

INDIGENOUS KNOWLEDGE – A HUMAN CAPITAL FOR RESPONSE TO CLIMATE CHANGE IN AGRICULTURE AT NORTH CENTRAL REGION, VIETNAM

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Introduction

- Climate change (CC), especially through extreme climate events, is currently a major threat to Vietnam's socio-economic development, even potentially heavy impact on particularly the livelihood security of the poorest rural population segments.
- The Vietnamese government has established the National Target Program to Respond to CC, with the aim of improving resilience and reducing vulnerability to CC of localities across the country.
- The Ministry of Agriculture and Rural Development (MARD) has also established the Action Plan Framework for Adaptation and Mitigation of CC (APFAMCC) in the Agriculture and Rural Development Sector for 2008-2020, which emphasizes the CC response activities towards sustainable development in localities, especially in less developed areas and poverty areas.



Introduction (Cont)

- The North Central region of Vietnam with three typical provinces namely Nghe An, Ha Tinh, and Quang Binh (NHQ) has a population of about 5,1 million inhabitants of which 70% are living in the delta and coastal areas, with most of these inhabitants' livelihood relying on agriculture and fisheries. With about 350km of coastal line open to the East Sea, the delta and coastal areas of these provinces is inherently affected by severe water disasters such as typhoons, floods, droughts, inundation, and salinity intrusion.



Introduction (Cont)

- Based on qualitative data collected from field research of the IPSS-NEU at three typical communes in three provinces in the North Central region in the framework of research cooperation project between Vietnam and Denmark on ***“Climate Change-induced Water Disaster- Information System for Participatory Vulnerability Reduction in North Central Vietnam” (CPIS_11-04-VIE)***, this paper reviews and clarifies the concept of indigenous knowledge (IK), describes and analyzes the extent of using the indigenous knowledge of local communities to response to CC-induced water disasters in agriculture in the North Central region, Vietnam. Hung Nhan commune, Hung Nguyen district, Nghe An province; Yen Ho commune, Duc Tho district, Ha Tinh province; Vo Ninh commune, Quang Ninh district, Quang Ninh province.



IK– a human capital in response to climate change: Concept and international experiences

- Knowledge is the human capital – one of five livelihood capitals of people such as natural capital, human capital, physical capital, financial capital, and social capital (*DFID, 2001*).
- **IK** is considered as knowledge of local ethnics people (*Ashok Das Gupta, 2012*).
- The term of **IK** is used to describe the knowledge system that is developed by a community in contrast to scientific knowledge called “modern knowledge” (*Ajibade, 2003*)



IK– human capital in response to climate change: Concept and international experiences (Cont)

- **IK** is traditional knowledge, is the information that people in a given community, based on experience and adaptation to local culture and environment, have developed over time and that continues to develop (*Stephen A. Hansen and Justin W. VanFleet, 2003*)
- **IK** is considered as the actual knowledge of people that reflects the experiences based on traditions and includes more recent experiences with modern technologies. It contrasts with the *international knowledge system* generated by universities, research institutions and private farms (*Ashok Das Gupta, 2012*)
- The **IK set** is influenced by the previous generations' observations and experiences and provides an inherent connection to regions and surrounding environment (*E. N. Ajani, R. N. Mgbenka and M. N. Okeke, 2013*).



IK– human capital in response to climate change: Concept and international experiences (Cont)

- **Climate change** refers to any changes in climate over time. That may be caused by the change of nature or as a result of human activities. CC is the ability of the natural system to adjust and the ability of people to respond to the stimuli of actual or expected climate or what their impact in order to alleviate the harm or take full advantage of beneficial opportunities (*IPCC, 2007:6*).
- **IK in CC adaptation** is the application of indigenous knowledge to adjust the life activities of local communities to minimize the negative impacts and optimizing the positive impacts of CC.



Increased climate change-induced water disasters are perceived in the North Central region

- ❁ The water disasters such as hurricanes, floods, heavy rains, droughts, inundation, and salinity intrusion still exist in coastal countries with a tropical climate, monsoon like Vietnam. However, in the context of CC, the phenomena have also become disorder to natural rules:
- ❁ In the past, there are an average of about 10-12 tropical storms per year passing through provinces in the North Central region. In the period 2008-2013, according to local inhabitants, the number of hurricanes in the year tends to reduce but the intensity of hurricanes increased sharply.



Increased climate change-induced water disasters are perceived in the North Central region (Cont)

- ✿ A this study in Nghe An, Ha Tinh and Quang Binh showed, 65.2% of respondents (n=355) informed that heavy rains appeared far more than the previous year
- ✿ Salinity intrusion of years before 1990 was only 5km from the sea to the mainland at the mouth of the river, but now under observation of local people in the region, salinity intrusion has increased and has moved inland up to 20-25 km



IK in weather forecast of inhabitants

- In the North Central region, local people usually based on folk experience that his ancestors passed down through observation of natural phenomena from plants, animals, insects, changes of the sky, clouds, wind and some other natural phenomena to bring out the weather forecast serve for their life and their production activities.
- Those experiences are passed from previous generation to next generation by the words of mouth or proverbs, or folk songs.



IK in weather forecast of inhabitants (Cont)



No Weather

Bases of forecast of local inhabitants

1 Sun and rain

- **Plants:** rely on observing the expression of some other herbs, such as **bermuda grass** [*cỏ gà*], **crinum asiaticum** [*Cây ngải tướng quân*], other name is **water banana trees** [*Cây chuối nước*], **torpedo grass** [*cỏ gừng*] and some fruit trees in home gardens, like star-fruit trees, lemon trees, ...

- **Animals and insects:** Observing the changes of animals and insects in natural environment such as toads, dragonflies, ants, termites, birds,... as well as the family pets such as dogs, cats, chickens, ...

- **Changes of sky, clouds and wind:** Observing the changes of sky, clouds and wind such as the moon, the rainbow, Laos wind (hot and dry western wind from Laos to the Central of Vietnam),...



IK in weather forecast of inhabitants (Cont)



No	Weather	Bases of forecast of local inhabitants
2	Typhoon and flood	<p>- Plants: observing the expression of some plants such as water banana trees, torpedo grass, bermuda grass, bamboo,... and some trees in the garden like jackfruit tree...</p> <p>- Animals and insects: some animals such as gobies [<i>cá bông</i>], carps [<i>cá chép</i>], red-claw crabs [<i>con rạm</i>], hylaranas [<i>chẫu chuộc</i>], toads [<i>cóc</i>], frogs [<i>ếch</i>], screaming birds (colley) [<i>chim hét</i>], ... and some insects such as ants, mason-bees [<i>tò vò</i>], bees ...</p> <p>- Some phenomena in the sky: thunder, rainbows, ... with specific signs are considered the basis for predicting the number of storms, floods in a year, large flood or small flood, and when flood gone down</p>



IK in weather forecast of inhabitants (Cont)



No.	Weather	Bases of forecast of local inhabitants
3	Drought	- Relying on observable phenomena from the moon in the specific time of the year such as <i>“it will be drought when the shadow moon appears”</i> , and the appearance direction of the rainbow to making the forecast.
4	Saline water phenomena	- Plants: observations rice seedlings, rice in the field turned into yellow or red - Wind: the appearance of many of the Laos wind - River water: observing the river water turned into blue and very clear, and the glittering surface of water in the river at night like fireflies, or intuitively tasting the water, or seeing a layer of white scum on the dry fields.



IK responds to climate change-induced water disaster in agriculture (Cont)

- Followings are some experiences that local farmers in the North Central region apply to deal with natural disasters caused by CC:
 - 1) Use short-day varieties of rice and vegetable so harvesting time may come before storm and flood season.
 - 2) Adjust cultivating calendar to ensure the growth of rice and harvesting time is not in storm and flood season.
 - 3) Cultivate only a crop in a year to give land a rest and avoid crop loss during flood ad storm season.



IK responds to climate change-induced water disaster in agriculture (Cont)

- 4) Use new rice variety with higher salt tolerance or switch to other varieties resilient to high salinity or water logging.
- 5) Equip more farming instruments to cope with water disasters or extreme climate events
- 6) Upgrade within-farm channel and canal systems and build open-close calendar of drains according to local weather calendar.



Conclusions and recommendations

- IK in production activities is an important human capital of local residents in Vietnam North Central region in coping with ongoing climate changes.
- Apart from traditional experience as mentioned in folklores or proverbs, local farmers also observe trees, insects and animals for weather forecast including sunny, rainy, flood, drought or salinity intrusion. As such, local farmers increase the response capabilities and decrease their vulnerability under climate change-induced water disasters.



Conclusions and recommendations (Cont)

- In agriculture, the local people living in Vietnam North Central region have utilized both traditional knowledge as well as contemporary experience in coping with natural hazards. Specifically, they apply new varieties, rearrange cultivating calendar, use new farming instrument and upgrade canal and drainage system.
- In the process of applying IK in responding to natural hazards, local farmers have learned and gradually adjusted from inappropriate farming techniques to more effective ones. However, IK now have not been documented and just circulated via word-of-mouth channel.



Conclusions and recommendations (Cont)

- To utilize the advantage of local knowledge in responding to climate change-induced water disaster, the IK should be studied, documented and disseminated in various forms including leaflets, video tapes or visual graphs, etc.
- It is advisable that the IK need be integrated into school curriculum or training syllabus to farmers.



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