

DISSEMINATION OF INFORMATION ON CLIMATE CHANGE: A CASE STUDY OF WOMEN MUSSEL HARVESTERS AT KwaNgwanase in KwaZulu-Natal

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ABSTRACT

Climate change has recently been the cause of a number of natural disasters throughout the world. Climate change and the changing conditions arising from it exacerbate the poverty of many poor rural communities in developing countries by damaging the natural resources on which they depend for survival. All sectors, including the library and information services (LIS) sector, should make an effort to understand this phenomenon, and ensure that information related to climate change is disseminated effectively and efficiently. The Millennium Development Goals, set by many countries for 2015, cannot be reached if efforts to achieve them are disrupted by drastic changes in weather conditions. Many communities situated along the coast depend on marine resources for both food and income, as is the case at KwaNgwanase, where mussels have been harvested for many years. However, climate change is affecting the mussel population, and the supply is decreasing. Focus group discussions, interviews and observations were conducted to identify the challenges of accessing and disseminating information relating to climate change faced by KwaNgwanase (KwaZulu-Natal province) women mussel harvesters. Specifically the objectives were to establish the flow and use of information on climate change to and by women mussel harvesters at KwaNgwanase, with the focus on information sources used; the role of the Departments of Agriculture, Forestry and Fisheries and Ezemvelo KwaZulu-Natal Wildlife (Ezemvelo KZN Wildlife). Specific information elicited related to the dissemination of information on climate change, and

in improving ways of diffusing relevant information to KwaNgwanase rural women harvesters. The findings indicate that information on climate change and its impact on marine resources was available but not adequately disseminated to the harvesters that affected their harvesting. It is recommended that various stakeholders and different methods of disseminating climate change information be used to enhance its accessibility, ie traditional leaders/elders such as the *amakhosi*; and utilising local government structures/stakeholders such as councillors to disseminate information on climate change to women harvesters. It was found that the indigenous knowledge possessed by these stakeholders is crucial and could be incorporated into climate change predictions. Information and communication technologies (ICTs), too, could be helpful in the diffusion and accessing of such information.

1. INTRODUCTION AND CLARIFICATION OF CONCEPTS

Climate change or climate variation has recently caused disasters throughout the world, including South Africa. Africa Adapt KSO (2009) observes that climate change has become a serious threat to the African continent, with many local communities already affected and struggling to adapt to or cope with its impact. United Nations Framework Convention on Climate Change's Article 1 (UNFCCC) (1992:3) defines climate change as the change in climate directly or indirectly attributable to human activity, which alters the composition of the global atmosphere and occurs in addition to natural climate variability observed over time. The Intergovernmental Panel on Climate Change (IPCC) (2001) defines climate change as any change in climate over time, whether due to natural variability or as a result of human activity indicating the many causes of climate change.

The report by the Trustees of Columbia University (2004/5:1) states that the concentration of greenhouse gases in the atmosphere is increasing, with emissions of carbon dioxide and changes in land-use all associated with global climate change. The report further states that humans are tampering with the climate system through alterations to the carbon cycle which affects ecological, social, economic and health systems (Campbell-Lendrum, Corvalán & Prüss-Ustrün 2003:133), a fact also noted by Smyth (2009:800), who comments that the nature and extent of climate change hinders development and environmental sustainability, and threatens human security (Climate Change Facts nd:4). Health and well-being could be affected by an increase in the number of very hot days, and by air pollution, which could give rise to respiratory and asthma problems in people, especially children and the elderly (Fact File nd:4). Water resources, agriculture, natural ecosystems and human health could be affected, and must therefore be protected. As Reid (2007:12) observes, natural systems provide goods and services that have value for society.

Developed nations have engaged in behaviour and practices that have contributed to climate change, while, ironically, poor nations have contributed least to the problem of climate change (Reid, Sahlén, MacGregor & Stage 2007:5), yet they have become

the most vulnerable and are likely to be most affected by climate change (Reid *et al* 2007:7). There is therefore a need for a vigorous dissemination of information on climate change to poor rural communities, and women harvesters at KwaNgwanase in particular. There is also a need for creating avenues and structures which could be used to promote information access and dissemination to effectively curtail the effect of climate change. Therefore, this study aims to determine whether rural women mussel harvesters of KwaNgwanase experience challenges in terms of the accessibility and dissemination of information on climatic changes by the Departments of Agriculture, Forestry and Fisheries (DAFF), and Ezemvelo KZN Wildlife's officials in the area.

2. CLIMATE CHANGE WITHIN THE SOUTHERN AFRICA CONTEXT

Within the southern Africa context the need and value of information and knowledge in terms of climate change is imperative. Previously indigenous knowledge was paramount and sufficient in terms of addressing natural resource based challenges. However for the past decades indigenous knowledge has been in need of additional sources and resources to supplement corrective ways to address climate issues such as assistance from various national and regional departments, the use of relevant information technologies as well as the realisation that library and information services have a role to play in this regard.

2.1 THE ROLE OF INDIGENOUS KNOWLEDGE

In the past, people were able to predict the weather by interpreting natural signs, and thus indigenous knowledge was easily shared among young people and the elderly orally or by word-of-mouth. Archer (2003), Mwaura (2008) and Mogotsi, Moroka, Sitang and Chibua (2011) discuss both traditional and meteorological ways of weather forecasting. Archer (2003:1530) for example, piloted a study to explore the usage of traditional knowledge in the forecasting of local weather in rural communities in the province of Limpopo. While Mwaura (2008:51) commends South Africa on its biodiversity, he laments on the impact of many years of colonialism and apartheid that have manifested in the apparent loss of indigenous knowledge in environmental conservation and speculates that many species may have become extinct. According to Mwaura (2008) the Imbewu Youth Programme of the South African National Parks (SANParks) focuses on traditional knowledge of retired indigenous park rangers or 'wise elders', who use oral tradition to communicate with the youth, hoping to promote interest in conservation efforts and engenders environmental awareness (2008:52). In Botswana, the agro-pastoral communities of the Kalahari are heavily dependent on their environment for subsistence. Due to climate variability that has caused harsh and highly dynamic ecological systems they have developed multiple adaptive livelihoods out of necessity using both traditional and meteorological methods (Mogotsi *et al* 2011:916).

2.2 THE ROLE OF THE DEPARTMENT OF AGRICULTURE, FORESTRIES AND FISHERIES AND EZEMVELO KZN WILDLIFE

Ezemvelo KZN Wildlife and the DAFF are entrusted with the long-term conservation of the rich biodiversity and management of the province's natural resources. Their role is to advise the communities about their natural resources and its importance. Due to communities having limited knowledge in this respect, these authorities are tasked to call community meetings where important information on the natural resources, biodiversity, forests, fires, animals, farming and the management thereof, is shared.

2.3 THE ROLE OF INFORMATION AND COMMUNICATION TECHNOLOGIES (ICTS) AND CLIMATE CHANGE

Despite all these adaptive efforts and strategies, geographic distance could result in the delayed dissemination of urgent information in rural areas.

While the contribution of traditional ways for the prediction of climate change is acknowledged, the diffusion of information has become more accessible through the use of information and communication technologies (ICTs), with people globally adopting these technologies to enhance their lives and businesses, particularly through mobile phones. According to a report from the Economist Intelligence Unit (2010:3), mobile data tools and services are one area where the emerging world equals or outpaces the developed world in terms of usage patterns. With high telephony penetration, particularly in the form of mobile phone technology in Africa (including South Africa), the diffusion of information on climate change could be maximised. For example, North Carolina State University is promoting the maximised use of cell-phones in Kenya and South Africa, (in collaboration with the University of Pretoria's Department of Tourism Management). This initiative, called the Wishvast Network allows its users to join groups of local relevance to exchange information, meet new people based on shared interest, and build trusting relationships (National Collegiate Inventors and Innovators Alliance (NCIIA)). The NCIIA further indicates that through the Wishvast Network, users can message a group to advertise themselves, their products or services, or get access to resources. This would suggest that women mussel harvesters could have access to weather and climate change information as soon as they need it with instant dissemination to them as a group.

Traditional ways of diffusing information, such as meetings, visits, hands-on training and educating, and radio remain important and effective, especially in the context of semi-literate groups in the rural areas of developing countries, where marginalisation with regard to access to new technology still occurs. However, mobile phones, computers, the Internet and other ICTs have the potential to make possible and enhance rapid information-sharing and raising awareness. The idea and efforts of the Wishvast

Networks are supported in Melchioly and Saebo's (2010:1) observation that mobile phone technology has become the mainstream delivery mode owing to widespread reach to the majority of the African population.

In South Africa mobile phones and technologies such as geographic information systems (GIS) could be used to facilitate and monitor environmental information and provide a weather forecasting service to those who would benefit from it. Urgent SMSs could be sent via mobile phones to alert people to the likelihood of, for instance, floods, to prepare them to evacuate dangerous areas, and thus potentially contribute to their safety.

Efforts have been made in Southern Africa, in Botswana (Mogotsi *et al* 2011:919) and South Africa where attention is now being paid to rural communities previously marginalised in the climate forecast system (Vogel 2000; Kgakatsi 2001). Television is regarded as a potentially useful tool and platform for interpreting weather to people. In the Bobonong area, in Botswana, the primary source of climatic data was radio broadcasts (68%) and television broadcasts (11.2%) indicating that meteorological forecasts are used (Mogotsi *et al* 2011:919). Since television signals are broadcast throughout South Africa, efforts to translate weather interpretation into all nine South African official languages could assist and encourage people to pay attention to weather and climate information which could result in the saving of lives that may otherwise be lost to floods, extreme heat and lightning.

Climate change and accompanying disasters disrupt efforts to realise the Millennium Development Goals (MDGs) (United Nations Report on MDGs 2006) (See Appendix 1:22), in particular goals 1, 3 and 7 which aim at eradicating extreme poverty, promoting gender equality and empowering women, and ensuring environmental sustainability as a means of reversing the loss of environmental resources. Natural assets such as fish, forests, wildlife, agriculture and crops and water are affected. Many businesses, including those in agriculture are affected during disasters related to climate change, forcing people either to start afresh or simply abandon their business efforts, through which they had aimed to provide for their families and communities and alleviate poverty. Clearly these above goals are applicable to the case under study, namely the KwaNgwanese women mussel harvesters.

2.4 THE ROLE OF LIS AND CLIMATE CHANGE

It is vital that information on climate change be disseminated to all levels of the community in order that everyone should understand the nature and scope of climate change as well as its impact on the socio-economic and environmental stability of the community's livelihood. Therefore, disseminating climate change information cannot be confined to weather and environmental specialists. The library and information services (LIS) sector, too, should become involved by accessing the indigenous knowledge from elders and by making this knowledge/information available. Public libraries, especially those situated in the areas where climate plays a pronounced role, may involve themselves

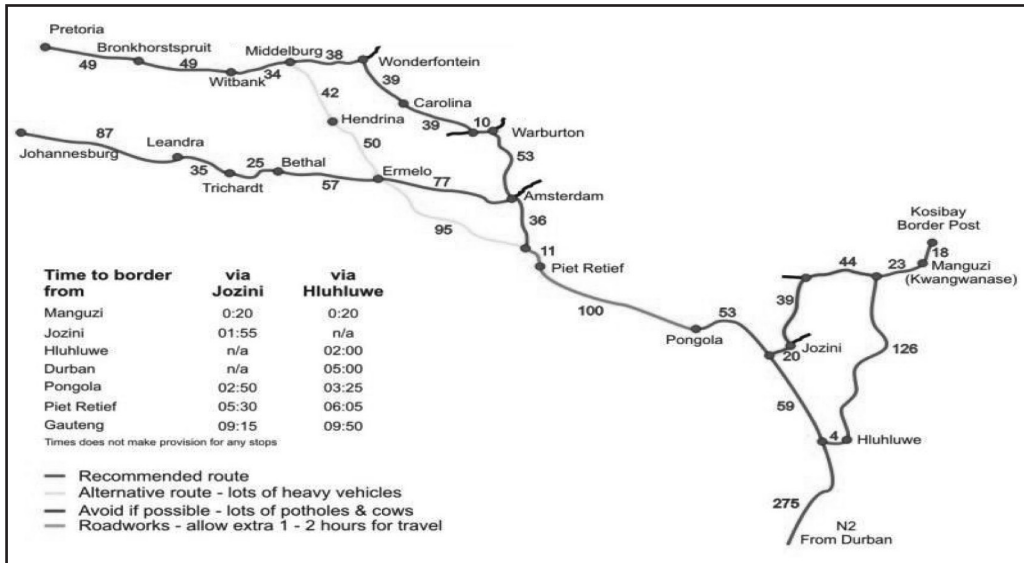
and partner in activities that are done by different departments such as the Department of Basic Education, that may target learners at schools; Departments of Environmental Affairs and Agriculture, Forestry and Fisheries, and any other relevant department that may extend its target to the general public and engage in campaigns at alerting people on weather changes and its impact.

Libraries can also start their own alert campaigns where they regularly disseminate information on weather and climate changes. Such an awareness campaign could be launched during Annual Library week/Arbor Day to diffuse urgent information to communities for the safety of the people. Libraries should be seen as fore-runners in creating awareness about and the importance of climate change, as was articulated at the Conference on Climate Change and Children, held in Manila (2012) where it was evident that especially children's museums in the Far East (Japan, Korea, Singapore, Philippines) are actively involved in not only raising awareness of climate change but also teaching children skills to survive climatic disasters such as earthquakes, tsunamis and floods.

Several conference speakers emphasised the importance to create awareness about climate change within a community, especially amongst the children (Alipao 2012; Burke 2012; Kuroiwa 2012; La'O 2012). Alipao (2012) for example, makes a difference through advocating for a sustainable and friendly environment by focusing on the youth in his home town. Similarly Burke (2012) believes that connecting children with the natural world is a critical step in fostering environmental stewardship and advocacy. In the same vein, La'O (2012) is of the opinion that children's museums have a responsibility to create awareness about the global climate crisis motivates children to learn about their immediate surroundings. Kuroiwa (2012) indicates that in Japan, children's museums have developed interactive exhibitions to raise children's awareness of natural disasters, global climate change and environmental issues. With this commitment of children's museums in the Far East it is important to note that at COP17 (2011) held in Durban, South Africa in November 2011, a long-term Climate Change Awareness Campaign was launched of social mobilisation for action on climate change. During COP17, a Climate Change Train ran between Cape Town and Durban to highlight the impact of climate change on vulnerable communities, raise awareness and educate people through exhibitions, classes and talks (www.capetowngreenmap.co.za; www.greentalent.co.za).

3. CONTEXT OF THE STUDY

KwaNgwanase is situated in the Umhlabuyalingana local municipality in northern KwaZulu-Natal.



Map 1: Map of KwaNgwanase

Source: Kositourism (2008)

This area is biologically diverse, which promotes economic production, yet the marine species found there remain vulnerable. Members of the community, especially women, depend on harvesting marine resources for household consumption and to sell. Generally, women are agents of change, as they play a significant role in their households and communities (Commonwealth 2011:2) (Sharma, Nagar & Chopra 2007). Smyth (2009:800) notes that women play a fundamental role in the productive and reproductive economy as managers of natural resources and increasingly as participants in community-level social and civil activities. Understandably and as part of their role as women, most women at KwaNgwanase harvest mussels, a shellfish that grows attached to rocks in the intertidal zone in the area. Harvesting is a long-established aquacultural activity, which has been practiced for years in the area. Owing to limited employment opportunities and the need for self-sustainability in the informal business arena, greater exploitation pressure on the marine animals has resulted in overharvesting of species such as mussels. This situation has arisen due to significant social and economic dependency of the community on its natural resource base and the absence of specific control measures, which have encouraged unrecorded and uncontrolled harvesting practices. This has resulted in negative consequences for the ecosystem in the area exacerbated by changes in the climate. This is a complex situation that requires a balance between demand and supply. The demand for survival (basic survival/livelihood needs) by harvesting mussels and selling them at the market; and supply, (the availability of sellable mussels) through the implementation of policy/

legislation, technical and support measures, that will ensure the sustainability of mussel harvesting (and other marine resources) at KwaNgwanase.

A need exists for mussel harvesters to receive information that will enable them to understand climate change and its impact on their families and communities. This will enable them to develop and adopt best practices when harvesting, taking into consideration their income, markets and livelihoods as well as threats arising from climate change. According to Reid *et al* (2007:5), fishing as a resource, is also a climate-sensitive sector. Therefore, diffusion of relevant information to the women harvesters of KwaNgwanase is crucial.

The mussel harvesting sector at KwaNgwanase is at risk owing to a range of macro-environment factors, such as political, economic, socio-cultural, technological and environmental factors. Environmentally the mussels are stressed due to undesirable water quality, because of environmental toxicity in both the water and air. Technologically, mobile phones could assist in disseminating urgent climate information and allow women to access and share relevant information. However, as the majority of women are semi-literate and not techno-savvy, this may not happen. From an economic perspective the current world recession and high unemployment figures in South Africa could lead to unethical and unacceptable behaviour in aquaculture, such as marine pollution and where over-harvesting/fishing is practiced in the name of ‘we do not have money, we are unemployed’, as indicated by one respondent. Politically, especially in developing countries and where communities are found, governments are failing to provide the necessary economic infrastructure and sustainability. This may lead to communities practicing behaviour detrimental to aquaculture resources, including mussels, which may potentially force this vulnerable sector to cease its activities.

4. PROBLEM STATEMENT

The problem under study was to investigate whether rural women mussel harvesters of KwaNgwanase experienced challenges in terms of the accessibility and dissemination of information on climatic changes, specifically the dissemination of information by officials from the Department of Agriculture, Forestry and Fisheries (DAFF), and Ezemvelo KZN Wildlife. The objectives addressed were:

- To determine the age distribution of the rural women mussel harvesters at KwaNgwanase in terms of accessing information on climatic changes;
- To determine the level of education of the rural women mussel harvesters at KwaNgwanase in terms of accessing information on climatic changes;
- To determine whether rural women mussel harvesters encounter problems during harvesting that may be addressed by climate-related information;
- To determine the access, dissemination and sources of information on climate

change by rural women mussel harvesters;

- To determine the role of formal stakeholders (i.e. Department of Agriculture, Forestry and Fisheries (DAFF) and Ezemvelo KZN Wildlife) in terms of the dissemination of information on climate change to rural women mussel harvesters at KwaNgwanase; and
- To establish ways to improve dissemination of information on climate change to rural women mussel harvesters at KwaNgwanase.

5. METHODOLOGY

The study followed snowball sampling as a non-probability sampling technique where existing respondents recruited future respondents from among their acquaintances. The rationale for using this respondent-driven method of sampling was to find other mussel harvesters in the community, since the fieldworker was not physically resident in the community and may have been less successful in identifying the social network of mussel harvesters.

This technique has limitations as people's friends are more likely to be included in the sample. There is also a lack of knowledge as to whether or not the sample is an accurate reading of the target population likely to be included in the sample. The researcher however attempted to address these limitations by asking respondents to suggest additional respondents that they were not necessarily friendly with, but they had seen harvesting mussels.

The geographical research area, ie KwaNgwanase, was purposively selected as the researcher is familiar with it and has credibility within the Thonga community.

The sample consisted of forty-three rural women mussel harvesters. The officials from DAFF and Ezemvelo KZN Wildlife assisted in identifying the first three harvesters (this sample could be regarded as that of a mini pilot study). After securing an appointment with these women harvesters, the other respondents were identified through snowballing.

A total of five focus group discussions were conducted with the women respondents ranging between seven and ten in each focus group. These forty-three individual women are all members of the Thonga community in Manguzi and Tembe Tribal Authority. It was decided not to go beyond the forty-three women as the focus group discussions did not yield any additional or new information on the topics explored.

6. ANALYSIS AND FINDINGS

The data obtained in the focus groups were of a qualitative nature and analysed based on themes set as the objectives in par. 4 and are presented and discussed in the following six subheadings:

6.1 AGE DISTRIBUTION OF THE WOMEN HARVESTERS

The literature (Ford Foundation 2010:3; Reid 2007:12; Smyth 2009:800) indicates that communities benefit from natural resources, including marine resources.

Table 1: Age distribution of the rural women mussel harvesters

Age bracket	Frequency	Percentage
15–29 years	15	35%
30–40 years	20	46%
41–50 years	6	14%
51 years and older	2	5%
Total	43	100%

Table 1 indicates that the majority of the women harvesters 20 (46%) are in the 30-40 year age bracket, and with more than a third, 15 (35%) in the 15-29 year age bracket. Women aged 51plus years also participate in mussel harvesting at KwaNgwanase, with 5% of the sample in this category.

The marine resources constitute a source of livelihood for many, and rural women of all ages, including those in the category of 51 years and older, as well as teenagers in the range of 16 years work as harvesters at KwaNgwanase. Young females aged 15 years and below were observed to also be engaging in mussel harvesting and were allowed to participate in the study because of the Labour Relations Act, regardless of their needs. According to the *Quarterly Labour Survey*, Quarter 1 (2010:vii) the people who can be counted in the Labour Force is between the ages 15-64 years.

6.2 LEVEL OF EDUCATION OF RURAL WOMEN MUSSEL HARVESTERS

Literacy levels in rural communities tend to be extremely low (AusAID 2005:1). KwaNgwanase is characterised by both illiteracy and unemployment. In table 2 the levels of education attained by the women mussel harvesters, is reflected. Although nearly half (19, 44%) had received primary education, about a third 13 (30%) had no formal education at all, while 2 (5%) had a tertiary qualification. They all worked together, with their respective levels of education not constituting a boundary.

Table 2: Level of education of the rural women mussel harvesters

Level of education	Frequency	Percentage
No formal education	13	30%
Primary level (Grade 1–7)	19	44%
Secondary level (Grade 8–12)	9	21%
Post-matric/tertiary (college, university)	2	5%
Total	43	100%

6.3 PROBLEMS EXPERIENCED BY RURAL WOMEN MUSSEL HARVESTERS THAT CLIMATE-RELATED INFORMATION MIGHT ADDRESS

More than half of the women (25, or 58%) harvested mussels for household consumption, and the rest (18, or 42%) harvested solely for trading and business purposes. Problems they experienced during the mussel harvesting process that may be related to climate change, were:

- the number of harvested mussels had decreased due to the increase of the number of women harvesters had increased. Young mussel beds were being tampered with, since more women were harvesting more frequently and at any time;
- young mussel beds were being tampered with- since some of the women were unaware that mussels should be of a certain age and size and were harvesting more frequently and at any time;
- the issuing of fines by DAFF, since other community stakeholders such as Ezemvelo KZN Wildlife and LIS regarded the harvesting behaviour of the women as unacceptable;
- dissemination of information to the women harvesters was seen as a problem by them. They indicated that only male farmers in the community were taken into consideration with visits and meetings arranged with them and not with them. They felt that they would benefit from such information and training in their harvesting;
- the women identified a need for information relating to harvesting, resources that could assist them in the harvesting process and technical knowledge relating to harvesting; which support Ochieng's (2009:3) observation that information on climate change does not reach all stakeholders, and a need for greater openness of communication channels exists; and

- language was cited as another problem as a problem indicating that the women harvesters preferred to be addressed orally and face-to-face in isiZulu, their mother tongue. They indicated that although Ezemvelo officials occasionally distributed English pamphlets the printed medium was inappropriate with them being semi- or illiterate; also the text was not always in isiZulu creating a barrier to information access. They indicated that they could not rely on their literate children to read them the pamphlets as they were not interested in agricultural matters.

6.4 THE ACCESS, DISSEMINATION AND SOURCES OF INFORMATION ON CLIMATE CHANGE BY RURAL WOMEN MUSSEL HARVESTERS

As indicated above DAFF officials visit groups of male farmers in the area and share information on farming and climate in a face-to-face setting and distribute pamphlets. This information reaches the women harvesters via informal verbal information-sharing among the community's members. Clearly the DAFF's efforts are aimed primarily at semi-literate male farmers not able to utilise the pamphlets. Although these pamphlets are either in isiZulu or English or a combination of the two, most community members could not utilise them and they were not aimed at the women mussel harvesters.

The respondents were gravely concerned as they were not receiving information specific to their needs and all indicated that they would adapt their harvesting practices to accommodate relevant information on climatic conditions. One woman's response is representative of the sample: 'I would follow the times of harvesting strictly to allow mussels to grow big enough to be harvested ... I would also teach others good ways of harvesting, such as not to touch the beds until the mussels are big.' This indicated the women's willingness to learn and adopt good practices should information on climate, food security and environmental sustainability and management be made readily available to them.

6.5 THE ROLE OF DAFF AND EZEMVELO KZN WILDLIFE IN CONVEYING INFORMATION (CHANNELS AND SOURCES) ON CLIMATE CHANGE TO THE WOMEN MUSSEL HARVESTERS

The DAFF and Ezemvelo KZN Wildlife officials had contact with the community in general, specifically the male farmers and Indunas, but not with the women mussel harvesters in particular. The officials distributed pamphlets (usually in English although sometimes in isiZulu) to the community that was not a suitable channel of information access on climate and weather changes due to the literacy levels of many women harvesters and consequently this medium would not benefit them.

According to the respondents, DAFF officials prevented them from harvesting by issuing them with fishing permits, rules and procedures to harvest, which resulted in a negative relationship between the two parties. Whereas respondents representing the DAFF and Ezemvelo KZN Wildlife, said the officials reported considerable resistance among the entire KwaNgwanase community, not only among the women mussel harvesters. It was reported that the community feared that DAFF and Ezemvelo KZN Wildlife planned to take over and control their resources and riches. The officials indicated that the community refused to accept permits allowing them to harvest officially and according to procedures. The community viewed the permits as control measures which made it very difficult for the officials to engage with the community as a whole, and the women mussel harvesters in particular. This is understandable because DAFF and Ezemvelo KZN Wildlife are in most cases not part of the community.

6.6 WAYS TO IMPROVE DISSEMINATION OF INFORMATION ON CLIMATE CHANGE TO WOMEN HARVESTERS AT KWANGWANASE

According to the respondents (the rural women mussel harvesters) the dissemination of information on mussel harvesting and climate change, should be through oral communication and personal visits as this would be the most suitable way of ensuring smooth information flow.

Personal oral dissemination of information by a community elder or Induna

The respondents indicated that to access climate change information, they would prefer an Induna or community member who understands their situation to orally disseminate the information to them. Since the DAFF only engaged with male farmers and did not proactively disseminate information to the women harvesters this resulted in not only an unproductive relationship between the two parties, but negated the empowerment of the women by not providing them with relevant harvesting information. The women harvesters thus felt the need for a community elder, which supports their case in the oral dissemination of relevant information.

Personal oral dissemination of information by the DAFF and Ezemvelo KZN Wildlife

The respondents were of the opinion that the proactive dissemination of information on mussel harvesting and climate change, should be through oral communication and personal visits as this would ensure smooth information flow between them and the information providers (the DAFF and Ezemvelo KZN Wildlife). Thirty-five (81%) of women suggested direct personal contact with information providers and a participatory method. They wanted to be visited and included in activities that related to their community and to them as women harvesters in particular, so that the diffusion

of information would be made easier. They preferred personal visits, as this would give them the opportunity to ask questions.

According to the information providers (DAFF and Ezemvelo KZN Wildlife officials) frequent and more open meetings, visits and training sessions for information diffusion were suggested. For example, they indicated the importance of teaching the women harvesters to harvest once a month, to cater for their busy schedule with other activities in the office and also to enable women to have enough time to plan ahead and gather together for some discussion or any information sharing.

Traditional channels of dissemination (radio, pamphlets)

Some of the respondents were not in favour of the (above personal) visits which they feared would be time consuming and suggested in addition to the community radio, that their cell phones could be used as a means for the DAFF and Ezemvelo KZN Wildlife to convey urgent information. Some other respondents indicated that pamphlets could be used to supplement oral communication, but that these should be in isiZulu, the language spoken locally. The respondents stated that the DAFF officials also distributed information on farming specifically to the farmers, but only in English. Although the respondents were aware of the importance of communication with the DAFF office for urgent information, the emphasis was on the need for the oral dissemination of information.

A community radio station, Maputaland Community Radio, operates in the area. The respondents suggested that the radio could be important for broadcasting information dealing with climate change and harvesting issues in isiZulu, this being the most appropriate language for broadcasting information relating to the community and their livelihoods. The majority of the women however had concerns about the usefulness of information randomly transmitted by radio and preferred to sit and listen to a radio programme at a fixed time.

ICTs as channels of information dissemination

Some respondents felt that their cell phones could be used as a means for the DAFF and Ezemvelo KZN Wildlife to convey urgent information. However, the use of ICTs (like mobile phones) for information diffusion had not been adopted to any significant degree. Women mussel harvesters indicated mother tongue oral information diffusion via cell phone or radio as appropriate if it could occur frequently.

8 RECOMMENDATIONS

Based on the findings of this study the following recommendations are made for the improvement of information access and dissemination amongst rural women mussel harvesters:

- The use of videos plays and demonstrations to disseminate information about climate change to the community. This may help the rural women mussel harvesters and the broader community, including both children and elderly people, to understand climate issues better. This means of conveying information by using videos, plays and demonstrations is also supported by faith leaders both locally and internationally. Archbishop Desmond Tutu and other leaders of faith and environmental campaigners from Africa and around the world are advocating for a better environment through an event called ‘Climate Change Concert and Rally’. This event took place prior to the COP17 Conference in Durban in November 2011, where talks by world leaders were held. The aim of the Climate Change Concert and Rally is to urge world leaders to reach a fair and legally binding agreement to curb climate change (The Art Link Report 2011). In addition, climate-related games, stories and cassettes should be used to provide a better understanding of good practices that the women harvesters could implement in order to ensure the availability of this marine resource for generations to come.
- The repackaging of weather prediction information by involving the weather forecast services. This has been emphasised by the women mussel harvesters as the best means of disseminating information on climate change.
- Climate change announcements in schools and by the leaders in the area, such as local government officials and traditional leaders such as the *amakhosi* and *izinduna* since these structures are already available within the community context.
- A community radio station exists whose broadcasts reach most parts of KwaNgwanase. Community radio stations play a vital role in reaching a community and are an excellent way to disseminate information. In addition to Ukhozi FM, a popular radio station that reaches the whole of South Africa and beyond, Maputaland Community Radio could be used to cover issues relating specifically to KwaNgwanase. A community radio station could be used to broadcast quick and urgent announcements relating to weather changes, floods, storms and fires, and to advise people to evacuate dangerous and threatened areas. It is recommended that the community, in conjunction with decision-makers and the local government, consider the utilisation of a community radio station for this purpose.
- Training/hands-on programmes and activities planned for farmers in the area should also be available to the women harvesters to give them a legitimate platform for voicing matters that relate to them. This will empower and motivate them to communicate relevant information on climate change and its impact to other women, and encourage all to adopt good practices.
- Involvement with Non-governmental organizations (NGOs), such as Ntuzuma and Bhukula Mfazi Environmental co-operatives, and Imbewu Youth Project,

that work in the area of Durban, but not yet established in KwaNgwanase area, should be encouraged, so that all can benefit from initiatives in support of adaptation to climate change and its impact. According to the Minister for Agriculture, Environmental Affairs and Rural Development, Lydia Jonson, the main objective of the Ntuzuma and Bhukula Mfazi Environmental Co-operatives are to work with people in teaching them what they can do in their communities in order to avoid hazardous climate disasters (Johnson 2011).

- Alternative sources of income: Since women mussel harvesters may need to consider an alternative income to mussel harvesting during certain periods of the year, they should be encouraged to plant trees as a flood protection measure, especially as forests come under threat during climate change. This exercise will also provide employment and income, offering an alternative to mussel harvesting for household consumption, trading and income generation.
- The use of ICTs for the dissemination of information on climate change. It is imperative that ICTs such as mobile phones be used to disseminate information on climate change. Repackaged information on climate change and its effects on natural resources such as mussels can be disseminated to women mussel harvesters via ICTs (mobile phones in particular) since the majority mobile phones, and they should be utilised for the urgent diffusion of climatic information.
- An existing school, church, clinic or any community building that is central and available to the community could be used as a central hub for information dissemination; to conduct relevant training on climate change and also as an information depot for weather and climate change experts for reaching out to the communities. Such an information hub could be used in the interim as a gathering place to ensure the rapid diffusion of vital information on climate change. Traditional leaders and political councillors play an important role in the communities, and could be involved in disseminating information on climate change to their communities and to women harvesters in particular.
- The planning and building of a telecentre, library or weather office near or at KwaNgwanase that could be used as a central point for information dissemination on climate change to women harvesters and to the community at large.

9. CONCLUSION

Climate change or global warming that brings about climate variations is contributing to the decrease in the mussel population at KwaNgwanase. The study revealed that there were no plans for training sessions to educate mussel harvesters about climate variations and its effects on this and other natural resources. The findings indicate that women harvesters were concerned about the decrease in mussel numbers, as this

affected their livelihood and businesses, and the need for training in good mussel harvest practice became evident. The officials of DAFF and Ezemvelo KZN Wildlife supplied information on climate change and on fishing to the women harvesters when making general visits to the community, but they agreed that these visits were not as frequent as they should be, and that this information was usually presented in the form of printed pamphlets, which was clearly not the medium that should be used.

The dissemination of information on climate change is hampered by inadequate sources and channels of communication. ICTs such as mobile phones were not being used to disseminate information on climate change. Therefore repackaged information on climate change and its effects on natural resources such as mussels be disseminated to women mussel harvesters via ICTs (mobile phones in particular) since the majority of the women harvesters have mobile phones, and they should be utilised for the urgent diffusion of climatic information. In addition, climate-related games, plays, stories, videos and cassettes should be used to provide a better understanding of good practices that the women harvesters could implement in order to ensure the availability of this marine resource for generations to come. Pamphlets and other printed media are not recommended as many women are semiliterate and they appear not to be a viable solution for their situation.

Climate change is a serious issue. All information provision sectors must take action by actively participating in the dissemination of information about climate change to their communities, and to the women mussel harvesters in particular, as a way of ensuring adaptation to the effects of climate change, sustainable practices and the empowerment of women mussel harvesters. Information specialists and professionals, such as the librarians could be involved in rendering specific services, and collaborate with community volunteers, who have easy access to the community, and can quickly disseminate urgent information, alerts and warnings to these women, and that matters relating to climate change not remain the exclusive responsibility of DAFF and Ezemvelo KZN Wildlife.

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APPENDIX 1: MILLENNIUM DEVELOPMENT GOALS

- MDG 1: eradicate extreme poverty and hunger
- MDG 3: promote gender equality and empower women
- MDG 4: reduce child mortality
- MDG 5: improve maternal health
- MDG 6: combat HIV/AIDS, malaria and other diseases
- MDG 7: ensure environmental sustainability
- MDG 8: develop a global partnership for development

Source: World Health Organization (WHO) 2012

This study was conducted in response to the Joint Science Academics' Statement on Global Response to Climate Change, in which all nations are urged to take prompt action to reduce the causes of climate change, adapt to its impacts and ensure that relevant information to address impact of weather and climate change is included in all relevant national and international strategies. Furthermore, the South African Promotion of Access to Information Act 2 of 2000 supports access to information as a means of supporting and exercising citizens' rights to information (South Africa 2000:2).