

## BUILDING COMMUNITY RESILIENCE FOR CLIMATE CHANGE THROUGH TRANSFORMATIVE LEARNING

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### **Abstract**

*Human action has triggered a vast cascade of environmental problems that now threaten the continued ability of both natural and human systems. With the increased impacts of climate change related risk and disasters, interest has shifted to seeking for more effective and sustainable ways to respond to these disasters and climate-risk with focus on resilience-building. This paper examines the concept of climate change causes and its effects, resilience and resilience building, transformation learning and strategies of building community resilience to climate change induced and related disasters. It advocates for building community resilience through transformative learning to improve the adaptive, anticipatory, absorptive and transformative resilience capacities anchored on transformational risk evaluation, decision making and adaptation. Transformative learning has the potential to instigating changes in behaviour that are capable of reducing climate risk related activities.*

**Keywords:** *Building, Community, Climate change, Learning, Resilience*

### **Introduction**

Adapting and efforts at coping with disasters is a common challenge of human beings from all parts of world. However, in recent years, climate change induced flooding and natural disasters are on the rise, threatening individual and collective lives and belongings, bringing victims great misery. Man is endowed with critical reflective thinking on issues and finding solution, he is constantly learning and acquiring skills and attitude that can be used to curb future occurrence of disasters. Learning for change is, therefore, required, categorized as transformative learning which is the process of using a prior interpretation to construe a new or revised

interpretation of the meaning of one's experience in order to guide future action (Mezirow, 1996). Individuals and communities have the capacity to learn and transform their perspectives and practices towards climate induced shocks. This has to be stimulated through capacity building processes. Specific types of learning required at the individual level in order to influence change and transformation at the community is transformative learning, where individuals' frames of reference and embedded assumptions will be fundamentally altered.

The community is seen as the basic unit of disaster prevention and risk reduction. The simple sum of individual resilience is the base that constitutes the community resilience since individuals constitute the component of a community. However, community resilience is a wider concept, including not only the individuals' ability but also the external force, which refers to the speedy improvement of returning to equilibrium after hazards in the community. Communities are a reservoir of knowledge and skills that has not been fully harnessed and exploited for their cumulative benefits. Therefore, as part of the effort to reduce disaster risk, using the community as the base, requires conscientization through transformational learning that changes their life styles which inevitably leads to new thoughts and behaviours. It is when one learns and changes his mind, behaviour and attitude either gradually or sudden life takes on a new direction with improved capacity (Mguni, 2011). The potential usefulness of transformative education in addressing climate change has not been explored sufficiently and this paper, therefore, attempts to examine transformative learning as one appropriate approach to facilitating the worldview shift required to address this complex challenge of climate change and its related risks.

### **Climate Change and Effects**

Climate change is the periodic modification of Earth's climate due to changes in the atmosphere, caused by interactions between the atmosphere and various other geologic, chemical, biological, and geographic factors within the Earth system. Climate refers to the

average weather at a particular place, and consisting of temperature, precipitation, humidity and windiness (BGS, 2019). It also refers to specifically as the mean state and variability of these features over time. It means that the weather is always changing, owing to instabilities in the atmosphere. Though climate change has always been there, the global warming that is prevalent today, causing serious issues on earth due to greenhouse effect is the concern. This is due to human activities and called anthropogenic greenhouse effect, which occurs in addition to natural greenhouse effect. The atmosphere is in a continual motionsuch that both its physical properties and its rate and direction of motion are influenced by several factors, such as solar radiation, the geographic position of continents, ocean currents, the location and orientation of mountain ranges, atmospheric chemistry and vegetation. It should be noted that these factors change through time. Therefore, climate, which results from the physical properties and motion of the atmosphere, varies at every conceivable timescale (UNFCC. 2011).

Global warming and climate change occur when carbon dioxide (CO<sub>2</sub>) and other air pollutants (greenhouse gases) collect in the atmosphere and absorb sunlight and solar radiation that have bounced off the earth's surface (UNESCO; 2013). Normally, this radiation would escape into space but these greenhouse gasses, which can last for years to centuries in the atmosphere, trap the heat and cause the planet to get hotter. That is what is known as the greenhouse effect that has the resultant effect of climate change. The greenhouse gases that cause rise in temperature are

carbon dioxide 64%, methane 17%, Nitrous Oxide 6% and fluorinated gases. The activities that lead to emission of these gases into the atmosphere are burning of coal, oil and gas and nitrous oxide. Cutting down forests (deforestation) which reduces the absorption of CO<sub>2</sub>, increasing livestock farming (cows and sheep produce large amounts of methane when they digest their food), and use of fertilizers containing nitrogen that produce nitrous oxide emissions among others. Climate change destabilizes and alters the earth's temperature equilibrium thereby causing far-reaching effects on human beings and the environment. These effects can be classified into direct and indirect. The direct consequences of climate change according to (IPCC;2018) include: rising maximum and minimum temperatures, rising sea levels leading to flooding, higher ocean temperatures and acidification, an increase in heavy precipitation (heavy rain and hail), desert expansion, shrinking glaciers and thawing permafrost, while the indirect consequences of climate change, which directly affect human beings and our environment, include:

- an increase in hunger and water crises, especially in developing countries.
- health risks through rising air temperatures and heat waves.
- increased global economic inequality.
- economic implications of dealing with secondary damage related to climate change.
- increasing spread of pests and pathogens.

- loss of biodiversity due to limited adaptability and adaptability speed of flora and fauna.
- ocean acidification due to increased HCO<sub>3</sub> concentrations in the water as a consequence of increased CO<sub>2</sub> concentrations.

### **Transformative Learning Theory**

Transformative learning as a theory, developed by Jack Mezirow in 1978 is built upon the notion that our interpretations of our experiences are what give them meaning and lead to personal change. Thus, whatever meanings we ascribe will determine how our perspectives and expectations shift. The theory details how we challenge and refine our implicit perspectives so that they become explicit. Doing so can increase one's self-awareness and confidence. Transformation is life changing which is anchored on learning and this change is either sudden or gradual and learning changes one's perspectives. Transformative learning theory views the process of perspective transformation in three dimensions: psychological (changes in understanding of the self), convictional (revision of belief systems), and behavioral (changes in lifestyle). Transformative learning is the expansion of consciousness through the transformation of basic worldview and specific capacities of the self that is facilitated through a consciously directed process such as appreciatively accessing and receiving the symbolic contents of the unconscious and critically analyzing underlying premises (Broodfield, 2000). Perspective transformation, leading to transformative learning, occurs infrequently which usually results from a

disorienting dilemma and is triggered by a life crises (climate change) or major life transition, which may also result from an accumulation of transformations in meaning schemes over a period of time (Brookfield, 2000). The perspective transformation as explained by Mezirow follows the path from disorienting dilemma, self-examination, sense of alienation, relating discontent to others, explaining options of new behaviour, building confidence in new ways, planning a course of action, knowledge to implement plans, experimenting with new roles and reintegration (Fletcher;2007). The theory has two basic kinds of learning: instrumental and communicative learning. Instrumental learning focuses on learning through task-oriented problem solving and determination of cause and effect relationships. Communicative learning involves how individuals communicate their feelings, needs and desires. Meaning structures are understood and developed through reflection. Mezirow (1991) stated that reflection involves a critique of assumptions to determine whether the belief, often acquired through cultural assimilation, remains functional for us as adults. Reflection is similar to problem solving, in this case it is flooding. The pivot of the theory is how we reflect on the content of the problem, the process of problem-solving, or the premise of the problem targeted towards solving it. Through this reflection, we are able to understand ourselves more and then understand our problems and learning better. The Transformational Learning Theory is mainly applicable to adult learning. It deals with changing

assumptions and perspectives which adults have picked up through life. Adults may have a harder time letting go of long-held convictions, but they are also more cognizant of why they need to learn and in motivating themselves to achieve the desired results of solving problems. Summarily, the three core stages of transformation learning are:

- All transformations will start with some form of personal crisis, whether mild or massive. It is the catalyst, the point at which we realize there is a transformation to be had.
- We follow up a dilemma with reflection and examinations of what we thought we knew and how we can resolve the discrepancy with the new experience. It is about figuring out what improvement might look like.
- The later stages of the transformation are about action. We learn what we need to learn, try out new perspectives and integrate them into a new world view that dictates our future behaviour.

### **Community Resilience**

Resilience can be defined as the ability of a system to absorb, recover from or adapt to changes, whilst retaining its essential functions, structure and identity (Lonstaff, Armstrong, Perrin, Parker & Hidek, 2010). Also Cole & Buckle, (2004), defined resilience as a community's capacities, skills, and knowledge that allow it to participate fully in recovery from disasters. While Gunderson, & Folke (2005) sees resilience as the return or recovery time of a social-ecological system, determined by that system's capacity for renewal in a dynamic environment and the people's ability to

learn and change (which, in turn, is partially determined by the institutional context for knowledge sharing, learning, and management, and partially by the social capital among people). It is also the ability of community members to take meaningful, deliberate, collective action to remedy the impact of a problem, including the ability to interpret the environment, intervene, and move on. It is based on the capacity of a system, community, or society potentially exposed to hazards to adapt, by resisting or changing, in order to reach and maintain an acceptable level of functioning and structure.

Resilience can better be explained and understood, using the following three concepts.

- **Resistance:** The ability of the system to continue performing its functions in the case of a disturbance, without significant changes to the system. This notion of resilience applies to the design of engineered systems such as bridges, buildings, etc. that are designed in such a manner that they can withstand great amounts of pressure (they are the community infrastructure that are prone to disasters).
- **Recovery:** The ability of a system to recover its essential functions in case of a disruption. This notion is related to complex open systems. Complex open systems are systems that interact with their environment and are constantly developing and evolving over time. This interpretation acknowledges the idea that the world is changing continuously. This means that there is no fixed normal state to which the system can return, but there

are specific functions of the system that are essential for people to survive or that are deemed valuable (for instance, food, drinking water, shelter, medical services, communities, parks, etc.). To preserve these functions, one has to consider all the elements in the systems that contribute to the performance of these functions. The societal system is complex, open and non-linear, yet remains intact. (Martin-Breen & Andries, 2011).

- **Adaptivity:** This is the capacity of a system to react to changes in its environment, adapt to and learn from experiences. This notion is related to a specific class of systems which are complex and adaptive. Such systems are characterized by self-organisation and co-evolution. Self-organization refers to the ability of the system to develop a new structure based on internal and local interactions. Co-evolution refers to the ability of the system to continue to operate while adapting to changes in the environment.

A resilient society is a society in which individuals, groups and communities are able to cope with threats and disturbances caused by social, economic, and physical changes (FAO, 2010, Adger, 2000). This can be understood more broadly in relation to general changes. More often, societal resilience is taken to mean resilience towards disasters, the process of preventing an event escalating into a disaster. Therefore, it requires the ability to prepare, the capacity to cope with the impact of disasters when they occur and the capacity to implement recovery activities in such a way that the societal

disruptions are minimized (Renschler, Frazier, Arendt, Cimellaro, Reinbom & Bruneau, 2010).

The term community resilience refers to the interconnected network of systems that directly impact human society at a grassroots community level, including the socioeconomic, ecological, and built environments. According to the Australian Government's Social Inclusion Board (2014), community resilience refers to the capacity of communities to respond positively to crises. It is the ability of a community to adapt to pressures and transform itself in a way which makes it more sustainable in the future. Rather than simply survive the stressor or change, a resilient community might respond in creative ways that fundamentally transform the basis of the community. Boshier, Lee; Chmutina, Ksenia (2017), defined community resilience as the sustained ability of a community to use available resources (energy, communication, transportation, food, etc.) to respond to, withstand, and recover from adverse situations such as economic collapse to global catastrophic risks. Community resilience is the sustained ability of communities to withstand, adapt to, and recover from adversity. It is also the ability to prepare for anticipated hazards, adapt to changing conditions, withstand and recover rapidly from disruptions activities, such as disaster preparedness which includes prevention, protection, mitigation, response and recovery. A community is resilient when members of the population are connected to one another and work together, so that they are able to function and sustain critical systems, even under stress; adapt

to changes in the physical, social or economic environment; be self-reliant if external resources are limited or cut off; and learn from experience to improve itself over time Paton (2013). While the resilience of individuals, families, or specific organizations are key components of community resilience as a whole, a resilient community is greater than the sum of its parts (Parker, 2010). Therefore, a resilient system is a complete, complex, and interconnected system which contains many more links (Magis, 2010).

The community as a system is a complex adaptive system. Community resilience is, therefore, the ability of this complex, adaptive system to cope with threats and disruptions. When there is disruption to the functioning of the system, the system will in the first place attempt to resist the changes in order to continue functioning as normal. The extent to which the community can resist changes is limited and in case of a more severe disruption the system will at some point experience (partial) dysfunction. At that point in time, the system will draw on its ability to recover and/or adapt to the changes. This will lead to the restoration of the essential functions of the system or adapt to a new state of functioning (Lonsdale, Pringle, & Turner, 2015). The extent to which community is able to offer resistance or can recover or adapt to changes is determined by the different capacities that are part of the specific system that is being stressed. These capacities which are related to the system components, range from social to physical or institutional capacities. They can be used in different phases of the disruption cycle, defined as pro-action, prevention, preparation,

response and recovery. Capacities can be tangible, such as the population, schools, physical infrastructure, food and water or intangible, such as social networks, cultural identity, communication or wealth. The strength and quality of these capacities, and thus the resilience of the system, is determined by the qualities of the system components (Norris, Stevens, Pfefferbaum, Wyche, & Pfefferbaum, 2008). Community resilience is built upon following foundations:

- *People*. The power to envision the future of the community and build its resilience resides with community members.
- *Systems thinking*. Systems thinking is essential for understanding the complex, interrelated crises that is unfolding and what they mean for the similarly complex communities.
- *Adaptability*. A community that adapts to change is resilient. But because communities and the challenges they face are dynamic, adaptation is an ongoing process.
- *Transformability*. Some challenges are so big that it is not possible for the community to simply adapt; fundamental, transformative changes may be necessary.
- *Sustainability*. Community resilience is not sustainable if it serves only us, and only now; it needs to work for other communities, future generations, and the ecosystems on which we all depend (PCI;2016).

### **Building Community Capacities for Resilience**

Resilience is the ability of a system (like a community) to absorb disturbance and still retain basic function and structure.

Building resilience means intentionally guiding the system's process of adaptation in an attempt to preserve some qualities and allow others to fade away, all while retaining the essence or identity of the system. In a human community, identity is essentially determined by what people value about where they live. However, what a community of people collectively values is open to interpretation and subject to disagreement. This suggests that people and the ways they come to rough consensus are necessarily at the centre of community resilience building. Building community resilience is anchored on social learning which is building capacities. This learning will lead to some social outcomes, acquired skills and knowledge building through a collective and communicative learning (Muro & Jeffrey, 2008). It can occur formally and informally in natural and unforced settings through conversation and mutual interest. Social learning is an ongoing, adaptive process of knowledge creation that is scaled-up from individuals through social interactions, fostered by critical reflection and the synthesis of a variety of knowledge types that result in changes to social structures, such as organizational mandates, policies and social norms (CCCR). It is made up of different elements from the perception of risks or losses, its problem identification, to the critical reflection and testing or experimentation in order to derive new knowledge, thus enabling resilience at a range of societal levels. The capacities of communities can be built for resilience on four types, which are, anticipatory capacity, adaptive capacity, absorptive capacity and transformative capacity

(Norris, Stevens, Pfefferbaum, Wyche & Pfefferbaum, 2008).

**Anticipatory capacity:** This is the ability of human systems to anticipate and reduce the impact of shocks through preparedness and planning. This can be seen in the proactive actions taken before an event, either to avoid or reduce exposure to a certain risk, or to minimize vulnerability to specific events. It is built on knowledge, information and experience as essential elements of anticipatory capacity, and education and effective communication plays a vital role. People anticipate risks based on their human capital, their knowledge, information and experience. Education, however, is key as most people in poor rural communities anticipate risks in light of their experience only. As new risks emerge, they may not be well prepared unless they get information from governments or other stakeholders to raise their awareness of these risks. They need to be aware, not just of the risks to themselves, but how a disaster might affect the capital and assets that they hold. Effective communication about risks, therefore, has a significant role to play in building anticipatory capacity. Many countries have set up early warning systems to help them avoid or reduce the impact of hazards such as floods, landslides, storms and forest fires. However, the realization of anticipatory capacity requires translating information and knowledge into action, and needs to take social, cultural and gender considerations into account.

**Adaptive capacity:** This is the ability of human systems to absorb and cope with the impacts of shocks and stresses. Absorptive capacity draws mainly on the

available resources within human systems to recover from adverse conditions. Absorption refers to a system's ability to cope with shocks that have not been anticipated and, therefore, have not been preceded by adaptive or transformative efforts, or to the residual exposure that has not been mitigated by these efforts. Despite efforts made by states and society to anticipate and reduce risks, it is impossible to avoid all hazards. It is, therefore, important to take measures that can help people adapt and live with them. To build adaptive capacity, it is necessary to reduce the exposure and vulnerability of a society. Efforts that build adaptive capacity by reducing exposure and vulnerability entails using a variety of measures including prudent macro-economic and fiscal policies, integrating risk information into key sectoral policies (e.g. agricultural development), and mainstreaming risks (e.g. climate change-related) into national planning. One of such is diversifying income sources and forms of capital that can help to build resilience at individual and household levels. Incomes enable people to absorb the impacts of shocks and adapt to cope with future shocks. However, relying on one income source makes people vulnerable in case if that source is affected by a shock. Thus, diversifying income sources helps communities to cope with risks. Most income diversification programmes apply a livelihoods approach, such as off-farm cultivation.

**Absorptive capacity:** It is the ability of human systems to change in response to multiple, long-term and future risks, and to learn and adjust after a risk materializes such as climate change. It describes the

capability to take deliberate and planned decisions, even when conditions have changed or are about to change, to achieve a desired state. Absorptive capacity refers to the measures that people use to cope in the wake of disasters such as flooding. One crucial aspect of building absorptive capacity is to increase the options through which basic needs can be met in times of crisis. Absorptive resilience capacity can be built through social protection systems that can help build general resilience by providing income and health security, in particular to vulnerable populations. Social protection provides opportunities to attain growth in a manner that protects poor and excluded groups. It does so by smoothing patterns of income generation and consumption so that shocks cause less disruption by maintaining political and social stability, among other ways. Social protection programmes tend to focus on wider goals that can play a critical role in reducing poverty. One crucial aspect of building absorptive capacity is, therefore, to increase people's income-earning options, so that they can meet their basic needs.

**Transformative capacity:** This involves the ability to take deliberate steps to change systems that create risks, vulnerability and/or inequality. Transformative capacities support people to invest and innovate, and can help societies to break away from the status quo, and shape their ability to identify opportunities for transformation. Transformative capacity refers to the ability of a society to create and move to a fundamentally new system, so that a risk is avoided, or will have a limited impact if it does occur.

These four capacities are not independent but overlap and complement each other, forming a continuum that promotes different levels of change, ranging from persistence through incremental adjustments to transformational changes. Human systems that have these fundamental resilience capacities are less likely to be undermined by shocks and stresses. Communities need to invest in analysis of emerging risks and their potential impacts on critical human systems.

### **Transformative learning for community resilience to natural hazards**

Man is regularly faced with problems either created directly or indirectly due to natural causes. Climate change has both negative and positive effects. However, the negative effects have its toll on man. One of such effects is climate change that has negatively affected the lives of people collectively and individually. Though man is naturally endowed with the instinct to subdue the environment and solve natural problems, he needs conscientization on its prowess. Change is, therefore, required through learning and the frames of reference in the transformation learning as opined by Mezirow can provide a framework for its actualization. Transformation is the process whereby individuals transform problematic frames of reference to make them more inclusive, discriminating, open, reflective and emotionally able to change (Sunderland & Crowther, 2008). Frames of reference are integrated sets of assumptions and expectations, built up through socialization and experience, through which individuals understand and attach meaning to their experiences that guide future actions.

Changes in frames of reference will lead to changes in actions. Individuals' responses proactive, reactive, or transformative to natural hazards and their risks are shaped by the way they frame and attach meaning to those risks which influence their decision to relocate or stay as a result of flooding. Critical reflection on assumptions in problematic frames of reference is fundamental to transformative learning and can lead to transformed frames of reference and/or better-supported assumptions, enabling clearer understanding of and functionally improved responses to future experiences. Transformative approaches seek to foster change in individuals' capacities (knowledge and skills), attitudes, agency and actions; the expectations embedded within relationships between people in the home, in groups and in organizations; and institutional rules and practices.

### **Transformational Risk Evaluation**

Natural disasters, such as climate change induced, occur almost yearly in Nigeria, especially in the Niger Delta region. Risk evaluation is needed and anchored on reflective reasoning to improve the capacity of the people. Attitude towards risks is shaped by people's encounters with hazards and their interaction with the environment for their livelihoods (Paveglio, Boyd & Carroll.2017). Many choose to live in hazard-prone areas because it allows them to sustain their livelihood, and consider natural hazards and disasters not as aberrant phenomena but rather a part of everyday life, that is seen as normal by the community members. But this requires learning to change their perception on the risks. Cultural factors and practical

considerations may lead an individual to trade-off risks and remain in a disaster-prone area to access available natural resources that may seem irrational to an outside observer.

Enhancing resilience through transformative learning requires a change in attitude toward natural hazard risks and resultant changes in practices to address and mitigate those risks. This requires both critical reflection on past disaster (flooding) experiences (retrospective learning) and imagining future scenarios (prospective learning). Community members thus have to be sensitized on risk mitigation methods and strategies base on reflective thinking to enable them predict and identify warning signs for the possibility of a flood and prepare, either to evacuate or stay with precautionary measures. Risk mitigation strategies are influenced by four main factors, which are the nature of the past traumatic event; individuals' ability to imagine a worst-case scenario, people's structural locations, and the societal norms, values, and belief systems that have to be activated through learning. Often, culture plays a greater role in shaping risk perception than actual exposure to risk itself (Gielach, Belsher & Beutler, 2010) with the denial and active forgetting of past disasters and consequently of future risk being deeply embedded in certain cultures.

### **Transformational Decision Making**

Decision making under a condition of risk is an important action to be executed by individuals and community members with several outcome probabilities, which they have to choose. Individuals can act independently to change the course of circumstances based on critical reflection

upon past disaster experiences (retrospective learning) and by imagining an alternative future (prospective learning) which is anchored on critical reflection. Three types of consciousness that are relevant to critical reflection and imagination for transformative learning are discursive or reflexive consciousness (discursively scrutinizing beliefs, values, and worldviews that shape actions), practical consciousness (everyday practices that are rarely subject to scrutiny), and the unconscious (where reasons for actions are unknown to the actors themselves). In a context of continuity and change, discursive consciousness may lead toward transformative learning or transformational adaptation, while actions and practices based on practical consciousness and unconsciousness are likely to maintain current practices. People's capacity to reflect on past traumatic experiences and take a decision to mitigate future risks is greatly shaped by cultural perceptions and prescriptions, such that culturally-embedded beliefs, values, norms, and practices can cause people to act against their personal perceptions of risk.

### **Transformational Adaptation**

Enhancing resilience via transformative learning entails a fundamental alteration in behavioural orientation toward risks associated with natural hazards (flooding) and an accompanying transformation of adaptation practices. These actions are referred to as transformational adaptation, which is a fundamental change in adaptation practices (Fook, 2015, Few, Morchin, Spear, Mensah & Bendapudi, 2017). The key pivot for transformational adaptation is the agents' (community)

ability for forward-thinking that is, imagining a better future and altering their behavioural orientation toward risk and working towards it. Here, transformative learning is triggered by a form of discursive or reflexive consciousness which requires the individuals discursively scrutinizing their current adaptation practices and orientation toward risks.

Frames of reference are problematic when they fail to serve as reliable guides to understanding and action – for example, when an individual encounters a “disorienting dilemma” where outcomes or emerging situations do not match prior assumptions or expectations (Sunderland & Crowther, 2008). This is particularly relevant to the problem of building resilience to flood related shocks, as assumptions, risk assessments, and plans of action based on experience of past natural disasters (flooding) may prove mistaken or inadequate in the face of more severe and frequent future extreme events. Critical reflection on assumptions embedded in problematic frames of reference is fundamental to transformative learning and can lead to transformed frames of reference and/or better-supported assumptions, which will enable a clearer understanding of and functionally improved responses to future experiences.

### **Suggestions**

Building resilience requires governance approaches, institutions and policies that will be geared toward dealing with risk associated with flooding. Resilience thinking, informed by an assessment of risk, understanding of potential impacts, and risk-informed response efforts, can support better policymaking.

- Every community has an existing mitigation capacities and measures, which should be understood and improved upon. This can be done through international, national or local support to improve on their capacities and mitigation and adaptationskills.
- Communities should be encouraged with professional support to evaluate their capacities (strengths and weaknesses) and start from those points to develop new capacities in relation to climate change resilience. They can learn from existing initiatives on how to make the most use of available resources, potential pitfalls to look out for, and solutions.
- As a measure to operationalizing the concept of community resilience, policymakers should introduce a practical approach to resilience thinking to identify the sources of existing and emerging risks, map out the critical systems in the community that these risks will affect, and establish the most vulnerable to the potential impacts of these risks and formulate policy responses that can enhance specific resilience capacities.

**Conclusion:** Transformative learning is essential for building community resilience to environmental risks such as flooding. Transformative learning requires time, space, and opportunity for critical reflection in order to meaningfully alter deeply-rooted values, beliefs, and practices. These elements are not attainable when people are fully consumed with their daily survival. Transformative learning goes beyond just content knowledge acquisition: learning but rather as a desirable process for adults to learn to

think for themselves, through true emancipation from mindless or unquestioning acceptance of what we have known through life experience, especially, those that our culture, religions, and personalities may predispose us towards, without our active engagement and questioning of how we know what we know. Adults truly need to take ownership of their social and personal roles, and develop through transformation learning self-authorship towards helping their society become a better place through their greater understanding and awareness of the world and issues confronting them. Through transformative capacity, communities can build more resilient systems capable of responding to climate change through sustainable transformation of social equity, which is the capacity to create a fundamentally new system when ecological, economic or social structures make the existing system untenable. It is concluded, therefore, that transformative learning is essential for building community resilience to climate-change-induced environmental risks.

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