



GSJ: Volume 11, Issue 9, September 2023, Online: ISSN 2320-9186

www.globalscientificjournal.com

IDENTIFICATION OF LOCAL KNOWLEDGE EMPLOYED BY THE FLOOD-PRONE COMMUNITIES IN RIVERS STATE, NIGERIA

AMACHREE, DIKIBUGERERE Q.; PROF. A. A. OBAFEMI AND MARK OGORO

DEPARTMENT OF GEOGRAPHY AND ENVIRONMENTAL MANAGEMENT

FACULTY OF SOCIAL SCIENCES

UNIVERSITY OF PORT HARCOURT

Abstract

Food-prone communities having regularly experienced flooding seem to have developed local knowledge in their assumption that it will help reduce the disaster risk. Such local knowledge is only an informal and unscientific local way of attempting to combat the risks. Despite the local knowledge and other efforts by these flood-prone communities there seem to be more risk as the communities continually suffer the risks. This study assessed local knowledge for disaster risk reduction in flood-prone communities in Rivers State. The study used cross-sectional research design through survey in three local government namely: Ahoada West, Ogba/Egbema/Ndoni and Obio/Akpor which a total of 400 copies of questionnaire were administered in the flood-prone communities. The results shows that embeddedness of local and indigenous local knowledge in community practices which has gained a niche in disaster risk reduction has led to the development of time-test knowledge and method for preparing, mitigating, responding and recovering form impact of natural hazards.

Keywords: Hazard, Flood, Risk, Local Knowledge and Disaster.

1.0 Introduction

Local knowledge is an important resource,
however, that continues to contribute to

environmental conservation and disaster management in different regions, and traditional communities utilize local knowledge to deal with disasters of different kind. Local knowledge reflects local power to handle a challenging situation. Power relations stemming from local power is related to the creation, interpretation, or validation of local knowledge which can be found not only between community but other external organisations. Traditional communities use local knowledge to deal with many types of catastrophes, and local knowledge is an essential resource that continues to support environmental preservation and disaster management in diverse places. Local expertise demonstrates local capability to manage a difficult circumstance. The formation, interpretation, or validation of local knowledge, which may be found not just amongst the community but also other external organizations, is connected to power relations arising from

local power. According to Mosse (2000), a group of people's leading figures tend to share their local expertise. Local expertise in Nigeria is closely correlated with regional culture and indigenous peoples' earlier experiences (Fabiya & Oloukoi, 2013). This demonstrates that the local populations have a thorough understanding of their surroundings, including its physical, social, and spiritual nuances (Ibid). In an effort to highlight the value of local knowledge, Easton (2004) focused on three alternative interpretations of the concept. First of all, it is seen as a learned behavior from the past. Thirdly, it incorporates what individuals already know and develops new information and perspectives on problems. Second, it is a manifestation of an alternate way of thinking. Howell (2003) argued that local knowledge has been passed on to younger generations, and are regarded as “unscientific” knowledge. In spite of this

many people still use local knowledge which many see as old 'fashioned' knowledge.

Despite this, many still rely on what many consider to be "outdated" local knowledge and the fact that local knowledge is not based on science, it has often been used in conjunction with science to empower local communities and supplement scientific understanding (Makhanu, Otengi, China, Waswa, Masibo & Masinde, 2007). Similar to this, Kallard (2000) argues that because information is evaluated in the context of survival, local knowledge has an advantage over Western science. In order to develop local knowledge, such flood-prone populations need have a fundamental understanding of the flood. "Such local knowledge of floods has implications for local participatory approaches to community adaptations and mitigation techniques to lower flood risks" (Odemerho, 2014).

It is important to emphasize that communities living in floodplains use a

variety of local knowledge to deal with disasters caused by flooding (Danladi, Siong & Teck, 2018). These writers believe that the diverse local knowledge they have is the product of previous flood experiences. As a result of their past experiences, communities in Rivers State that are prone to flooding have developed unique local knowledge.

2.0 Literature

Local knowledge, according to Howell (2003) is passed on to younger generations. This means that local knowledge is an acceptable strategy to combat disaster risk. However, the adoptions of local knowledge strategy vary among different communities. It is noteworthy the mention of the fact that the local knowledge practices of the flood-prone communities in Rivers State may not be the same with other communities that have encountered flood disaster. Certain local knowledge practices adopted by one community could be copied by other communities, depending on its effectiveness.

These reasons necessitate the review of different communities' local knowledge in the fight against disaster risk.

In a study conducted by Ekine & Talbot (2020) the following local knowledge were adopted by the communities in Ahoada West Local Government Area to combat flooding in the area. The communities resorted to construction of flood ways. The flood ways refer to channels dug for river or other water course on the adjacent land areas that are reserved for base flooding into them so as to stop the commutative increase of the water surface elevation more than a specific level. This was thus constructed to solve flooding problem in the area. The communities also built river and coastal defenses. These are infrastructural defenses to bar the water from encroaching on to the inhabited land. When this fails, the communities resort to the use of emergency measures such as sandbags or portable inflatable tubes are used. This according to Ekine & Talbot

(2020) is similar to coastal defenses adopted in Europe and America where sea walls, beach nourishment and barrier islands are built in flood-prone areas. Also, the communities also adopt flood warning technique. Flood warning is the provision of advance warning of conditions that will likely cause flooding and the pre-warning of possible time there will be flood and possible dangers. This method is equally applied by the Ilajes, Itskekiris and Ijaw tribes who reside within coastal rural communities. These communities to Fabiyi & Olukoi (2013) (as cited in Ekine & Talbot, 2020) have an unwritten knowledge of local meteorologists which hinge on observation and traditional practices and the communities' belief systems. Thus, the use of the above local knowledge helps the flood-prone communities to predict flood disaster on seasonal and long term situations.

Similarly, Igwe & Wordu (2016) found the following as local adaptive strategies adopted in combating flood disaster in Orashi area of Rivers State. First, the Orashi communities devised local technologies and manufacturing expertise during the flood. Through this way, the communities fabricated canoes and wood rafts and used them as means of transporting humans and properties belonging to the inhabitants of the area. Also, it is a fact that flooding affects the drinking water sources, which is a possible cause of water borne diseases that can kill people during the flood. With this knowledge, the communities resorted to purify the water using local sources, such as filtration, boiling and decontamination using charcoal. This according to the authors provided a safe drinking water for the inhabitants who were not evacuated. Third, agricultural produce are great sources of economic growth of the people, and when there is flood crops are destroyed. The

people of the flood-prone communities in Rivers State especially the Orashi people having been apprised of this, decided to adopt the local practice of early harvesting of farm produce like yam, cassava, plantain etc. This was done early of the local harvesting period. They also resorted to late cultivation of crops and decided to plant flood-resistant crops.

The fourth local knowledge adopted by the people was social capital. The value “social capital” according to Scott & Marshall (2005) is a concept originally devised by James Coleman to describe the types of relations that exist between individuals as located within both families and communities. Coleman maintained that “the social capital for young person’s development resides in the functional community, the actual social relationships that exist among parents, in the closure exhibited by the structure of relations, and in the parents’ relations with the institutions of

the community. There seem to have been a significant shift in meaning when it is applied to disaster risk management. Social capital is a system of mutual support garnered in the task of ensuring that the weak, trapped and properties are saved to the best of their abilities by a structure of social relations who are members of the community. In the light of this, Igwe & Wordu (2016) revealed that the Orashi people in the spirit of social capital has a network of people who constituted a local flood emergency management committee which undertook the task of mopping-up the affected areas to find the vulnerable, trapped and incapacitated individuals within the flooded areas and assist them to safety. It was revealed that the younger ones who were mostly volunteered members of the social action group used the communicated canoes and wood rafts to ferry helpless people and trapped properties to safety.

These among others formed the people's local knowledge of disaster risk reduction.

In a different study, Nwaogu & Ezekwe (2018) found that the Ndoni people during the 2012 flood that ravaged their communities took some local initiatives to quell the disaster risk. The community built flood barriers. These were concrete walls constructed around buildings to protect the houses. This practice was reportedly effective in protecting their buildings. Also, the communities used social cohesion/capital as a local knowledge. Some community human resources were mobilized that enhanced rapid recovery of some trapped persons and properties.

Finally, the Ndoni people sand-filled some areas that could easily allow the flood to penetrate their residences. These sand-filled areas were raised above the flood levels. It was on the elevated areas that when the state government came to their rescue, temporary shelters were built on the elevated areas by

the government. Furthermore, Ahoada West Local Government Area which is also considered a flood-prone area in Rivers State, according to Maduakolam, Inyang & Kaigama (2019) have some locally adapted strategies adopted by the people. These include, changing water and land use management, capacity building to integrate climate change, developing of flood control and monitoring mechanism.

In a related study, Ngwese et al. (2018) revealed some local knowledge adopted by the people of Northern Ghana; among them is the use of drought-prediction knowledge and practices. People of the study area utilize different traditional and local knowledge and practices to predict imminent drought. This include “the snails and chameleon egg hatch” indicator which is reportedly based on their spiritual beliefs”. “It refers to knowledge associated with mythical and cosmological ideologies” (Ibid). The other forms of

knowledge/practices rely on observations – experience which is tested over several generations and adapted to their environments. Then there is a flood prediction practice. The White Volta River lives in a place also inhabited by small number of hippopotamuses that breed and feed within the shores of the river in Chietanga. The animals have been observed to spend most of their time near the river and rarely move in land, except during floods or the period of imminent flood. The movement of the hippopotamuses to land has been observed as a sign of imminent flood and had been followed by generations.

Brown and Brisibe's (2020) research focused on "developing local resilience capability in communities exposed to floods in the Orashi region of Rivers State. The study which used qualitative research techniques, identified five essential characteristics that the Orashi communities possessed and that helped them increase their ability for dealing with the

flood calamity. Among these include leadership, social capital, etc. Other flood-prone villages in Rivers State were not included in this research because it primarily focused on the Orashi area. Additionally, it took a qualitative perspective. This necessitates quantitative empirical study that takes into account all of Rivers State's flood-prone locations. In a different study, Dube & Munsaka (2018) looked at how traditional knowledge helped Zimbabwe reduce its risk of catastrophe. This study was carried out in the flood-prone Tsholotsho region of Zimbabwe's Matabeleland, North Province. This study used a qualitative approach and discovered that by observing trees and clouds, people could forecast impending flooding and understand weather patterns. Local communities also make use of the resources they have on hand to implement structural measures for disaster risk reduction. The study "concluded that community adoption of indigenous

knowledge reduces catastrophe risk". Since this study was carried out in Zimbabwe, the local knowledge that was used may be considerably unlike from that of the residents of Rivers State. Communities in Rivers State that have been inundated must be studied.

3.0 Methodology

The cross-sectional research design was adopted in the study. This study assessed the relationship between local knowledge and disaster risk reduction in flood-prone communities in Rivers State. The study area mainly was Ogba/Egbema/Ndoni, Obio/Akpor and Ahoada West Local Government Area. The data collection methods for the study was qualitative and quantitative methods. Therefore, the quantitative methods was the use of questionnaires, weighted averages, while the qualitative method used the indepth interviews and focus group discussion.

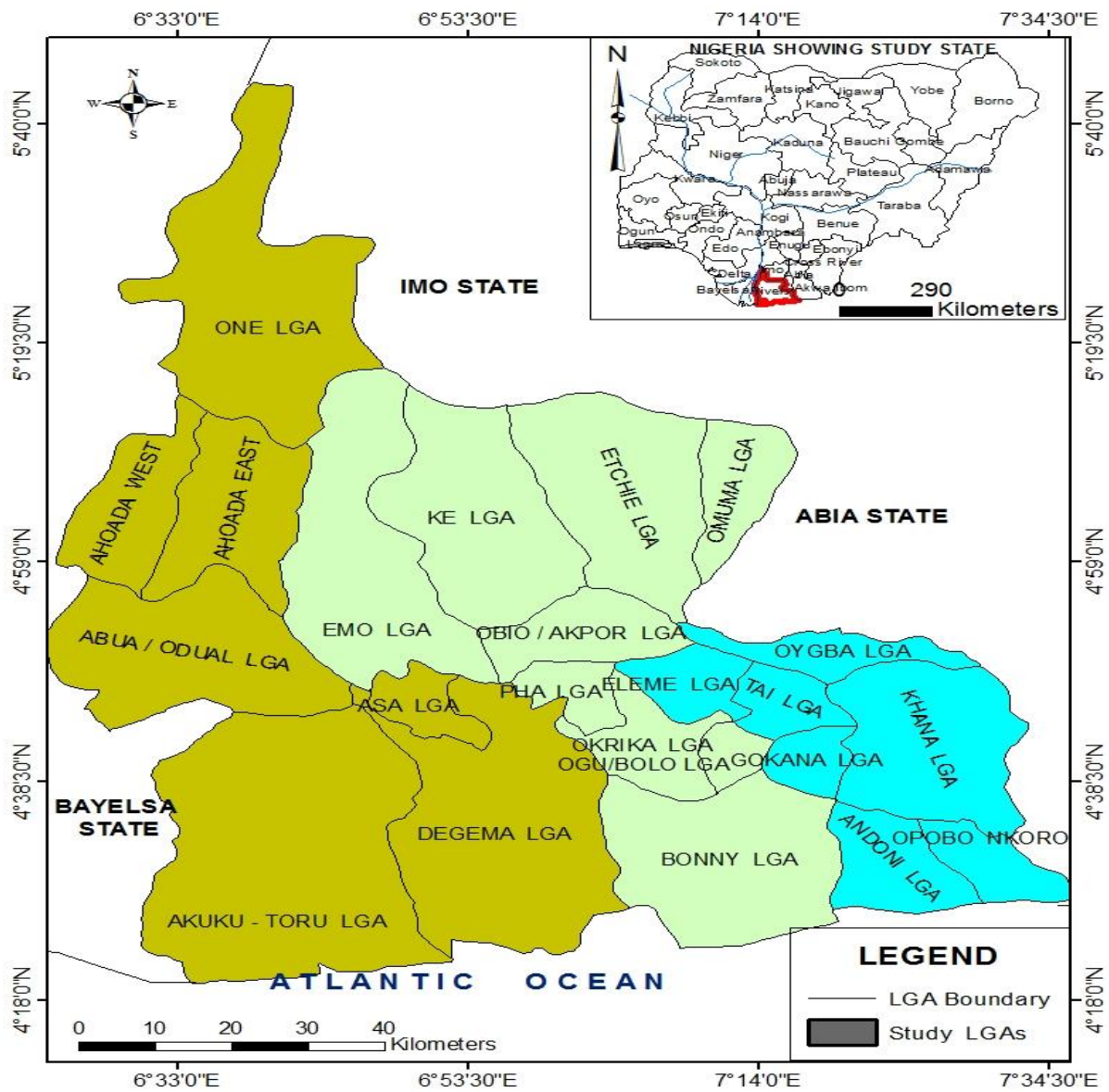


Figure 3.1: Study Area Map.

4.0 Results

Forms of Local Knowledge employed by the flood-prone communities

Table 4.9: The forms of local knowledge employed by the flood-prone communities

Variables	Variable classification	Frequency	Percentage
We use sand bags for flood abatement			
	SA	161	43
	A	57	15
	D	49	13
	SD	35	9
	U	76	20
Weighted Average	3.51		
Remark	Strongly Agree		
Total		378	100
We build our houses on higher lands/High DPC to avert flood risk			
	SA	224	59
	A	67	18
	D	52	14
	SD	10	3
	U	25	7
Weighted Average	4.20		
Remark	Strongly Agree		
Total		378	100
People in my community practice early planting and harvesting of crops to reduce disaster risk.			
	SA	189	50
	A	98	26
	D	34	9
	SD	23	6
	U	34	9
Weighted Average	4.20		
Remark	Strongly Agree		
Total		378	100
We migrate to neighboring villages during raining season to avert losses as a result of flood.			
	SA	102	27
	A	197	52
	D	25	7
	SD	30	8
	U	24	6
Weighted Average	3.85		
Remark	Agree		
Total		378	100

We dig trench and drainages to allow easy flow of water	SA	45	12
	A	72	19
	D	85	22
	SD	97	26
	U	79	21
Weighted Average	2.75		
Remark	Strongly Disagree		
Total		378	100
We train our children and youths to swim against flooding days	SA	45	12
	A	72	19
	D	85	22
	SD	97	26
	U	79	21
Weighted Average	2.79		
Remark	Strongly Disagree		
Total		378	100
There is a traditional method of purifying drinking water so as to avoid contaminated water.	SA	110	29
	A	89	24
	D	67	18
	SD	78	21
	U	34	9
Weighted Average	3.43		
Remark	Strongly Disagree		
Total		378	100
Local early warning forecasting helps in disaster risk reduction	SA	40	11
	A	122	32
	D	80	21
	SD	98	26
	U	38	10
Weighted Average	3.07		
Remark	Strongly Disagree		
Total		378	100
There is a local method of food preservation to avert hunger	SA	150	40
	A	98	26
	D	80	21
	SD	38	10
	U	12	3
Weighted Average	3.89		
Remark	Strongly Agree		

Total		378	100
Lunar Observation helps in forecasting flood event occurrence	SA	34	9
	A	50	13
	D	170	45
	SD	46	12
	U	78	21
Weighted Average	2.78		
Remark	Disagree		
Total		378	100

Source: Researcher’s Analysis, 2023

The local knowledge include among others, early planting, discongestion of drain and other water ways construction of wooden bridge (monkey bridge), building on high lands/ increasingly the DPC level, local method of food preservation, water purification, sandbag filling and finally embarkment. Increasing DPC level, canalization, drain clearance and sand filling are more dominant approaches employed in the study are. These approaches employed are termed as local form knowledge as revealed in the table 4.9 above.

The application of local knowledge in flood disaster risk reduction was tested across the using a likert scale questionnaire approach

as applied under 5 ratings of strategy agree to undecided.

The results from the analysis on forms of local knowledge of flood risk reduction, showed that 43% of the respondents strongly agree that they use sandbags for flood abatement while 15%, 13%, 9% and 20% of the respondents agreed, disagreed, strongly disagreed and undecided respectively. The table also revealed that 59% and 18% of the respondents strongly agreed and agreed that they build their houses on higher lands /High DPC to avert flood risk; 14% and 3% of the respondents disagreed and strongly disagreed while 7% were undecided

The result also found that 50% of the respondents strongly agreed that the people

in the community practice early planting and harvesting of crops to reduce disaster risk, 26% agree while 9%,6% and 9% Disagree, Strongly Disagree and Undecided respectively.

Respondent Agrees with the form of local knowledge of migrate to neighboring villages during raining season to avert losses as a result of flood with 52%, 27% strongly agree, 7% Disagree, 8% Strongly and undecided stood at 6%.

For digging of trenches and drainages to allow easy flow of water 12% and 19% of the respondents also strongly and agreed, however, 22% Disagree, 26% Strongly Disagree 21% were undecided. For training our children and youths to swim against flooding days, 12% and 19% of the respondents also strongly and agreed, however, 22% Disagree, 26% the Strongly Disagree 21% were undecided. The table further observed that 11% and 32% Strongly Agree and Agree with local early warning

forecasting helps in disaster risk reduction while 21% Disagree, 26% Strongly disagree and 10% were undecided. The results of Local method of food preservation shows that 40% Strongly agree with the method, 26% Agree, 21% Disagree, 10% Strongly disagree and 3% of the respondents were undecided. Finally for lunar observation method the result showed that 9% of the respondents strongly agreed Lunar observation helps, 13% of the respondents agreed, while 45%, 12% and 21% of the respondents were, disagreed strongly disagreed and undecided respectively.

Discussion

For generations, local peoples and local communities have successfully been using traditional methods to prepare for and respond to disasters (UNDRR, 2022) and for over centuries they adapted to local cultures and environments, the term Local Knowledge” refers to the knowledge, practices, and behaviours of local

communities all around the world were used in various communities to manage adversities in order to support, cope and recovery from flood events. In the context of Disaster Risk Reduction (DRR), local Knowledge lies in the accumulated experience that comes with the close relationship of local communities to their environment, formed through successive trials and errors over generations and space for local and scientific knowledge to co-exist or in reality transform to commonly recognizes methods for reducing disaster risk. The local knowledge can help inform existing approaches for disaster risk reduction, therefore the importance of local knowledge cannot be over-emphasized.

From the analysis of the study, the results showed that different forms of local knowledge of flood risk reduction exist in the study area and were identified. The analysis of 5 point likert scale showed that 43% of the respondents strongly agree that

they use sandbags for flood abatement while 15%, 13%, 9% and 20% of the respondents agreed, strongly disagreed, disagreed and were undecided respectively. It also revealed that 59% and 18% of the respondents strongly agreed and agreed that they build their houses on higher lands to avert flood risk while 14%, 3%, 7% were while strongly disagreed, disagreed and were undecided. For clearing and digging trenches and drainages to allow easy flow of water the study found that 50% of the respondents strongly agreed, 26% of the respondents also agreed, however, 9% strongly disagreed while 6% of the respondents disagreed and 9% were undecided. The result also revealed that 27% of the respondents, 52% strongly agreed and agreed that they migrate to neighboring villages during raining season to avert losses as a result of flood however, 7% of the respondents were strongly disagreed while 8% disagreed and 6% undecided. The analysis showed that 40% of

the respondents strongly agreed that they train their youths and children to swim against flooding days; 26% of the respondents agreed, while 12%, 18% and 4% of the respondents were strongly disagreed, disagreed and undecided, respectively. Furthermore for the traditional method of purifying drinking water so as to avoid contaminated water and Local early warning forecasting helps in disaster risk reduction 29% of the respondents strongly agreed, 24%, 18%, 21% and 9% agree, strongly disagree and undecided respectively. For local food preservation method, 40% of the respondent strongly agree that local form of food preservation has long been practiced in the study area to safeguard the food for future use, 26%, 21%, 10% and 3% agree, strongly disagree and undecided respectively. Finally the result also revealed that for Lunar Observation helps in forecasting flood event occurrence, 45% strongly disagree that it is not a

common form of local knowledge of disaster risk reduction in the study area, 9% strongly agree, 13% agree, 12% disagree and 21% of the respondents were undecided. The weighted averages for the analysis were 3.51, 4.20, 4.02, 3.85, 2.75, 3.75, 3.79, 3.43, 3.07, 3.89, and 2.78 with grand mean and criterion mean of 3.0 and 3.7. This suggest strong agreement and implies that knowledge exist and provide form bases for disaster risk reduction and these forms of local knowledge exist in the study area which has been used overtime to reduced flood disaster risk. This collaborate with the study conducted by Fabiyi & Oloukoi (2013) which examines the nature and types of traditional and indigenous knowledge systems adopted in the management of ocean and river flooding in some selected coastal rural communities in Nigeria. The study adopted a qualitative methodology, specifically sourced data. It was revealed that the communities – the Ilajes, Itshekiri's

and Ijaws have undocumented knowledge of local meteorologies which are hinged on observation and traditional practices and belief systems. This enabled them to predict flooding in time, and on a short and long term basis. The study also revealed that the communities also have some local adaptation strategies and indigenous technologies. These include social capital, building materials used and construction style, and local public works amongst others.

In this present study, several forms of local knowledge for flood disaster risk reduction were identified.

5.0 Conclusion

Local knowledge is a coping strategy or mechanism applied by inhabitant of vulnerable communities over time for mitigating disasters risk in order to avert challenging related to reoccurring disasters. Local knowledge is the basis of

communities coping strategies practices that have help vibrant communities survive natural calamities over time.

The embeddedness of local and indigenous local knowledge in community practices which has gained a niche in disaster risk reduction has led to the development of time-test knowledge and method for preparing, mitigating, responding and recovering from impact of natural hazards.

The truth that communities believe in and held valid significantly shape their understanding of hazards and risk thereby affect how they respond to disasters.

6.0 Recommendation

The study therefore recommended based on the findings of this study

- 1) Effective sensitisation should be carried out in the flood-prone communities on response to early warnings signs to strengthen flood risk reduction.

- 2) Institutional framework should be put in place to redevelop local knowledge in to disaster risk reduction strategies to mitigate the impact of flood

service, food and agriculture organization (FAO).

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