "Happiness" or SWB has continued to capture the attention of many people around the globe, that drives a long yearn for a way to measure it. A model proposed by Cummins, Gullone, and Lau (2002) shows the influence of personality, affect and positive cognitive biases/buffers as the regulating mechanisms of SWB. The model of SWB homeostasis states that the deviation of the level of SWB from the set-point level are regulated through the process of adaptation, whereby a set of cognitive buffers acts to restore SWB levels to a normal range (Cummins, Gullone & Lau, 2002). Cummins (2013) proposed that the SWB Homeostatic mechanism is comprised of two different kinds of buffers-*internal and external buffers*. The cognitive buffers are referred to as the internal buffers, whereas, wealth and personal relationships are considered to be the most powerful external buffers of SWB homeostasis (Cummins, 2013). In the present study, the SWB homeostasis model is extended to include external resource variables and flood-related stressors as additional predictors and resilience as an additional outcome variable. It was hypothesized that under the conditions of recurrent

stressors both the internal and external buffers/resources will be actively engaged in restoring and maintaining the level of SWB homeostasis and resilience.

A direct path model was tested to find out the major predictors of SWB and resilience and an indirect path model was tested to find out the mediating effect of internal/cognitive buffers between predictors (personality, affect, external buffers/resources) and outcomes (SWB and resilience). The variables were taken from two major theories, that is, SWB homeostasis theory and COR theory. The predictors of resilience will be discussed separately in the later sections.

5.5.1 Predictors of SWB (Direct Path Model)

The direct path model hypothesized that personality, affect, environmental stressors, external resources, and internal/cognitive buffers will significantly predict SWB. The results of the direct path model showed that four dimensions of personality (*extraversion, neuroticism, agreeableness, and openness)* emerged as significant predictors of SWB. Neuroticism negatively predicted SWB. A large volume of literature documented that personality is the key element in the sustained stability of the SWB homeostasis (Davern et. al., 2007; Gutierrez et. al., 2005). The present findings support the previous literatures where neuroticism was found to be a significant predictor of SWB along with extraversion (Davern et. al., 2007; Gutierrez et. al., 2005; Hayes & Joseph, 2003; Cummins, Gullone & Lau, 2002; Diener & Lucas, 1999). Studies have also documented a positive direction of association of openness and agreeableness with SWB (Henning, 2017; Soto, 2015). According to Cummins, Gullone and Lau (2002), personality is one of the strongest predictors of set point range for the entire homeostatic system of an individual as it provides a stable affective background.

Among the resource categories, *object and condition resources* turned out to be significant predictors of SWB. These findings confirm the previous literature suggesting wealth and personal relationship as the most powerful predictors of SWB (Tomyn et al., 2017; Cummins, 2013; Cummins, 2000). The previous findings hold strong support for factors external to the human being that also influences our SWB homeostatic mechanism such as,- money/wealth, close relationships and community connectedness and so on (Cummins, 2013; Jorgensen et. al., 2010; Cummins, 2007). The loss of these resources may significantly impact an individual's wellbeing (Halbesleben, Neveu, Paustian-Underdahl & Westman, 2014). According to Diener and Seligman (2004), happy and healthy social relationships are essential to well-being. The close relationships with mutual reciprocation of sharing and support are found to be the most powerful external buffer of SWB homeostasis (as cited in Cummins, 2007). A study conducted by Galinha et al. (2016) found that satisfaction with relationships is a significant predictor of SWB in India. These predictors help the victims to deal with the external adversities at the wake of such recurrent flood events by providing a sense of control. A sense of control over their external adversities decreases the environmental as well as psychological stressors which in turn help maintain their homeostatic equilibrium.

Of the three cognitive buffers, only *optimism and perceived control* were found to be the significant positive predictor of SWB. However, self-esteem failed to explain any significant variance in SWB among the recurrent flood victims. The existing literature documented optimism as a strong positive predictor of SWB as people high on optimism garner positive expectations of future and holds a positive outlook for life events (He et. al., 2013; Cummins, 2013). Optimism enhances the perceived ability to manage the after-effects of potentially stressful events (Cherry et. al., 2016; Prati & Pietrantoni, 2009) and thereby increasing one's perceived control.

Furthermore, negative affect is found to be a negative predictor of SWB. The previous literatures frequently documented affect as another stable significant predictor of SWB (Cummins, Gullane & Lau, 2002). The present study results showed negative affect as an important predictor of SWB with a negative direction of association. These findings indicated that the level of SWB increases with the decreased level of negative affect. The optimal state of SWB is often defined by lowered negative valence states and there is a host of study defining the link between negative affect with anxiety/depression (Burns & Machins, 2010; Vittersø, 2001).

Among all demographic variables, only *education* predicted SWB negatively. This seems to be a counterintuitive finding. However, this finding is relevant and reflects the situation of the present sample. It is possible that limited earnings due to lack of adequate income opportunities in these remote flood devastated areas despite having higher educational qualification may induce negative feelings hindering the level of SWB among the educated class. To a certain extent, an active reciprocity of education, income, and SWB may be a plausible reason for such an inverse relationship in the present study. Similar findings were reported by Tiliouine, Cummins, and Davern (2006) in Algeria; where they have found that people with no formal educational qualification scored the highest mean score of SWB. Among the flood-related environmental stressors, availability of safe shelter during the flood was found to be a significant positive indicator of SWB in the present sample.

5.5.2 Indirect Path Model of SWB

The indirect path model hypothesized that cognitive/internal buffers (optimism, perceived control, and self-esteem) will mediate the relationship between predictors (personality dimensions, affect, environmental stressors, and external resources) and SWB. These pathways were conceptualized based on the SWB homeostasis model which proposes that 1st order

determinants (personality and affect) and external resources influence 2nd order determinants (cognitive/internal buffers) which in turn determine SWB. The results of the indirect path model indicated that among the three internal/cognitive buffers only optimism is a significant mediator variable between personality traits (agreeableness, conscientiousness, and neuroticism), affect (positive and negative affect), resources (object resources and condition resources) and SWB. However, other two cognitive buffers (self-esteem and psychological control) did not mediate this relationship. This finding indicates that three cognitive buffers may play a significant role in maintaining SWB, but they may not have the equal unique contribution in predicting homeostatic equilibrium under different circumstances. The integrated model also indicated that both internal and external resources are crucial for the process of SWB homeostatic maintenance. Although, it is noteworthy that not all indicators included in the SWB homeostasis theory and COR theory contribute equally in restoring and maintaining the level of SWB in these recurrent flood survivors. It partially supported the SWB homeostasis model proposed by Cummins, Gullone, and Lau (2002). Testing of the integrated model provided insights into the dynamics of the SWB in terms of identifying the crucial factors responsible for the maintenance of SWB in the context of the present sample.

Findings of the other pathways of the model are by and large in line with the existing literature. For example, studies have shown that optimism shares a positive correlation with SWB as well as other positive psychological state of mind; whereas, this construct is negatively correlated with variables causing poor mental health or poor wellbeing such as neuroticism, anxiety and so on (Scheier & Carver, 1992). The previous studies often showed that the positive affect is a close associate of optimism (Marshall et. al., 1992). Studies also indicated that certain personality traits may help in predicting positive expectations about future occurrences, such as neuroticism was found to correlate negatively and agreeableness positively with optimism.

(Bastianello et. al., 2014). Furthermore, external resources such as money/wealth, close relationships also influence the optimistic outlook of an individual and found to be very powerful predictors of optimism and positive mental health. (Tomyn et al., 2017; Cummins, 2013; Segerstrom, 2007; Aspinwal & Richter, 1999; Hobfoll, 1989). The optimistic prospect further aids to the acquisition of additional resources (Alarcon, Bowling & Khazon, 2013; Hobfoll, 1989). The effective actions and persistence in pursuing their goals make an optimist more likely to accumulate resources over time (Segerstrom, 2007; Aspinwal& Richter, 1999; Hobfoll, 1989).

5.6 Predictors of Resilience (Direct Path Model)

The direct path model hypothesized that personality, affect, environmental stressors, external resources, and internal/cognitive buffers will significantly predict resilience. The analysis of the direct path model indicated age, condition resources and perceived control as the significant predictors of psychological resilience.

The current findings depicted age to be a significant positive predictor of psychological resilience. The existing literature also indicate that resilience is a dynamic process that changes over time as a function of development and interactions with the environment (Martinez-Marti & Ruch, 2016; Southwick et. al. 2014; Kim-Cohen & Turkewitz, 2012). In a study conducted by Bonanno et al. (2007) found that the people over 65 years of age were three times more likely to be resilient and less likely to have PTSD symptoms than the people under the age group of 18-24 years. Therefore, it is possible that psychological resilience increases along with an individual's growing age.

Among the external resource categories, condition resources emerged as a significant predictor of psychological resilience in the current sample. Condition resources include

conditions that are valued and sought after that involve relationships and status such as, being married, having a family, and work seniority and so on. Existing literature also supports that lack of conditioned resources such as lack of social support is often reported as a risk factor for negative mental health including depression and post-traumatic stress disorder (PTSD) (Bonanno et al., 2007; Brewin et al., 2000). Furthermore, literature also suggests that the resilient individuals are often skilled in construing social networks and seeking out social support during distress (Sharkansky et al., 2000; King et al., 1998; Gribble et al., 1993). Social support is often reported as one of the strongest predictors of the psychological resilience that foster recovery from distressing events over time (Meredith et al., 2011; Bonanno et al., 2007; Koenen et al., 2003).

The perceived control is found to be a major predictor of psychological resilience in the present study. According to Bandura's (1989) social cognitive theory, the most important determinant of behavioral and affective responses to highly stressful events is the individual's belief upon one's capacity to manage and control events in his/her life. The literature has often documented that the repeated exposure of uncontrollable, aversive events may result in chronic pathological emotional states such as anxiety and depression, among the victims (Rapee et al., 1996). One of the core causes of such subjective, behavioral and physiological symptoms of distress is found to be the lack of or lower level of perceived control (as cited in Rapee et al., 1996). According to Barlow (1998, 1991), the central cause of many emotional disorders such as anxiety and depression is the individual perception of the lack of perceived control over the negative events. Andrew and Debus (1978) suggested that the individual belief of control over setback encourages persistence. In a study conducted by Ullman et al., (2007) on 600 sexual assault survivors found that the survivors' perception of greater control over their recovery process was the protecting factor against PTSD. Another study showed that the perceived

control predicted positive changes in the mental health status in the Israeli recruits during a combat training period, and these positive changes were mediated by the reduced appraisal of threat, use of problem-solving and support-seeking strategies (Florian et al., 1995). The available shreds of evidence have indicated that perception of uncontrollability can cause decreased learning, low persistence and depressed affect (Rothbaum et al., 1982).

On the basis of the current findings it can be concluded that the resilience is an ever-evolving process that tends to differ and changes with an individual's growing age, strongly predicted by an individual's sense of perceived psychological control over distressing events, and enhanced by the social bonding specifically in the context of the present sample.

5.7 Indirect Path Model of Resilience

The indirect path model hypothesized that cognitive/internal buffers (optimism, perceived control, and self-esteem) will mediate the relationship between predictors (personality dimensions, affect, environmental stressors, and external resources) and resilience. According to Cummins and Wooden (2014), resilience is the power of psychological homeostasis/equilibrium, and hence it might be expected that higher level of these buffers may be associated with higher level of resilience. This postulation is partially supported in the present study as the mediation path analysis revealed that among the three cognitive buffers, only perceived control is a significant mediator variable between personality traits (neuroticism), Affect (positive and negative affect), external resources (object resources and energy resources), environmental stressors and 'resilience'. However, other two cognitive buffers (self-esteem and optimism) did not mediate this relationship. The present findings indicated that although cognitive buffers are positively correlated to psychological resilience, but they may not have their equal unique contribution in predicting resilience under different circumstances.

Research has indicated that individuals with average or higher levels of perceived psychological control are skilled at both manipulating the environmental conditions that suit their personal needs, as well as, are able to control their concurrent emotional reactions to the distressing external events (Heeps, 2000). This could be the key reason for the positive relationship of perceived control to resilience. Other pathways of the model also could be explained by the existing research findings. For example, the present analysis showed both positive and negative affect to be the significant predictors of perceived control. The previous studies showed that perceived control is often associated with decreased level of negative affect (Thompson et al., 1998) and increased level of positive affect (Heeps, 2000). The higher levels of negative affect are expected to be associated with a diminished sense of control over the external events in individuals reflecting high external locus of control (Chorpita, Brown, & Barlow, 2016; Clark, Watson, & Mineka, 1994). The results indicated neuroticism to be another significant negative predictor of perceived psychological control. The wide range of research findings often associated neuroticism with limited social skills and a tendency to avoid situations that demand active control strategies (Raja, Johns, & Ntalianis, 2004; Judge, Locke, Durham, 1997). The inherent exaggerated negative emotionality is often associated with a pervasive perception that the world is a dangerous and threatening place to live in, confirming a general sense of inadequacy and a lack of perceived control over salient events (Clark & Watson, 2008; Barlow et al., 2002; Goldberg, 1993). Heeps (2000) found that the relationship between perceived control (primary and secondary control) and negative affect can be explained in terms of the influence of the personality dimension of neuroticism, whereby, individuals are predisposed to the frequent negative feelings. The results also indicated that the condition and energy resources are the significant positive predictor of perceived psychological control. Hobfoll (1989, 2001) stated that people with higher stress resistance capacity often posit the

quality to conserve and maintain their resources. Resources such as perceived control, self-competence, self-admiration and social support help people cope with adversity and buffer against negative mental health consequences (as cited in Morelli, 2010).

5.8 Extension of SWB Homeostasis Model to Explain Resilience

The results of the proposed integrated theoretical model indicated that the determinants of SWB homeostasis theory can be extended to explain psychological resilience also. SWB and resilience shared a positive relationship with each other in the present sample. It was observed from the integrated model that almost the same categories of determinants of SWB could explain the mechanism of the maintenance of resilience. For example, In the case of SWB, 1st order determinants (personality dimensions of Neuroticism, agreeableness, and conscientiousness; positive and negative affect) and external resources (condition and object resources) significantly predicted 2nd order determinants (only optimism out of three cognitive/internal buffers) which in turn predicted SWB. However, in the case of resilience also, 1st order determinants (personality dimensions of neuroticism; positive and negative affect) and external resources (object and energy resources) significantly predicted 2nd order determinants (perceived control) which in turn predicted resilience. However, there were both common and unique predictors of SWB and resilience as well. At least, at the broader level, results of the present study seem to reveal that separate cognitive/internal buffers are responsible for maintaining SWB and resilience. Optimism seems to be the most significant internal buffer for maintaining SWB and perceived control seems to be the most significant internal buffer to maintain resilience. These findings will help us to explain the complex relationship between SWB and resilience.

5.9 Theoretical and Applied Implications of the Quantitative Study

This study provided crucial insights into the mechanisms of the internal and external factors maintaining SWB and resilience among the recurrent flood victims. These insights may have varied applied implications. It is clear that internal psychological buffers maintain SWB homeostasis within the normative range. However, various external factors such as environmental stressors and external resources may influence these internal buffers and lead to either breakdown or maintenance of SWB. In the integrated model, among the internal buffers, 'optimism' and 'psychological control' turned out to be the most significant psychological buffers maintaining SWB and resilience respectively. These internal buffers may be addressed in psychological intervention programs (such as counseling, therapies) for the vulnerable population who are at risk of homeostatic breakdown. The SWB measure is an important indicator of homeostatic breakdown and risk of depression (Cummins, 2007; Cook, 2003). Furthermore, external resources particularly object, condition, and energy resources were associated with internal buffers and SWB and resilience. These findings confirm that external resources such as income, material possession, knowledge, and social support could be very crucial factors for increasing SWB and resilience particularly for the underprivileged population such as victims of natural disasters. Interventions for these factors can be addressed by various agencies such as government bodies and NGOs.

This study has made some significant theoretical contributions. The results of the quantitative study supported the conceptual framework of SWB homeostasis theory and extended it by integrating conservation of resources theory and resilience. The present study revealed that the various external resource categories proposed by COR theory (object, condition, and energy resources) along with the 1st order (personality, affect) and 2nd order

determinants (cognitive/internal buffers) made significant contributions to both SWB and resilience. However, not all indicators included in the SWB homeostasis theory and COR theory contributes equally in restoring and maintaining the level of SWB and resilience in these recurrent flood survivors. Furthermore, it was observed that the SWB homeostasis model can be extended to explain psychological resilience. Thus, this study contributed in understanding the mechanisms to maintain both SWB homeostasis and resilience and provided insights into the complex relationship between both SWB and resilience specifically in the context of recurrent disaster victims.

Chapter 6

Study 2: Traditional Coping Strategies in the Context of Flood Related Disasters: A Qualitative Study in the Majuli Island

6.1 About the Study

A qualitative study was conducted to understand how the inhabitants of Majuli Island of Assam (a northeastern state of India) cope with recurrent flood-related stressors? Are there any traditional or culture-specific practices which help them to cope with such recurrent stressors?

The Majuli Island has multiethnic societies living within one homogenous culture, thriving and helping altogether to preserve, protect and propagate its Vaishnavite culture (Sahay& Roy, 2017). Apparently, cultural aspects of native history and flood-related experiences along with the values, beliefs and social milieus are often found to exert profound influences upon the applicability of certain approaches (Thieke, Mariani, Longfield, &Vanneuville, 2014). Almost every community has their unique indigenous knowledge and coping styles to deal with the flood hazards (Das, 2014; Thakuria, 2000). According to Das (2014), integrating the community perceptions of floods, local wisdom that has been passed through generations in oral traditions and their indigenous coping techniques with the advanced techno-managerial approaches may rather benefit the entire island to mitigate the flood hazards in a more effective way.

The inhabitants of the Majuli Island perceive floods as an imperative phenomenon of their life and thus have adapted to certain structural and non-structural coping mechanisms to

deal with these recurrent fluvial disasters (Katyaini, Baruah & Mili, 2012). An in-depth understanding of the traditional coping mechanisms is imperative for the disaster preparedness and post-disaster management as well as planning sensitive interventions to mitigate the adversity and ill mental and physical health conditions. Proper acknowledgment and preservation of the community-specific traditional/indigenous coping strategies can significantly contribute to culture and region specific relevant disaster mitigation programs (Fletcher et al., 2013).

Therefore, this study aims to explore various traditional coping strategies used by the inhabitants of Majuli Island in order to gain better insights into their adaptation process. In this connection, qualitative research can be helpful in understanding traditional and culture-specific knowledge systems by exploring the subjective worldviews of the participants.

6.2. Overview of Qualitative Research

According to Denzin and Lincoln (2000), qualitative research is an explanatory and realistic approach which enables, "Qualitative researchers study things in their natural settings, attempting to make sense of, or to interpret, phenomena in terms of the meanings people bring to them" (p.3). This kind of research design is most suitable for exploratory research that focuses on individual experiences and contextual knowledge (Kaushal, 2013). Some of the advantages of qualitative research are as follows:

The qualitative method primarily uses open-ended questions that may provide a platform to induce rich meaningful and culturally significant responses.

The quantitative analysis often provides the objectivity and generalizability of the data; whereas, the qualitative analysis helps to gain a deeper insight into the respondents' inner beliefs, values, attitudes, motivations, cultural aspects and so on (Kaushal, 2013).

It helps in exploring, identifying, understanding and further interpreting the complex facts of a particular situation that may obligate strong influence and its implications in a better manner (Kaushal, 2013; Healy & Perry, 2000).

The interviewer is not restricted by the rigid boundaries of the pre-set questionnaires which facilitates probing and follow-ups of unanticipated and valuable information (Kaushal, 2013; Kaplan & Maxwell, 1994).

In the present context, the qualitative analysis may help in understanding the underlying suffering, fears, behaviors, needs and various coping strategies of the survivors of the recurrent flood in a more articulated and comprehensive manner. This method of data analysis will provide a more flexible platform to acquire the detailed and culturally salient perspective of these recurrent victims.

6.3. Method

6.3.1. Participants

The qualitative study focused specifically on the population of Majuli Island. The participants residing in different severely flood-affected areas of the Majuli Island were selected for the interview. There were a total of 22 individuals participated in the qualitative interview, out of which 8 were females and 14 were males. The age ranged from 26-65 years. All the participants were the native inhabitants who were born and brought up in the Majuli island and belong to the

diverse ethnic background. One (1 male) of them was a doctorate degree holder, four (3 males, 1 female) of them were master degree holders, six of them were college graduates (4 males, 2 females), two (2 males) studied up to 12th standard, and nine (3 males and 6 female) of them had some high school education. The participants were from diverse professional involvement including the head priest (Satradhikar), Vaishnavite Priest (Bhakat), Professor, Teacher, NGO worker, Accredited Social Health Activist (ASHA), Fisherman, Farmer, Potter, and Housewife. The participants were chosen using the purposive sampling method. Each participant was provided with an information sheet briefing about the study, method, and confidentiality of the data provided.

6.3.2. Data Collection

A semi-structured interview schedule was designed for the qualitative study to explore various traditional and culture-specific coping mechanisms adopted by the target sample. An eight-item open-ended questionnaire has been constructed to assess the traditional and indigenous coping strategies. All the interviews were conducted in their home and approximately continued for around 60-90 minutes. After a brief rapport formation, interviews were initiated with open-ended and non-directive way with further probing if necessary. Most of the interviews were audio-recorded accept a few cases. Aside from the primary interview, observation of behavior and body language, informal talks and past researches were incorporated to ensure reliability and validity of the data collected (Hussain & Bhusan, 2010).

6.3.3. Data Analysis Procedure

All the interviews were transcribed verbatim. The thematic analysis was used to analyze the qualitative data. The thematic analysis is a widely used technique of qualitative data analysis

which implicates a process-oriented approach that identifies and code recurrent patterns and themes from searching through the data (Kaushal, 2013). According to Boyatzis (1998), a theme can be defined as "pattern found in information that at minimum describes and organizes the possible observations and at maximum interprets aspects of the phenomenon" (p.4). It is basically a qualitative data analysis technique that identifies, analyze and report patterns or themes contained by the data, minimally organizing yet describing the rich details interpreting the various facets of the research matter (Braun & Clarke, 2006). The analysis revolves around the themes that are crucial in describing and interpreting a phenomenon (Kaushal, 2013). The thematic analysis does not mandate upon any pre-requisite theoretical knowledge or approaches unlike grounded theory, discourse analysis, narrative analysis and so on and can be easily adapted to all kinds of qualitative data. The entire process of the thematic analysis is done in six phases that create established and meaningful patterns/themes (Kaushal, 2013; Braun & Clarke, 2006). According to Braun and Clarke (2006), the six phases of the thematic analysis are as follows,-

(i) Familiarizing with Data

The analysis starts with transcribed verbatim and writing down the initial notes based on repeated readings of the data.

(ii) Generating Initial Codes

The second phase is to generate initial codes; the most basic element of the raw data, that help identify significant features of the data in a systematic manner from the entire data set and assembling the data appropriate for each code.

(iii) Searching for Themes

In this phase, different codes are usually assembled to form a potential theme. A theme may be organized using the thematic map of visual depiction. The further exploration of the relationships between different codes and themes may be done where certain preliminary code may become a theme and other codes being the sub-themes and so on.

(iv) Reviewing of Themes

Once the themes are identified, the further refinement and reviewing of these themes may be essential. This phase is necessary to test the validity of the acquired themes with the corresponding data. The possibilities of assembling two or more themes or breaking down of existing themes are often apparent in this phase. After these further modifications of the themes, if the analysis does not provide complete information, then one has to go back to the original data to find out the missing information.

(v) Defining and Naming the Theme

After the satisfactory formation of the thematic map, each theme needs to be defined and further refined where the analysis focuses upon identifying the essence of each individual theme as well as overall themes and to outline the features of the data that set the basis for each of them. The themes should be non-overlapping and further analyzed to identify their sub-themes.

(vi) Report each Theme

This is the last phase where the final analysis and report writing is done. The reports should be abridged, comprehensible and based on the logical account of the data within and across themes. The write up should validate the themes with appropriate evidence. The themes can be

demonstrated with clear examples and direct statements of the participants. The report writing should include the comprehensive perspective of the research questions beyond the narrative of the data.

Chapter 7

Study 2: Results

The purpose of the qualitative study was to explore various traditional coping strategies used by the recurrent flood victims of Majuli Island who have been facilitating short and long-term adaptation during and after the floods. The Majuli Island consists of a well-knit community with rich cultural and traditional heritage of knowledge and skills. Consequently, it provided a rare opportunity to study and explore the role of traditional coping strategies in adaptation to recurrent floods. The people of Majuli Island over the years developed and applied their own local and traditional knowledge and skills to deal with recurrent floods every year. This could be one of the main reasons for their survival and successful adaptation. Most of their coping strategies are based on their past experiences and the age-old traditional knowledge and tactics that have passed through generations. Some of them are also based on modern scientific knowledge and technologies. Understanding of these coping strategies may provide insights into the use of these strategies for intervention and recovery of the community.

7.1 Traditional Coping Strategies to Floods

The result of the study clearly revealed that various traditional knowledge and skills play a vital role in the adaptation process of the recurrent flood victims of Majuli Island. A brief summary of the traditional coping strategies are depicted in the following diagram (Fig. 7.1) followed by their description-

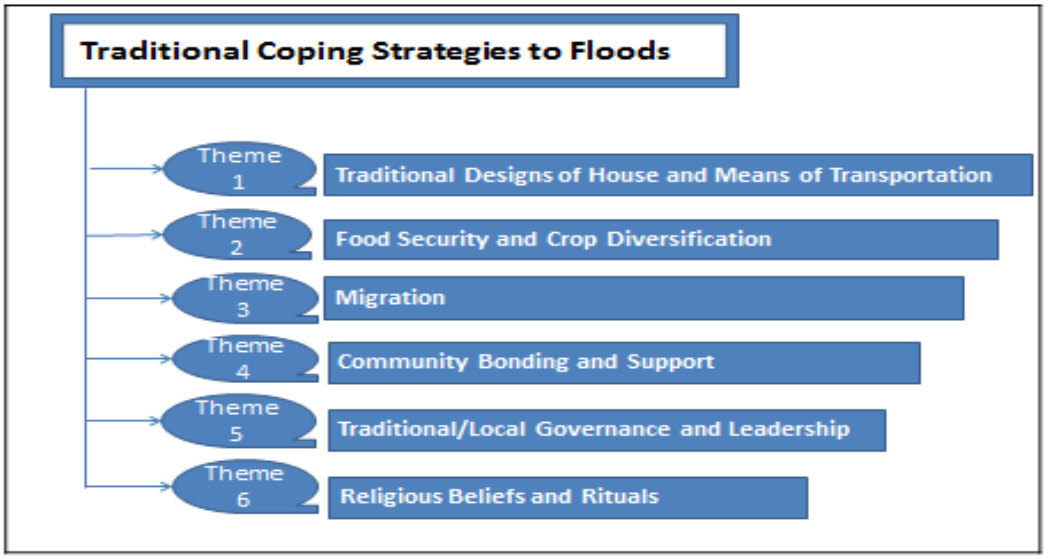

Figure 7.1. Diagrammatic representation of sub-themes of the Traditional Coping Strategies.

7.1.1 Traditional Designs of House and Means of Transportation

Safety needs are the most basic needs of human being. During floods, relocating to safe places is the foremost concern of the survivors. Although, it is not always possible for everybody to relocate from their houses to safe places due to lack of sufficient available safe spaces and difficulty in transportation. Therefore, the people of this island use their ancestral knowledge to cope up with such difficulties.

Most of the participants reported that they build 'Chang Ghar' (Stilt houses), approximately 7-15 feet above the ground level so that the flood water cannot enter into their houses easily. Apart from these stilt houses, they also prepare adjustable 'Chang' (platform) made of bamboo and wooden planks which save them during high flood conditions when even their stilt houses are flooded. They manage to stay in that adjustable changes build within their Chang ghars, which help them to save themselves from the flood water without relocating to

other places. Likewise, many build ‘Chang' (Platform) and ‘Bor-Chang’ (Big Platform) made of bamboo, cane and wooden planks at a height from the ground level where they keep all their necessary stuff to be used during floods such as grocery, clothes, medicines, gas stove and so on prior to the occurrence of flood events. As the flood water hit their houses, they immediately shift to these high raised platforms (Chang and Bor-Chang) that save them from the fluvial destructions. However, now-a-days, some people are adopting the modern technologies and build (one/two) rooms of concrete structures with high raised plinths where they can shelter themselves during flood without relocating to other places and prevent flood-related damages to some extent. Many people even make their animal shelters with high raised plinth structures so as to save them from the flood. These applied safety measures are quite apparent from the following narratives-

One of the participants said, *“Our Chang ghar is an effective way of coping with floods. Moreover, we build adjustable Changs within our houses to deal with the high flood condition. The Chang ghar and the adjustable changes are explicit to the Mishing community”.*

Another participant said, *“We build fix changs and bor-changs at a height from the ground where all the necessary goods are kept before floods so that we can shift to these changs immediately as the flood water enters our houses”.*

Furthermore, most of the places of the Majuli Island get disconnected during floods. The means of transportation becomes a severe problem. Most of the participants reported that they use their traditional knowledge and skills to overcome this problem as well. They use the locally made banana rafts, bamboo boats, county boats (small wooden boats) for transportation. Almost,

(Photo: Chang Ghar, High-raised plateform, Bor-Chang)

every person regardless of their gender knows how to swim and sail a boat so that they can help themselves as well as others in need during crisis. For example, one respondent reported,

"People of Majuli are not scared of floods as they grow up playing with the river. Almost every person knows the basic skills of swimming and sailing a boat that help them during a crisis. Nearly every household owns a boat. Those who do not own a boat makes bamboo or banana rafts to transport during floods".

7.1.2 Food Security and Crop Diversification

The people of Majuli Island have been facing food security issues due to recurrent floods and soil erosion. Most of the participants reported that their traditional ways of agriculture and preserving food is helping them at least partially to cope with the issue of food security.

One of the major adverse side effects of the recurrent floods is the damage of agricultural produces. Almost every year floods severely damage the paddy fields by destroying the crops and by sand siltation. The major source of livelihood of the people of the Majuli Island is the agricultural production, especially rice, potatoes and green peas cultivation. But many of its agricultural land area have already been eroded away by the majestic river Brahmaputra and the majority of the remaining croplands are sand silted. Sand siltation turns the fertile croplands into barren sandbars. According to the local people, it took at least 5-7 years to make the land cultivable. Therefore, these people have adapted crop diversification as an alternative way of coping strategy against the destructive floods. People living in high sand silted areas have started the mustard cultivation, while people living in low sand silted areas started cultivating two seasonal crops instead of one in a year. One of the respondents from the Dhapak village said,

"Paddy fields are destroyed by the floods and people have to wait for the next year cultivation. Therefore, people here usually cultivate two seasonal crops rather than depending on a single one so as to surplus the losses incurred during floods".

The Pohardia village of the Majuli Island once considered to be the storehouse of agricultural produces, has also been eroded away by the recurrent floods. However, some people are still residing in the remaining area of this village. One of the participants from the Pohardia village said,

"In these sandbars, very limited crops can be cultivated such as mustard, melon etc. Many of us have adapted to the mustard cultivation to mitigate the loss of these recurrent floods".

The inhabitants of Majuli Island are also trying to use their traditional knowledge to prevent the preliminary flood erosion. According to the local beliefs, certain riverine plants help erosion prevention to some extent such as, 'Ikora', 'Nol-khagori', 'Birina', 'Jhao-Bon' (Tamarix Dioica) and so on. On the other hand, according to some indigenous practice, the bamboo trees are the best cure for the barren sandbars or the sand silted lands which over the time turns it habitable as well as cultivable. In this direction, one of the participants narrated,

"Although we lack scientific evidence, it is our indigenous knowledge and experience that give us the expertise in initial erosion prevention and to make a barren sandbar cultivable. Certain riverside wild plants like 'Jhao-Bon, 'Ikora', 'Nol-khagori' and bamboos are to name some of these plants that are beneficial for flood-prone areas".

All the participants reported that the scarcity of food is one of the major problems they face during the flood. In order to lessen this problem, most of the inhabitants of the island store

dry food items that can last long enough for their survival. Apart from the storage of minimal grocery items, some communities use their age-old traditional practices of food hoarding to be used during difficult times. For example, the Mishing community stores dry foods like dry fish and dry meat, which is also a good source of protein, to be used during floods. Likewise, 'Sesu laddoos' are very common among the Bengali community; which is prepared from 'Sesu' a weed-like plant seed that is very light weighted. These laddoos (Indian sweet balls) are prepared with sesu seeds and jaggery which is a very good source of energy and easy to carry with. In this connection, one participant reported-

"We depend largely on various dry foods during floods as there are no ways that we can go out and buy other stuff. It is a traditional process of hoarding food. These dry fish and meat can be preserved for a longer period in the normal room temperature as they are slowly dried in wood fires which take out the moisture completely and make it dry".

Another participant said, *"We make these sasu laddoos as it is very light weighted and easy to carry with. These are quite filling, can withstand hunger for a longer period of time and cost effective as well'.*

7.1.3 Migration

The local inhabitants of the Majuli Island also use migration as a mode of coping strategy to deal with floods. These migrations could be voluntary or involuntary in nature. It can be within the Majuli Island or outside the periphery of this island districts. The government of Assam has come up with the policy to relocate the flood victims who have lost everything in flood, especially property, to another place usually outside Majuli, to its nearby districts such as Jorhat, Sivasagar, Golaghat and so on. This is the involuntary migration planned solely by the

government agencies to relocate the homeless flood survivors where the entire village is eroded away by the floodwater. In the voluntary migration, the victims themselves decide to migrate from one place to another to avoid the severe recurrent flood hazards and the migration can be within or outside the Majuli island. Many people are found to have migrated already twice or thrice within the island to avoid the severe damage of these recurrent floods. Although, in most of the cases, these migrants do not own any kind of land pattas (legal document of land ownership) and such settlements were initially on a temporary basis where most of them have settled permanently. That is why these migrants also suffer from a threat of official abolishment at any point of time in future. However, it is noteworthy that, many people who had involuntary outmigration and was relocated to different places outside Majuli have come back to resettle within the island again. According to them, a strong sense of belongingness and to protect its rich traditional heritage culture has brought them back to continue living on the island despite many severe hardships.

A participant from the Pohardia village said, *"After the erosion of our village, we were relocated in Jorhat district by the government bodies. But many of us had sold off those lands and resettled here in the small remaining area of the Pohardia village. This is our motherland and we will try our best to save this island and our precious heritage culture".*

7.1.4 Community Bonding and Support

The participants of this study narrated the role of strong family and community bonding and support system in coping with floods. During floods, people staying in a village and nearby areas come forward to help each other. People regardless of their caste, creed, religion and community come together to deal with the flood hazards. Community support and bonding are found to be an important mode of coping among these recurrent flood victims which gives them

a sense of security and hope. The feeling that they are not alone to face the hardship and their family, friends, neighbors, and others are there to help and support them creates a strong sense of optimism and hope. Although in Majuli island people follow a strong caste hierarchy. But, despite that, they all get united to deal with floods. This family and community bonding builds a natural sense of resilience at the face of floods. The following narratives provide evidence of such shared community bonding and support. One of the respondents said,

"People from different caste, creed and religion come together to help each other during crises. We all get united and help each other. It is not only the human beings but we have witnessed reptiles, ferocious animals and others such as snake, needle, frog, deer, rat, and fox taking shelter at the same place without harming each other during floods. It is a classic example of unity, being more humane, and a good learning lesson for all the human civilization".

Another participant added, *"We all come together to help each other as much as we can because everybody is almost in the same condition. However, the physical presence and support of our family, friends and villagers help us to calm down, be perseverant and arrange for alternatives to minimize the flood-related atrocities. Our bonding and support help us boost our mental strength and hope even though we hardly get any help from other agencies".*

One more participant added, *"We may not be able to help each other with materialistic needs immediately but can speak a few words of support and courage to help them mentally. Our physical presence and the words of encouragement are very important to increase their psychological strength".*

7.1.5 Traditional/Local Governance and Leadership

There is a strong traditional local governance system in Majuli Island. The traditional and local governance and leadership systems are also found to be an essential part of the coping strategies. These traditional governance structures of village heads, key leaders and some significant people (especially the head priest) are a crucial and active part of village life that plays a significant role in flood hazard management and adaptation process. The village heads and local leaders use their traditional networks to share information about disaster warnings, flood-related coping strategies and also help them during floods with their basic needs. The following narratives signify the importance of local governance systems. A local leader from the Dhapak village, a Mishing community village, shared,

"Because of the lack of proper awareness, people face a lot of hassles during floods. We often arrange some awareness programs among our villagers to make them aware of the basic prevention techniques to ward off the severe aftereffects of floods".

Another participant said, *"The Satra (Monasteries) and the Satradhikar (Monastery head priests) play an important role in helping people during floods. The Satradhikar and their disciples try to visit the severely flood-affected areas to distribute grocery, and clothes from the satras as much as they can".*

Apart from the existing leaders, many past influential leaders such as Late Sanjay Ghosh are a major source of inspiration in the lives of inhabitants of Majuli Island. Late Sanjay Ghosh was an Indian rural development activist, hailing originally from Kolkata, India died in 1997. From almost all the narratives it was quite apparent that these flood survivors regardless of their caste, creed and religion was highly influenced by the leadership of Late Sanjay Ghosh. His

teachings are still actively followed by these recurrent flood victims. According to the participants, he introduced the scientific knowledge of using strategic flood prevention techniques among these common people.

His influence is quite evident in the following narratives,-

"Had we have Late Sanjay Ghosh alive today, the Majuli would have been a different place altogether. He gave us the insight that we are not dependent on any external agencies to help ourselves. We, the people of Majuli, are capable enough to save our land and our precious heritage culture. He introduced many simple scientific techniques which we can do to mitigate the flood hazard to a great extent. He had a different kind of vision and attachment to this island. We still get the strength from his footsteps, although we are not completely successful but we are determined to deal with it".

Another participant said, *"Sanjay Ghosh was our mentor who guided us to make us realize our inner potential. He was an ideal leader and was a true well-wisher of Majuli Island. He not only showed us many techniques of erosion prevention but also worked himself in the erosion sites. That is how he encouraged thousands of local people to join hands with him for that noble cause. We will always admire him and follow his teachings".*

7.1.6 Religious Beliefs and Rituals

The Majuli Island is considered to be the hub of Assamese Vaishnavite culture (worshiper of Lord Vishnu and his various forms) and home to many Vaishnavite monasteries (Satras). The Satriya culture is a gift of the revered saint Sri Sri Sankardeva and his disciple Sri Sri Madhavdeva. This age-old tradition of Satriya culture is still carefully preserved in these Vaishnavite monasteries called Satras. Satriya culture is a rare combination of prayers, music,

performing art forms accompanied by many local instruments. Four of these Monasteries are considered to be the main satras,- Auniati, Dakhinpat, Gadamudh, and Kamalabari- each one is a treasure house of Satriya culture (Sharma & Singh, 2016).

It was very clear from the narratives of the participants that religious beliefs and rituals are an important source of coping strategy at the face of disasters. The people of the Majuli Island have immense faith in God and the teachings of these Satras. There is a common belief among the localities that as long as these Satras are there in Majuli, the island cannot extinct completely. Such unique belief systems and the performance of certain religious rituals make them distinct from the other flood victims in the rest of Assam.

There is a strong belief that worshiping and offering '*Pooja and Bhog*' to river Brahmaputra with proper rituals stops erosion in severe erosion-affected areas. This worshiping (pooja) is an age-old tradition that has been performed in many places including Pohardia village, Dakhinpat area, Benganaati area and so on. According to the local people, after this river worship, the river drastically changes its stream and erosion is either prevented to a great extent or totally stopped. Such incidences further enhance their faith over Satras and their charismatic powers. This kind of belief is quite evident in the following narratives,-

(Photo: Satriya Cultural Practices)

One of the priests of the Dakhinpat Satra said, *"We all have a strong belief that as long as 'Jadurai' (a form of Lord Vishnu) is here, the 'Dakhinpat Satra' is here; Majuli is protected, it cannot be eroded away completely. There is a relation between the Dakhinpat Satra and the river Brahmaputra. Only our Satra has the 'Bidhi'(Rituals written in a book) of the 'Baba Brahmaputra Pooja' (Brahmaputra worship). We along with our Satradhikar (Head Priest) go to different places on request to offer 'Brahmaputra Pooja' where erosion takes a severe toll. I, myself, had been to many places to offer the pooja with proper rituals".*

Apart from the Brahmaputra worship, Satriya rituals and festivals play an important role in coping with the devastating aftereffects of floods. The flood usually hit the area during April-May and last till August-September. Immediately after the floods a series of religious and cultural festivals take place where most of the people actively participate. These festivals include varieties of activities such as dance, drama, music, rituals and so on. These festivals are very popular and even attract tourists from all over the world. Continuous hymns of prayers, practice sessions of dance drama along with local instruments (such as khul, taal, kaah, Mridanga, dhol, Doba, flute) turns the entire place into a different world that is full of life, good spirit, and cheerfulness. People, often forget their sufferings of the past disaster and gets involved into these series of religious and cultural festivals that brings along new hope, optimism, enthusiasm, and zest which indeed help them to prepare for the next flood season with a sense of confidence and zeal.

The Satradhikar (Head priest) of the Auniati Satra said, *"Even after floods, people with their complete allegiance, devotion, and enthusiasm, take part in the religious and cultural events followed thereafter. It creates a sense of stability and optimism. People thrive mentally as well as intellectually forgetting their past sufferings after being a part of these festivals. Leaving*

apart the grief, jolt, and sufferings, people with their full enthusiasm and zest take part to celebrate the cultural festivals and yet prepare for the alleged upcoming danger".

Many of the victims try to associate their loss of resources with religious explanations which tend to reduce their guilt and helplessness feelings. Through their faith and with the help of these religious festivals these recurrent flood victims go through a process of building resilience and maintenance of mental equilibrium even after such repeated hardships.

One of the Participant from the Khurahula village said, *"God has given us everything, and he has taken it back from us. When the proper time comes, he will again give us back what we deserve. We don't need to worry about that and we are happy with whatever minimum we have with us".*

Another Participant said, *"People of Majuli are enriched with spiritual and moral teachings. The spiritual thoughtfulness and religious beliefs are the core of our coping mechanism, not only during floods but in any situation in life".*

Therefore, it is very clear that the priests and monasteries play an important role during floods in Majuli Island. Priests and monasteries act as key agents in providing counseling and psychosocial support to the flood victims and their families. It is very clear from the narratives that these faith-based leaders and institutions are one of the major factors that help the victims to build resilience at the face of adversity.

Chapter 8

Study 2: Discussion

The island of Majuli, the largest freshwater river island of the world, located in the upper Brahmaputra valley; is surrounded by a complex geographical edifice of sedimentary formation and triennial sandstone which makes it more prone to disaster-related hazards (Das, 2014). The Archaeological Survey of India (2005) stated, "The landscape is characterized in geo-tectonic discourse as vulnerable and particularly susceptible to the tectonic hazards posed by plate movements and the hydraulic ebb and flow of the Brahmaputra and its tributaries" (as cited in Das, 2014, p.3). The recurrent floods often threaten the basic psychosocial needs of its survivors. The analysis of the narratives reveals some of the most primary immediate needs that include the need for food, pure drinking water, availability of a safe shelter, sanitation, hygiene and medical facilities, cleanliness programs and means of transportation.

The limited availability of the safe shelters forces the flood victims to remain in the flooded areas which highly threaten their physical safety. Some of these people manage to shift to their nearby embankments, schools or community halls during high flood conditions. Limited food and lack of pure drinking water make the condition even worse. Along with the most basic requirements of food, pure drinking water and a safe place where they can shelter themselves, arises the immediate need for hygiene and sanitation. Lack of pure drinking water and unhygienic sanitation sewages often exacerbates multiple health issues including viral fever, vomiting, malaria, gastroenteritis, stomach infections, diarrhea, dysentery and so on (Hazarika, 2006). Therefore, an urgent need for medical facility arises to treat the victims. Many of these victims reported that people often die due to lack of proper medical treatment during and after

floods rather than drowning. During floods, diseases of foot-and-mouth, bovine diarrhea, and even hemorrhagic septicemia may take an epidemic form killing hundreds of cattle and other animals where lack of assistance from the veterinary section makes the condition miserable (Hazarika, 2006). Floods disrupt most of the transportation system making it impossible at times to get through the basic services of flood relief or medical facilities. The broken dams, embankments, bridges, roads severely affect the entire transportation system for a much longer period even after floods.

Apart from the severe floods, this island has been facing land erosion at a threatening rate especially after the massive earthquake of 1950 in Assam and Tibet (Sahay, 2017; Katyaini, Baruah, & Mili, 2012). The epicenter of the earthquake was the Brahmaputra valley with a recorded magnitude of 8.6 which elevated the entire north-eastern valley by 3 to 4 meters; causing unpredictable and severe floods even in areas where previously flood never occurred along with erosion and siltation (Sahay & Roy, 2017; Katyaini, Baruah, & Mili, 2012). The land erosion in the Majuli Island has taken a toll on its inhabitants where the agricultural livelihood is the most severely affected along with other sectors. The recent estimation of the total land area of the Majuli Island revealed that it has reduced to 352 square kilometers only ('Majuli', n.d.).

Despite encountering recurrent floods and adversities every year, the inhabitants of the Majuli Island are able to adapt and maintain their well-being at the face of recurrent floods. One of the main reasons of their survival and successful adaptation could be the use of traditional coping strategies which are passed down from generation to generation to deal with the recurrent floods. The Qualitative study explored various traditional coping strategies used by the recurrent flood victims of Majuli Island that have been facilitating short and long-term adaptation during

and after the floods. This study clearly revealed the role and importance of traditional knowledge systems and skills in adaptation to flood-related disasters.

This island is of a kind which has multiethnic societies living within one homogenous culture, thriving and helping altogether to preserve, protect and propagate its Vaishnavite culture (Sahay & Roy, 2017). Apparently, cultural aspects of native history and flood-related experiences along with the values, beliefs and social milieus are often found to exert profound influences upon the applicability of certain approaches (Thieke, Mariani, Longfield, & Vanneuville, 2014). Almost every community has their unique indigenous knowledge and coping styles to deal with the flood hazards (Das, 2014; Thakuria, 2000). According to Das (2014), the phenomenon of flooding cannot be solely understood based upon the techno-managerial approaches as the remote sensing visual perceptions may provide a false synoptic impression of the ecological changes. Integrating the community perceptions of floods, local wisdom that has been passed through generations in oral traditions and their indigenous coping techniques with the advanced techno-managerial approaches may rather benefit the entire island to mitigate the flood hazards in a more effective way (Das, 2014; Fletcher et al., 2013).

The communities living in disaster-prone areas often found to have a treasure of their own body of knowledge of early signs of disaster warnings, disaster preparedness and responses as well as post-disaster recovery. Such collective knowledge of disaster prevention and mitigation is acquired through their cumulative experiences and age-old indigenous knowledge that has been passed through generations (Garai, 2016; Fletchner et al., 2013; Pareek & Trivedi, 2011). The applicability of such diverse traditional knowledge is often an exclusive phenomenon of the specific domain of people that developed it (Fletchner et al., 2013; Pareek & Trivedi, 2011). Such traditional strategies can be managed without any external help or support and are

fundamentally scientific in nature (Bordoloi & Muzaddadi, 2015). Over centuries, the local inhabitants of the Majuli Island have developed their own ways of detecting early signs of flood, and ways to deal with it on the basis of their observations and experiences. These inhabitants use various signs of celestial changes (position of the Moon and rainbow), different plant and crop production, wind directions, cloud formation and its colour, soil sediments with the river flow and certain behaviors of animals, birds and insects to detect the early signs of flood and prepare accordingly for the upcoming disaster (Bordoloi & Muzaddadi, 2015; Dey, 2012, Srivastava, 2010).

The inhabitants of the Majuli Island perceive floods as an imperative phenomenon of their life and thus have adapted to certain structural and non-structural coping mechanisms to deal with these recurrent fluvial disasters (Katyaini, Baruah, & Mili, 2012). Some of these structural adaptation strategies are specific to particular communities. The Mishing community's ‘Chang-ghar' (Stilt houses) is considered to be one of the most effective structural adaptations to floods (Dey, 2012). The locally made banana and bamboo rafts, county boats are the most common and major means of transportation during floods (Katyaini, Baruah & Mili, 2012; Hazarika, 2006). Almost every household is trained in sailing boats and swimming.

The various kinds of traditional knowledge systems serve to detect the early signs/warnings of floods helping the communities to prepare for the upcoming disaster with their traditional disaster management techniques. These traditional early warning systems play an important role in flood preparedness in absence of proper scientific early warning systems (Bordoloi & Muzaddadi, 2015). Although, the major difficulty with these indigenous knowledge systems is that as they are based upon relative native experiences, which lack benchmark to be synchronized and combined into the conventional weather forecasting system (Pareek & Trivedi,

2011). However, these traditional knowledge strategies, if properly acknowledged and preserved, can be of significant help in forming culturally relevant effective disaster mitigation programs and risk reduction.

The inhabitants of the disaster-prone areas usually store foods following their traditional practices of food hoarding which help them during disasters (Fletcher et al., 2013). The northeast Indian traditional practices of preparing processed foods are closely related to their socio-cultural and ecological environment, food security, ethics, spiritual life, nutrition, and health habits (Singh, Singh & Sureja, 2007). The preserved foods are also a delicacy of Northeastern cuisine and are an age-old practice in Assam (Bhuyan, 2016). Many communities of the Majuli Island use dry foods, cold storages and granaries to withstand the food scarcity during floods (Katyaini, Baruah, & Mili, 2012).

The agriculture is a major source of livelihood in the Majuli Island and agricultural diversification has been extensively used as an alternative coping strategy to minimize the flood-related agricultural damages (Nath 2015; Dey, 2012; Katyaini, Baruah, & Mili, 2012). The inhabitants of the Majuli island practice four different kinds of paddy cultivation,- ‘Sali' (Winter paddy), ‘Ahu' (Autumn paddy), ‘Boro' (Summer paddy) and ‘Bao Dhan' (Deep-water paddy) (Hazarika, 2006). The autumn paddy (Ahu) is considered as a non-flood season crop that helps to compensate for the flood-related agricultural losses (Saikia, 2015). The ‘Baodhan' (Deep-water paddy) cultivation requires water profusion and hence can be cultivated in low-lying flood inundated areas where no other paddy cultivation can be done. The island, despite heavy floods and land erosion, is known for its agricultural productions of paddy (Sali, Baodhan, Ahu), a variety of pulses (Blackgram, Greengram, peas), potatoes, mustard, sugarcane, garlic and other vegetables (Nath, 2015). Some of the local inhabitants have adopted the sunflower, mustard,

potato or melon cultivation in sand silted areas where no other crops can be cultivated. People usually cultivate sugarcane, arum, garlic, and son on in the ‘Chapori' (Small Sandy islets) areas (Saikia, 2015). Such systematic and indigenous crop diversification strategies help them to mitigate the agricultural damage to some extent (Dey, 2012; Katyaini, Baruah, & Mili, 2012; Hazarika, 2006).

Unlike other peninsular rivers in India, the river Brahmaputra does not have a well-developed profile which eventually leads to continuous shifts of its course. The Brahmaputra is an extensively braided river in India that forms multiple channels merging around a number of mid-channel and sandbars, locally known as ‘Chars' and ‘Chaporis’ where the most of them are transient in nature which drastically changes their geometry and location usually after high floods (Sahay& Roy, 2017; Saharia et al., 2013; Goswami, 2008). The river shows high recurrent variability in its flow, channel pattern and sediment transport thus making unpredictable damages in different areas (Sahay& Roy, 2017; Saharia et al., 2013). The continuous land erosion has forced many ‘Satras’ and affluent villages of the Majuli Island to shift from their original places. According to the official reports, many affluent villages like Solmora, Lahkar, Ratanpur, Chinatoli on the eastern side and almost entire Ahataguri circle including Karatipar village of the western side has already been eroded away by the majestic river Brahmaputra within a span of last sixty years (Nath, 2015). For its inhabitants, both in and out-migration has become an important mode of coping strategy to deal with flood and erosion. Specifically, after the high floods of 1962, many families have voluntarily out-migrated to the nearby districts such as Lakhimpur, Jorhat, Golaghat, Sivasagar, Dibrugarh, and many other places of Assam-Nagaland border (Nath, 2015). The government authorities, at their local level, are trying to resettle the uprooted flood devastated families in the nearby areas either within Majuli or outside the island. The compensation provided by the higher authorities to these

people are not satisfactory as many families that lost almost 20 ‘Bighas' (1 Bigha=1,340 sq. km. in Assam) of land have been provided with only one ‘Bigha' land each (Sahay, 2017). According to Sahay (2017), “Since 1969, around 10,233 families have been resettled, but for an island where about 150-300 or more families are being uprooted every year for the past 60 years, it is shockingly inadequate” (p.27).

The displacements due to disasters have deep life-altering consequences including, increased financial crisis, loss of property and infrastructure, malnutrition, psycho-social ill-health and migration increasing the chances of social disparity and conflict (Chetia, 2017; Niazi, 2009). According to Osuret et al., (2016), the relocation of the displaced population after a disaster is not a long-term sustainable strategy as many of these victims often return to their at-risk areas. Some of the previous literature suggest that place attachment may reduce the risk perception at times making people more vulnerable to the disaster (Dominicis et al., 2015). Many communities are found to have a strong sense of cultural attachments to their native places that affect their disaster risk perceptions (Osuret et al., 2016). However, poor financial conditions, inadequate housing structure, informal migration settlements also increase the vulnerability of the at-risk population (Osuret et al., 2016; Dominicis et al., 2015; Zou & Wei, 2010).

The social support system is found to be one of the most influential coping mechanisms among the inhabitants of the Majuli Island. A strong community bonding and support from the extended family members are one of the most essential needs for the disaster-related effective coping (Fletcher et al., 2013). The social attachment is a crucial phenomenon during a crisis which helps provide comfort to the victims with the physical and psychological presence of supportive others and closed ones encouraging people to overcome threats and obstacles during

distress (Fernandes, Boehs & Heidemann, 2013; Mikulincer & Shaver, 2008). The social interactions often provide individuals with socially supportive networks of relationships that are affectionate, caring and readily available at the time of crises (Ibanez et al., 2003; Hobfoll & Stokes, 1988). Yet, when the disasters strike communities as a whole, their pre-existing social support networks are often disrupted as the social resources become the victims themselves (Cui & Sim, 2017; Ibanez et al., 2004; Kaniasty & Norris, 1997). It is quite evident in some works of literature that the disaster victims often share a united cordial bonding of mutual help and support based upon their knowledge and experiences that temporarily pull apart class, race, ethnic diversities and social barriers (Ibanez et al., 2004; Eranen & Liebkind, 1993).

The narratives of the participants revealed that the survivors typically rely upon their traditional governance systems during crisis conditions. These informal local governance systems play an important role in disaster preparedness and mitigation programs. Such local governance systems have strong collective aspect emphasizing community collaboration, unity, synchronization, and deployment of social networks for effective community-specific services and disaster survival planning (Mathbor, 2007). Every community has the potential strength of unique adaptation capacity to function effectively in the aftermath of disasters where their native governance structure plays a vital role (Fletcher et al., 2013; Norris et al., 2007). The traditional governance structures are an active part of the village life that plays an important role in disaster management by educating people, organizing local disaster mitigation strategy training or sharing information of disaster warnings through their native traditional networking systems (Fletcher et al., 2013).

The inhabitants of the Majuli Island are known for their religious faith and involvement in spiritual practices and religious festivals. Engaging in spiritual and religious rituals and

festivals also play a predominant role in psychosocial healing and to avert distressing memories of these recurrent flood victims. The head priests of the 'Satra' and their disciples play a key role in providing psychosocial support to the survivors and their affected families through the means of spirituality and providing material aids as much as possible. The previous literature have often documented that engaging in religious activities, finding meaning and making sense of negative stressful events through religious guidelines help people increase their mental strength, confidence and psychological resilience and wellbeing (Garai, 2016; Hussain & Bhusan, 2010).

Conclusions and Implications of the Qualitative Study

The qualitative study clearly reveals the role and importance of various traditional knowledge and cultural values in adaptation to natural disasters particularly floods. It was evident that these traditional knowledge systems are an important part of the life of the inhabitants of Majuli Island and plays a significant role in their adaptation and identity. Therefore, it is essential that these knowledge systems are preserved and promoted and should be emphasized in effective disaster mitigation programs. Following are some of the implications of the findings in terms of disaster preparedness and mitigation programs.

This study showed that crop diversification is at least partially solving the issue of food security and agricultural losses due to floods. The Majuli Island is a naturally fertile landscape suitable for agronomic productions. Agencies may help in the strategic planning and agronomic training programs in integrated farming and crop diversification including techniques to preserve seed/seedlings, selection of crops, crop rotation and so on along with their indigenous crop diversification practices. This will certainly benefit the farmers by decreasing flood-related agricultural losses and help attain financial gains. Furthermore, traditional food preservation and

processing techniques should be properly acknowledged as it can help withstand starvation and may offer a good opportunity for livelihood diversification as well.

This study identified traditional and local governance and leadership as a key facilitator in adaptation during floods. The village heads and local leaders use their traditional networks to share information on disaster warnings, flood-related coping strategies and also help them during floods with their basic needs. Integration of political and traditional governance system can be an important step in disaster preparedness and mitigation programs. A formal recognition and integration of the traditional governance structure with the government authorities, stakeholder and NGOs may provide a better platform for disaster preparedness and mitigation planning programs.

Religious beliefs and rituals are an important source of coping strategy at the face of disasters. The people of the Majuli Island have immense faith in God and the teachings of Satras. Therefore, faith-based counseling and intervention can be used for promoting mental health and well-being. The religious and faith-based social systems for post-disaster recovery and to build resilience among the community members against the devastating recurrent floods may certainly ensure long lasting positive effect. The ‘Satra' and their role in native community life and in emergency situations need to be understood and incorporated in the post-disaster psychosocial interventions as well as to formulate effective policy implications.

The government agencies have invested in many short and long-term disaster mitigation planning programs for the Majuli Island. Every disaster has different characteristics and varies in the extent of destruction. A systematic inclusion of these traditional and indigenous coping strategies will rather strengthen the culturally effective disaster mitigation program.

Chapter 9

Conclusions, Limitations, and Future Directions

9.1 Conclusions

One of the main significance of this study includes the test and extension of the SWB homeostasis theory (Cummins, Gullone & Lau, 2002; Cook, 2003). This study validates the role of various factors included in the SWB homeostasis model and further extends the model by including other significant factors proposed by COR theory such as different types of resources and environmental stressors. SWB homeostasis theory proposes that the experienced level of SWB is usually stable and maintained within a set point range, yet levels deviating from the range of homeostasis are regulated through adaptation process whereby cognitive buffers (optimism, control, and self-esteem) restore the level of SWB to its normal range (Cummins, Gullone & Lau, 2002; Cook, 2003). This model predicts that the first order determinants (personality and affect) influence the second order determinants (cognitive buffers) which in turn determine the level of SWB. The Integrated model of this study extends this proposition by suggesting that in addition to the first order determinants, the external resources (object resources, condition resources, and energy resources) and environmental stressors will also influence the cognitive buffers which in turn will determine the level of SWB. Further, the model proposes that the same sets of variables are likely to influence the resilience; as both SWB and resilience are positive in nature (Mahmood & Ghaffar, 2014), have some trait-like properties and is expected to correlate highly with each other due to their shared variance with HPMood (Tomyn& Weinberg, 2016). The analysis of this integrated model provided interesting insights associated with SWB and resilience and the mechanisms of their maintenance.

This study supports the fundamental proposition of SWB homeostasis theory that the experienced level of SWB is usually maintained within a set point range. For the present sample, it was found that the SWB is maintained within the normative range. However, the score was falling in the lower end indicating the psychological vulnerability of the sample.

The factors found to be the significant contributors of SWB include environmental stressors (*safe shelter*); personality traits (*neuroticism, extraversion, openness, and Agreeableness*); external resources (*condition and object resources*); affect (*negative affect*); cognitive buffer (*psychological control, and optimism*) and education. Indirect path model further reveals that 'optimism' is the most significant cognitive buffer that maintains the level of SWB by acting as a mediator between the personality traits, affect, and external resources and SWB. Therefore, this study provides evidence for the SWB homeostasis theory and its extended integrated model which incorporates COR theory. However, it was clear that not all specific indicators included in the SWB homeostasis theory and COR theory contribute equally in restoring and maintaining the level of SWB in the case of recurrent flood survivors.

The factors that were found to be significant contributors of 'resilience' were age, condition resources, and psychological control. The indirect path model further revealed that 'psychological control' is the most significant cognitive buffer that maintains the level of resilience by acting as a mediator between environmental stressors, personality traits (neuroticism), affect (positive and negative affect), external resources (object and energy resources) and 'resilience'.

The test of the integrated model of SWB and resilience showed both common and unique factors influencing SWB and resilience. 'Condition resources' seems to be a common direct predictor of both SWB and resilience. Indirect path model showed that for maintaining SWB,

‘optimism' is the most significant cognitive buffer whereas for maintaining resilience, ‘psychological control' is the most significant cognitive buffer.

A second study- a qualitative case study on Majuli Island (world’s largest river Island- also one of the two sites of the 1st quantitative study) revealed the role and importance of traditional knowledge systems and skills in adaptation to flood-related disasters. The inhabitants of Majuli Island have been surviving and adapting successfully to recurrent floods. This study revealed that one of the main reasons for their successful adaptation is the effective use of various traditional coping strategies. Various traditional coping strategies included traditional designs of house and means of transportation, food security and crop diversification, migration, community bonding and support, local governance and leadership, and religious beliefs and rituals. This study provided examples of traditional coping strategies, among the inhabitants of close-knit communities, can act as the catalyst in effective disaster mitigation programs. These traditional knowledge strategies, if properly acknowledged and preserved, can be of significant help in forming culturally relevant effective disaster mitigation programs and risk reduction.

9.2 Limitations

Above and beyond some of the major contributions, certain limitations persist in the present research. However, some of these limitations might provide a scope for future researches. Some of these limitations are discussed below-

(i) The data of the present study was collected from only one state of India, where fluvial disasters of various magnitudes occur every year. The characteristics of every fluvial disaster have its unique differences that may be place-specific. Hence, considering only a particular type of fluvial disaster (riverine floods) in one specific place itself limits the generalizability of the results. However, this study has a robust

hypothetical model that holds strong theoretical and empirical background and thereby expected to provide the pragmatic groundwork for protecting and maintaining the level of SWB and psychological resilience for the disaster victims.

(ii) The present study has some methodological limitations. The quantitative study used a cross-sectional study design approach which has its own limitations. The simultaneous assessment of the exposure and outcome may interfere with the scope for detailed evaluation of the physical, psychological and social vulnerabilities of the survivors as well as their coping strategies to deal with the recurrent floods.

(iii) The self-report inventories were used in quantitative study which is often criticized for its social desirability effect and the cultural response biasness.

(iv) Due to limited resources and time constraints, the data were collected from only two severely flood-affected areas of Assam. Moreover, the total sample size for the quantitative study was 306 and 22 for the qualitative study only; which also limits the generalizability of the study findings.

Nonetheless, the above-mentioned limitations have not improperly compromised the findings of this research which as a whole provided a platform to better understand the maintenance mechanisms of the SWB and psychological resilience and the various coping strategies of these recurrent flood survivors.

9.3 Future Research Directions

The present study is amongst those few foremost attempts that investigated the maintenance mechanism of SWB and psychological resilience with an integrated model of SWB homeostasis and COR theory. The current research contributes in the field of SWB and psychological resilience particularly in the context of recurrent flood disasters in the non-western cultural context. Discussed below are some of the possible future directions,-

i. Although the study provided some of the major contributions in the field of SWB and psychological resilience literature; the future research is needed to replicate and magnify these research findings.

ii. Future research may include different stressful events to have a deeper understanding of how internal and external indicators act upon to maintain the homeostatic equilibrium and psychological resilience across cultures. Particularly, a cross-cultural study could provide insights into the culture-specific mechanisms.

iii. The future studies may focus upon the longitudinal research design over and above the cross-sectional research design in order to detect the pre and post-disaster level of SWB and psychological resilience; which may indeed turn helpful in detecting episodic negative mental health consequences and to plan effective intervention programs.

iv. Further research is required to assess the longitudinal aftereffects of the recurrent floods on the mental health of children, young and older adults for adequate age-specific psychosocial intervention programs.

v. There is a scope of future research with the inclusion of different ethnic groups from more than one specific place for effective evaluation of traditional/indigenous signs of disaster warnings and coping strategies which may help the authorities to plan culturally relevant survival strategies and disaster mitigation programs for the recurrent disaster survivors.

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Appendix A (Questionnaires)

Indian Institute of Technology Guwahati

Department of Humanities and Social Sciences

Guwahati-781039

I am a research scholar of the Department of Humanities and Social Sciences, IIT Guwahati, under the supervision of Dr. Dilwar Hussain (Associate Professor, Psychology). This questionnaire is administered as part of my Ph.D. study.

About the study:

The current research aims to study the impacts of recurrent flood events and loss of resources upon the level of Subjective Well-being (SWB) and Psychological Resilience of the survivors. The present study is an attempt to investigate the integrated effects of subjective wellbeing maintenance mechanisms and the loss-gain spirals of existing resources on SWB and Resilience of the victims after suffering from repeated flood occurrences.

Demographic Data:

Age:……. **Gender:……** **Education:…….**

Marital Status:…….. **Occupation:……**

Ethnicity:……..... **Proximity to the Epicenter:……..**

Income(p.m.): **1000-5999/-** ☐ **6000-9999/-** ☐ **10,000/- & above** ☐

➢ **In reference to the recurrent flood events in the past 5 years, kindly answer the following questions:**

Sl no.	Kind of Stressors	Response	
1.	Physical presence of safe shelter	Yes ☐	No ☐
2.	Property damage	Yes ☐	No ☐
3.	Effect on work	Yes ☐	No ☐
4.	Endangerment situations	Yes ☐	No ☐
5.	Assistance during the flood (Financial, Social, Psychological)	Yes ☐	No ☐
6.	Evacuation from home	Yes ☐	No ☐
7.	Death of loved ones (if yes, how many?)	Yes ☐	No ☐
8.	Loss of livestock	Yes ☐	No ☐

➢ **To deal with life stressors, I have..**

Not at all/ not applicable	To a small degree	To a moderate degree	To a considerable degree	To a great degree
0	**1**	**2**	**3**	**4**

Sl no	Resources	Ratings				
1.	Personal Transportation (car, truck, etc.)	0	1	2	3	4
2.	Necessary home appliances & home furnishing	0	1	2	3	4
3.	Adequate Food	0	1	2	3	4
4.	Financial Assets (stocks, property, etc.)	0	1	2	3	4
5.	Housing that suits my needs	0	1	2	3	4
6.	Cordial marital relationship and intimacy with my partner	0	1	2	3	4
7.	Status/seniority at work	0	1	2	3	4
8.	Stable Employment	0	1	2	3	4
9.	Intimacy and support from my friends & co-workers	0	1	2	3	4
10.	Ability to organize tasks	0	1	2	3	4
11.	Savings or emergency money	0	1	2	3	4
12.	Adequate income and financial credit	0	1	2	3	4
13.	Financial stability	0	1	2	3	4
14.	Money for advancement and self-improvement	0	1	2	3	4

- This scale consists of a number of words that describe different feelings and emotions. Read each item and then list the number from the scale below next to each word. **Indicate to what extent you feel this way right now, that is, at the present moment *OR* indicate the extent you have felt this way over the past week (circle the instructions you followed when taking this measure)**

1	2	3	4	5
Very Slightly or Not at All	**A Little**	**Moderately**	**Quite a Bit**	**Extremely**

_____ 1. Interested	_____ 11. Irritable
_____ 2. Distressed	_____ 12. Alert
_____ 3. Excited	_____ 13. Ashamed
_____ 4. Upset	_____ 14. Inspired
_____ 5. Strong	_____ 15. Nervous
_____ 6. Guilty	_____ 16. Determined
_____ 7. Scared	_____ 17. Attentive
_____ 8. Hostile	_____ 18. Jittery
_____ 9. Enthusiastic	_____ 19. Active
_____ 10. Proud	_____ 20. Afraid

- Here are a number of characteristics that may or may not apply to you. For example, do you agree that you are someone who likes to spend time with others? Please write a number next to each statement to indicate the extent to which you agree or disagree with that statement.

Disagree strongly	Disagree a little	Neither agree nor disagree	Agree a little	Agree Strongly
1	**2**	**3**	**4**	**5**

I see Myself as Someone Who...						
Sl. No.	Item	Disagree Strongly	Disagree a Little	Neither Agree nor Disagree	Agree a Little	Agree Strongly
1.	Is reserved	5	4	3	2	1
2.	Is generally trusting	1	2	3	4	5

3.	Tends to be lazy	5	4	3	2	1
4.	Is relaxed, handles stress well	5	4	3	2	1
5.	Has few artistic interests	5	4	3	2	1
6.	Is outgoing, sociable	1	2	3	4	5
7.	Tends to find fault with others	5	4	3	2	1
8.	Does a thorough job	1	2	3	4	5
9.	Gets nervous easily	1	2	3	4	5
10.	Has an active imagination	1	2	3	4	5
11.	Is considerate and kind to almost everyone	1	2	3	4	5

- **Below is a list of statements dealing with your general feelings about yourself. Please indicate how strongly you agree or disagree with each statement.**

Sl no.	Items	Strongly Agree	Agree	Disagree	Strongly Disagree
1.	On the whole, I am satisfied with myself.	1	2	3	4
2.	At times I think I am no good at all.	4	3	2	1
3.	I feel that I have a number of good qualities.	1	2	3	4
4.	I am able to do things as well as most other people.	1	2	3	4
5.	I feel I do not have much to be proud of.	4	3	2	1
6.	I certainly feel useless at times.	4	3	2	1
7.	I feel that I'm a person of worth, at least on an equal plane with others.	1	2	3	4
8.	I wish I could have more respect for myself.	4	3	2	1
9.	All in all, I am inclined to feel that I am a failure.	4	3	2	1
10.	I take a positive attitude toward myself.	1	2	3	4

- **Please answer the following questions about yourself by indicating the extent of your agreement using the following scale:**

Sl. No	Items	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1.	In certain times, I usually expect the best.	0	1	2	3	4
2.	It's easy for me to relax	0	1	2	3	4
3.	If something can go wrong for me, it will.	4	3	2	1	0
4.	I'm always optimistic about my future.	0	1	2	3	4
5.	I enjoy my friends a lot.	0	1	2	3	4
6.	It's important for me to keep busy.	0	1	2	3	4
7.	I hardly ever expect things to go my way.	4	3	2	1	0
8.	I don't get upset too easily.	0	1	2	3	4
9.	I rarely count on good things happening to me.	4	3	2	1	0
10.	Overall, I expect more good things to happen to me than bad.	0	1	2	3	4

- **Using the scale provided, decide how much you either disagree or agree with each of the following statements. Circle the number from 1 to 5 that best indicates how you feel.**

Sl. No	**Items**	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
1.	I don't have much control over my emotional reactions to stressful situations.	5	4	3	2	1
2.	When I'm in a bad mood I find it hard to snap myself out of it.	5	4	3	2	1
3.	My feelings are usually fairly stable.	1	2	3	4	5
4.	I can usually talk myself out of feeling bad.	1	2	3	4	5
5.	No matter what happens to me in my life I am confident of my ability to cope emotionally.	1	2	3	4	5
6.	I have a number of good techniques that will help me cope with any	1	2	3	4	5

	stressful situation.					
7.	I find it hard to stop myself from thinking about my problems.	5	4	3	2	1
8.	If I start to worry about something I can usually distract myself and think about something nicer.	1	2	3	4	5
9.	If I realize I am thinking silly thoughts I can usually stop myself.	1	2	3	4	5
10.	I am usually able to keep my thoughts under control.	1	2	3	4	5
11.	I imagine there will be many situations in the future where silly thoughts will get the better of me.	5	4	3	2	1
12.	I have a number of techniques which I am confident will help me think clearly and rationally in any situation I might find myself.	1	2	3	4	5
13.	Even when under pressure I can usually keep calm and relaxed.	1	2	3	4	5
14.	I have a number of techniques or tricks that I use to stay relaxed in stressful situations.	1	2	3	4	5
15.	When I'm anxious or uptight there does not seem to be much that I can do to help myself relax.	5	4	3	2	1
16.	There is not much I can do to relax when I get uptight.	5	4	3	2	1
17.	I have a number of ways of relaxing that I am confident will help me cope.	1	2	3	4	5
18.	If my stress levels get too high I know there are things I can do to help myself.	1	2	3	4	5

- **Please indicate the extent to which you agree with each of the following statements by using the following scale:**

1= strongly disagree, 2= disagree, 3=neutral, 4= agree, 5= strongly agree.

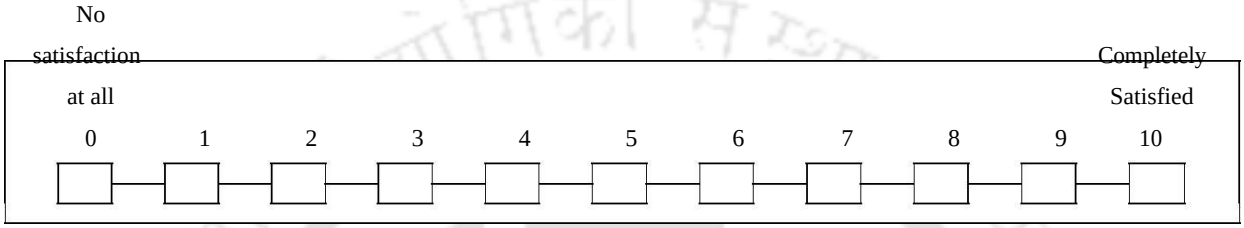
Sl no.	**Items**	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
1	I tend to bounce back quickly after hard times	1	2	3	4	5
2	I have a hard time making it through stressful events	5	4	3	2	1
3	It does not take me long to recover from a stressful event	1	2	3	4	5
4	It is hard for me to snap back when something bad happens	5	4	3	2	1
5	I usually come through difficult times with little trouble	1	2	3	4	5
6	I tend to take a long time to get over set-backs in my life	5	4	3	2	1

- **The following questions ask how <u>satisfied</u> you feel, on a scale from zero to 10 Zero means you feel no satisfaction at all and 10 means you feel completely satisfied.**

Test Items

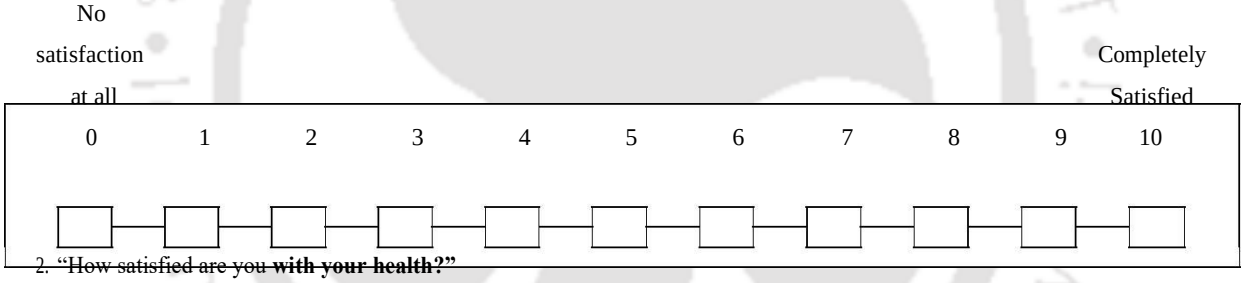
<u>Part 1</u> [Optional Item]

1. "Thinking about your own life and personal circumstances, how satisfied are you **with your life as a whole?"**

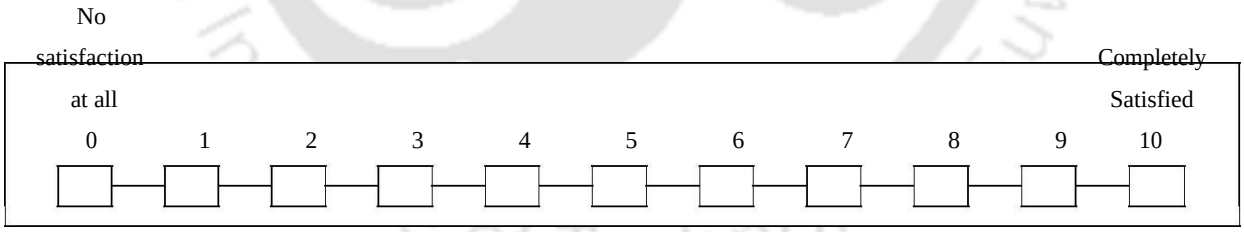


<u>Part 2</u>

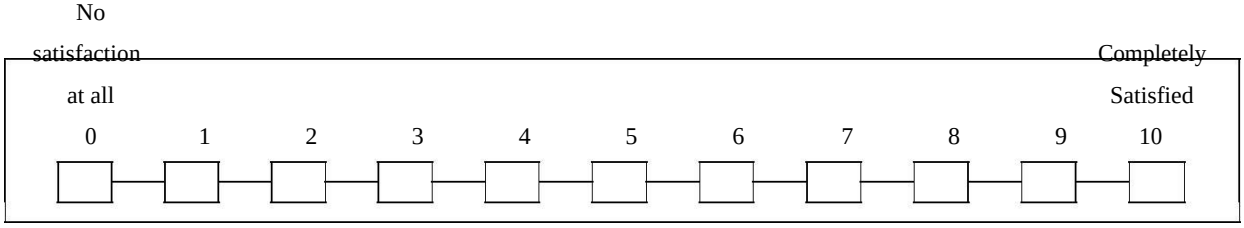
1. "How satisfied are you **with your standard of living?"**



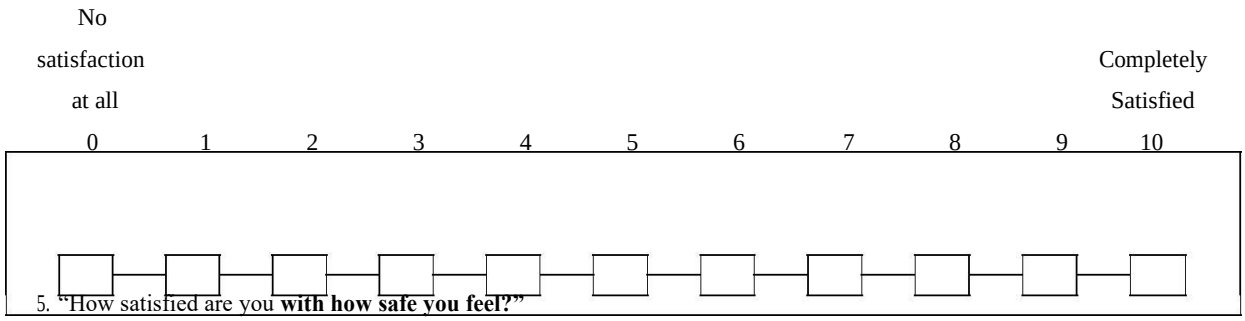
2. "How satisfied are you **with your health?"**



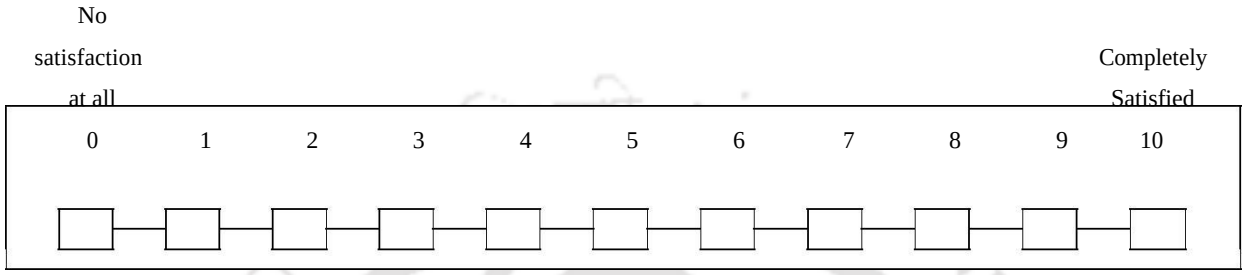
3. "How satisfied are you **with what you are achieving in life?"**



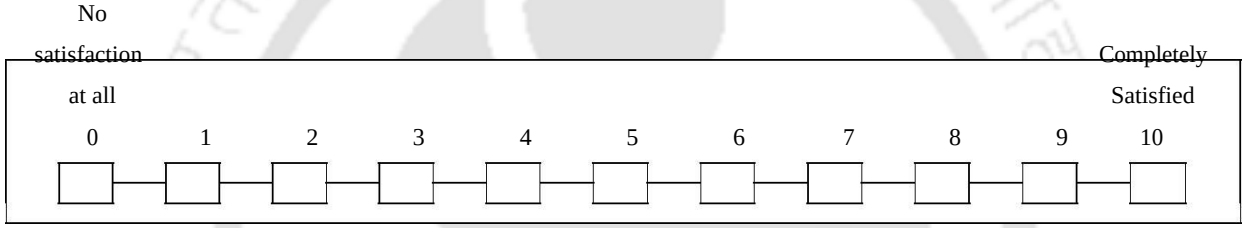
4. "How satisfied are you **with your personal relationships?"**



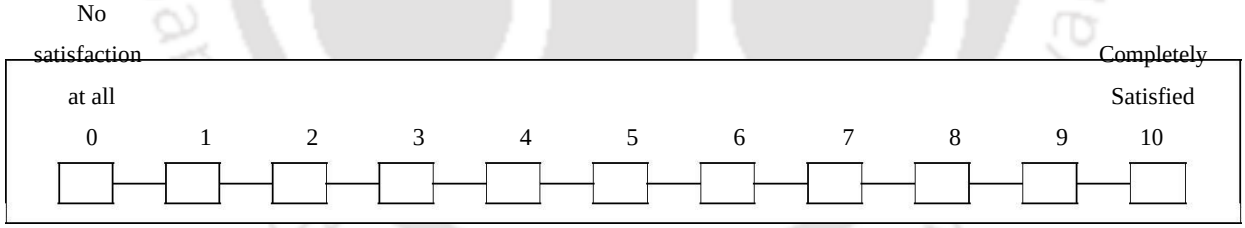
5. "How satisfied are you **with how safe you feel?"**



6. "How satisfied are you **with feeling part of your community?"**

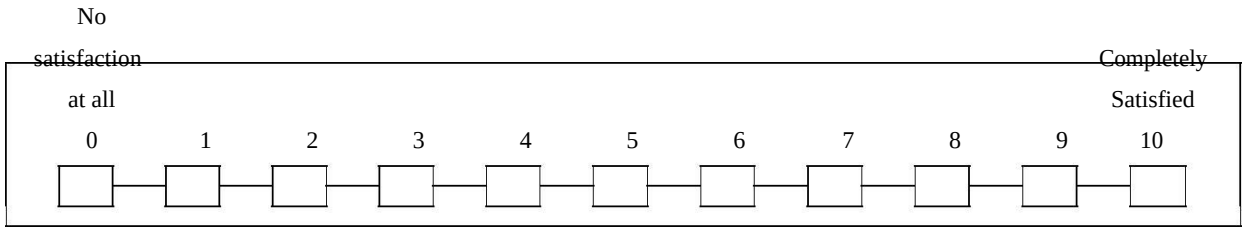


7. "How satisfied are you **with your future security?"**



[Optional item]

8. "How satisfied are you **with your spirituality or religion?"**



Appendix B

Qualitative Interview Schedule

1. Do you have any prior flood experience? (Mention about major floods, if any)

2. What is the usual duration, proximity and severity of these floods?

3. What is the nature and extent of infrastructure and other resource losses, such as employment, school, places, and other supportive settings?

4. Do you get the early warnings prior to floods? Is there any indigenous/traditional way of detecting the early signs of a disaster?

5. Are there any traditional coping strategies used to deal with floods? If yes, kindly elaborate on them. [(i) Collective coping startegies used by the community, and (ii) Personal Coping (traditional, religious or culture specific)]

6. Are there any kinds of social and community activities or involvements among the survivor population that provide emotional healing and strengthen resilience?

7. How well the Govt. help aids/agencies and NGO programs are able to address and meet the actual needs of the recurrent flood survivors?