

Indigenous Knowledge of Wild-food Resources among Children in Tanzania

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ABSTRACT This is a case study of children's knowledge of wild-food resources in three rural communities in Tanzania. The study argues that research on African Indigenous Knowledge Systems (AIKS) on wild food resources marginalizes the theoretical and practical knowledge that children have on these resources. It was found that children, both boys and girls, had a wide knowledge of the wild food resources. This was acquired through social practice. They saw, heard, gathered, processed and ate these food resources. Girls had more theoretical to practical knowledge of wild-food plants, while boys demonstrated greater knowledge of wild animals and birds due their respective involvement in related activities. The study recommends that more research should be conducted to establish the local knowledge of children in different age groups and genders for AIKS curriculum development purposes.

INTRODUCTION

The United Nations Food and Agricultural Organization (FAO 2011) estimates that, globally, over 2 million people are undernourished. Most of these people are women and children in the developing countries, especially in Africa. Bradford (2009) argues that, in spite of the substantial evidence showing the importance of wild-food resources to the global food basket, i.e. plants, fruits, animals, insects, etc., particularly for the vulnerable groups, their contribution role has not been given much attention in research on food security and nutrition in African local communities.

In the context of this study, wild food resources include the plants, animals, insects and other living organisms obtained from the wild and used by local communities for food. The study argues that although, historically, these wild food resources were sole dietary components for hunter-gatherer and forager cultures and still remain key to many agricultural communities, they are increasingly consumed in urban areas of Africa (Muya 2008).

Kimaro (2010) indicates that over one billion people in the world use wild foods in their diet; and that forests provide food to more than 300 million people. This article argues that, in the context of most African cultures, the distinction between cultivated and wild foods is foreign. This is because the term wild is often used to refer to ecosystems and situations in which human beings have not interfered. However, indig-

enous communities who depend on the natural environment for a livelihood, tend to influence and interfere with most, if not all ecosystems, including the flora and fauna. Wild foods have long provided local communities, both men and women, with a "hidden harvest", as they continually use the biodiversity around their farms and communities to supplement the traditional foods and incomes (Kingazi 2009).

Salim (2010) elaborates that African indigenous farmers, hunters, gatherers, fishermen, and foragers have not over the years simply taken natural resources from the environment - they have added value to it as in normal agricultural practice. For instance, foragers maintain natural resources by intentionally sowing wild seeds, irrigating stands of grasses, burning areas so as to stimulate plant growth, selective culling of game animals and fish, replanting of portions of roots, etc. All these indigenous natural-resource-management practices and associated knowledge systems were intended to maintain the stability of the ecosystems.

Semkulo (2010) offers a critical discussion of the economic value of wild foods in Tanzania. He argues that there are limited comprehensive estimates on the economic value of wild-food resources in the country. The quantitative analyses face methodological difficulties owing to a number of factors: first, existing case studies which use different valuation methods and diverse scales are rarely comprehensible; second, trade in wild-food resources is often informal or occurs at local markets, and hence is missed by

official accounting mechanisms. However, while exact estimates of the economic value and volumes involved is difficult, what is commonly agreed on, is that trade in and use of wild-food resources provide an important supplement to general incomes, being especially critical during economic and social hardships (Kingazi 2009).

Muya (2006) indicates that, as in other African countries, the contribution of edible wild resources to the well-being of rural households in Tanzania is widely recognized. These are vital components of the daily diet and nutrient intake, and are particularly important during times of crisis. They can be found close to human settlements for ease of acquisition; providing nourishment and variety in the diet. These edible wild resources also contribute to health maintenance as functional or medicinal foods, as well as in providing rural households with supplemental income opportunities through their sale at markets. Samson (2009) observed that local communities in rural Tanzania, rely on wild-food resources gathered from the agricultural landscape (fields, ditches, pathways), as well as from within the villages. For instance, some of the plant foods could be considered “managed”, in that transplanting and protection are undertaken. In addition, there are many small protein items collected, including freshwater fish, insects, and so on, which are sources of protein. The hunting of birds, insects and a variety of small game is also common. This is mostly conducted by children, especially boys.

However, this study argues that most of the existing research on African indigenous knowledge-systems of wild foods and their contribution to food-security has not taken into consideration the knowledge rural children have on wild-food resources (flora and fauna) as a rural food-security strategy, especially in times of food shortage. They acquire this knowledge through interacting with older members of the community, their peers, and social practices, as they live and interact with the natural environment.

The general objective of the study was to examine rural children’s knowledge of wild-food resources as a food-security strategy in changing social conditions. The context of this study is one in which rural communities are experiencing change owing to the migration of the parental generation. Muya (2006) shows that over 40 % of young parents (both male and female) in Western Usambara Mountains in the age group

of 17-30 years of age leave the rural areas in search of other life opportunities in the various urban areas within and outside the Tanga Region. In this situation children are often left behind in the village to be raised by their grandparents. Attention in this study has been paid not only to knowledge acquisition of children within the household, but also to the wider context of their interactions with the natural environment including social interactions with others within the community.

Using three village communities in the Western Usambara Mountains in north-east Tanzania, that is, Mbuzii, Vuga, and Mlalo, the study examines rural children’s local knowledge of wild-food resources for food security and sustainable community livelihood, especially during times of food shortage. Moreover, these rural communities are also experiencing changes due to migration of parents. As observed by Muya (2006, 2008), the children are left behind to be raised by other relatives, particularly grandparents. The study took into consideration that most of the local knowledge of wild-food resources is increasingly lost because of such migrations. The older generations are dying, taking with them undocumented information apropos these indigenous wild-food resources.

METHODOLOGY

This section presents the overall methodology and methods used in the research study. This includes the description of the research setting and the design of the study. The validity and reliability as well as limitations of the study are also highlighted including an explanation of the ethical measures that were followed in conducting the research.

This research was carried out in three villages in the Western Usambara Mountains in the Tanga Region, Tanzania, were selected for the study. The researchers originate from the research area. They know the culture, including the local language, Kisambaa. This made interaction easier with the knowledge-holders and community members in general. The study villages were Mbuzii, Vuga, and Mlalo. The Usambara Mountains are among the most important centres of biodiversity in East Africa. The choice of the study area was also influenced by the fact that, at national level, the Usambaras are an important water-catchment area and source of non-

timber forest products. Their international significance is as a result of the existence of abundant genetic resources used, such as medicinal plants, timber trees, and other plants of economic value, including wild coffee (Kingazi 2008).

The three study villages are fairly typical of the area in which hunting and gathering activities for wild foods were still practised. The majority of people are small-scale subsistence farmers. The predominant diet of the local people consists of a starchy staple food made from maize or cassava flour, and a side-dish of stew. The starchy, staple food is usually served as a form of stiff porridge “ugali”, when made of maize, or “bada” when made of cassava and/or cooking bananas. The stew, made from a wide variety of local wild and semi-domesticated plants and animals, is usually prepared separately. The foods included a variety of wild vegetables, birds, insects, and a variety of small game.

In order to determine the indigenous knowledge of wild-food resources among children in the study communities, a qualitative research study was carried out during the dry seasons (January to March 2011). The qualitative research approach was used in this research study since it is more flexible and due to the opportunity to interact with community members including the study children through research methods such as interviews and participant observation the information is richer compared to quantitative methods such as using a questionnaire. According to Silverman (2008), qualitative research investigates the search objects in their natural settings and attempts to make sense of, or interpret phenomena in terms of the meanings people bring to them.

Various research methods were available to the researchers within the qualitative research framework but interviews and participant observation methods were used in this study for data collection. They provided the researchers with the opportunity to be actively involved in the research process rather than being mere passive listeners. Interviews constituted a larger part of the data collection methods. They took an informal form, with more focus on asking questions and listening to the participants. Spradley (2007) explains that interviews allow a free flow of information in an unstructured way, with emphasis on listening and observing to ensure that the participants’ stories and experiences are heard. We used the interview guide to direct the

interview discussions, without hindering any additional information which came from the participants. The interview guide contained both unstructured and structured questions to allow unrestricted flow of ideas from participants. In order to facilitate the richness of the data, the participants were encouraged to talk openly about their experiences in the research problem to enable them to provide insights through words and not in numbers.

Follow up questions were asked where necessary to achieve clarification of issues. The interviews were tape-recorded with the consent from the participants, and participants were assured of anonymity and confidentiality of the interview and throughout the study. The interviews took approximately 30 to 40 minutes each. The interviews were conducted in preferred locations of the participants to ensure that they were comfortable enough to fully participate.

The interviews were conducted in Kisambaa, the local language since it was the language all the respondents understood better. As the interview questions were originally in English, they were translated into Kisambaa during the interviewing process for the participants to understand them. This allowed for clear communication, and the respondents felt comfortable to share their stories and experiences in a language they preferred.

However, we were aware of the potential weaknesses of the interview method as a technique of discovery in that even confidential interviews may not necessarily generate the truth but only what a participant was ready to share at a particular moment (Spradley 2007).

As researchers we were aware that interviews alone were not sufficient for the explorative study, and therefore we supplemented them with the use of participant observation to improve the validity of the findings. Participant observation provided us as researchers with ways to check for non-verbal expressions of feelings, to understand how participants communicate with each other and check how much time is spent on various activities. Participant observation has been used in a variety of disciplines as a tool for data collection about people, processes, and cultures in qualitative research (Russel 2009). Silverman (2008) elaborates that participant observation can also be used to increase the validity of the research study as it helps the researcher to have a better understanding of the study com-

munity or social group. The main objective of conducting the research study using participant observation as a method was to develop a holistic understanding of the indigenous knowledge of the children in the study communities on the use of wild foods. We accompanied some of the children informants during their gathering and hunting activities. We observed and noted the practices and interactions which these children had either with other children, their caretakers or others, were noted. Caretakers, as well as children, were asked about the children's life histories. This technique was used to capture the patterns of socialization and cultural knowledge transmission, and the practical dimension of the children's local knowledge.

There are various limitations in using the participant observation as a data collection method is that sometimes researchers are not easily accepted in the study communities. Factors such as one's appearance, ethnicity, age, gender and class may affect the researcher's acceptance. There are also situation where the researcher immerses into an unfamiliar culture and studies the lives of other people as a full time community member during the period of the research. This is a limitation as a researcher may have to change his/own way of life in order to fit within the study community or social group. However, this was not the case with our research study because were familiar with the culture and the way of life within the study communities.

We used a combination of interviews and participant observation in order to explore the children's knowledge and experience of wild foods especially the way this local knowledge residing among children contributes to food security and nutrition.

In collaboration with the community leaders, a purposive sample of 30 children (15 boys and 15 girls) aged 8–14 years old in the study villages participated in the study. The children were known by the community leaders to have wide knowledge and skills related to wild-food resources found around the communities. They were also considered to be mature enough to participate effectively in the study. About 10 adult relatives related to the participant children, mostly grandparents (6 female and 4 males) participated in the study.

On the issue of informed consent, permission of participants was sought to record the interviews and conversations in order to enable

us to focus on the participants/interviewees and their responses, not with note taking. Questions pertaining to the interviews were listed on the informed-consent sheet that each participant signed. In addition to respecting the privacy of the participants the researcher ensured their anonymity, an environment of comfort and trust was ensured throughout the research study in order to facilitate the greatest flow of views and insights from each participant. Participants were further given choices of withdrawing from the study whenever they felt that they have lost interest to participate. To protect the participants, their genuine names were kept confidential and the pseudo names were used when referring to their experiences

RESULTS AND DISCUSSION

The Contribution of Wild Foods to the Rural Community Diets

The study is in line with a previous study conducted by Muya (2008) in the same rural area. It revealed that, although the Wasambaa historically acquired much of their starchy, staple food items from farming, most of the leafy vegetables and meat in the traditional diet were obtained from wild-food sources. According to Muya (2006), until today, wild foods in the area accounted for over 10% of the dietary items. Children and women were the main collectors of these wild-food resources, especially the wild vegetables and fruits. This study found that, of the wild-food species (flora and fauna) consumed in the study area, 42% were vegetables, 25% were fruit, 22% were small mammals and birds, and 11% were mushrooms. Of the items obtained from the forest, 39% were birds and small mammals, 28% were fruit, 25% were leafy vegetables, and 8% were from wild-fish species sources, such as streams. According to the community knowledge-holders, including nutritionists in the community, these wild fruits, vegetables and animals were important sources of micronutrients for community members, especially for the children.

The wild animal species commonly hunted and consumed in the study communities included two types of small antelope, and two types of rodent (*Thryonomys* spp.). Children, especially boys, were actively involved in hunting these rodents and other small animals in the forest.

The other types of small animals hunted and reported by the respondent boys were *digi digi* or *paa* (*Rhynchotragus* spp.), *funo* (a species of Duiker, *Cephalophus* spp.), and *kuhe* (*Cricetomys gambianus*). In the case of foodstuff gathered by the respondent children, especially girls, these included wild vegetables such as *mchunga* (*Launaea cornuta*). Women taught their daughters how to harvest these wild vegetables in a manner that ensured regeneration.

Interviews and focus group discussions indicated that these wild-food resources were mostly used by many households when there was not enough cash to purchase cultivated vegetables (cabbages, tomatoes, spinach, onions, etc.) dried fish, beef, and so on. The period just before and during the rain season was one of the most agricultural labour-intensive periods (land preparation, planting and early weeding). It was also the period during which there was an augmented use of wild food. More than 60% of the respondent children indicated that they preferred wild vegetables to cultivated ones. They used them more often. These vegetables are palatable; and may be prepared without cooking oil, which was expensive. Wild vegetables were regarded as easily obtainable, affordable, and available all the year round. Children, both boys and girls, were actively involved in the collection of these wild-food resources.

Children's Local Knowledge of Wild-Food Resources

The study found that the most common plant species in the study area known to the respondent children, especially girls, were as follows in Kisambaa, the tribal language of the area, English, and the biological name, respectively: Mgagani (spider plant/*Gynandropsis gynandra*); Mnavu (black nightshade/*Solanum villosum miler*); Ndeemo (Malabar spinach/*Basella alba*); Kitojo/Mbwembwe (blackjack/*Bidens pilosa*); Tongwe (fame flower/*Talinum portulacifolium*); Dangadanga (Purslane/*Portulaca oleracea*); Kware/mshunga-mboga (hare lettuce/*Sonchus luxurians*); Bwache (*Amaranthus spinosus*) and Mchicha (*Amaranthus hybridus* L.).

The collection of wild vegetables was mostly done by women and children, especially girls. The girls could mention more names of wild vegetable plants than could the boys. The collec-

tion was usually done on the return from the farm, or while collecting firewood. The plants were usually collected at vegetative stage, when the leaves were still young and fresh. Sometimes, only the leaves are picked, as was the case with Ndeemo (*Basella alba* L.). Usually, only the amount needed each time was collected as part of sustainable harvesting. If more leaves than needed were harvested, these were dried and stored for future use. Some of the vegetable species, such as Mchicha (*Amaranthus hybridus*) and wild berries were collected for sale at the local and neighbouring markets as source of income.

It was observed that both boys and girls learnt practically by being involved in the activities of hunting and gathering wild food resources. The girls demonstrated wide experience in the collection and preparation of the wild vegetables. They indicated that the wild vegetables were eaten as a form of mboga (stew). The process of preparing them for a meal was similar to that done in most local sambaa communities, although the details differed from one species to the next. The process was as follows: (i) the leaves and young shoots were sorted; old leaves, as well as the petioles, were removed; (ii) leaves were cut once or twice, after which they were rinsed; (iii) the leaves were boiled briefly, then squeezed dry. The water used for boiling was not used for other purposes; (iv) the leaves were cooked in water or oil for about 15 minutes to half-an-hour, usually together with tomatoes and onions; (v) salt was added, either with or without other spices.

Interviews with the respondent girls and women revealed that, although pre-boiling was not always needed before cooking, some of the wild vegetable species such as Mshunga (*Launaea cornuta*), are so bitter to the taste that they need to be boiled for longer. Often the bitter vegetables were mixed with other vegetables to make the taste milder. Lime or lady's fingers (*Abelmoschus esculentus*) were used instead of tomatoes. Sometimes the leaves of certain wild vegetables, for example hombo (*Triumfetta annua* L.) were first dried and pounded to powder, before being boiled in water to make soup.

The study revealed that, although there were differences in content, the number of plant species elicited from the respondent children was as great as the species elicited from some adult men and women. This showed the ability and familiarity of children regarding the naming of

local wild-food resources. This was owing to the extent to which the children were directly and culturally involved in the community activities, including food-security practices. Out of the total number of wild-food resources named by respondent adults, the children knew 35% of the wild vegetables, 25% of the types of game, 24 % of the types of fish, 22% of the types of food-insects (found on land or water) and 20% of birds. It is noteworthy that the names of local fish were often mentioned by both boys and girls. In the study area fish was very important as a protein source in the diet. The fish were obtained from the streams and swamps around the study villages. The common names of local fish indicated by both respondent boys and girls in the local language included *dagaa* (*Sardinops ocellatus*), *mkunga* (*Anguillidae*), *kambale* (*Clarias gariepinus*) and *perege* (*Oreochromis korogwe*).

The study revealed that the respondent boys could mention most of the birds found around their respective local communities. This was due to the fact that the birds were generally caught by men and boys. The names of local birds frequently mentioned included: tropical boubou (*Laniarius aethiopicus*), African paradise flycatcher (*Terpsiphone viridis*), square-tailed drongo (*Dicrurus ludwigii*), white-eared barbet (*Stactolaema leucotis*), scaly francolin (*Francolinus squamatus*) African goshawk (*Accipiter tachiro*), brown-hooded kingfisher (*Halcyon albiventris*), and Retz's helmet shrike (*Prionops retzii*).

The study was also interested in the children's knowledge of wild animals eaten locally. The common types of wild animals frequently mentioned by the respondent boys and girls included two types of rodent (*Thryonomys* spp.), *digi digi* or *paa* (*Rhynchotragus* spp.), *funo* (a species of duiker, *Cephalophus* spp.), *kuhe* (*Cricetomys gambianus*), *swala* (*Aepyceros melampus*), *ngiri* (*Phacochoerus africanus*), *nungu* (*Erethizon dorsatum*), and *mbogo* (*Syncerus caffer*). Boys could give more names of animals and birds than girls. This may be because boys spent more time wandering around the village and playing outside including hunting with older boys and the elderly men. The study also attempted to establish the children's knowledge of wild fruits. This was due to the observation that wild fruits were mostly collected by children. They generally collected the wild fruits in

groups, sharing and eating them as snacks when they played together. The names of the wild fruits which were frequently mentioned by the respondent children, both boys and girls, included: *Makwazu* (*Tamarindus indica*), *mkadamia* (*Macadamia integrifolia tetraphylla*), *mfudu* (*Vitex payos*), *mshihwi* (*Syzigium guineense*), and *mkuyu-mpeho* (*Ficus valli-choudae*).

The study found that through individual in-depth interviews and focus group discussions the theoretical knowledge of the respondent children in general was quite high, as was shown by their ability to name the wild-food plants and animals. However, the study revealed that the respondent girls had more practical knowledge of wild food plants than boys. This was due to their being involved in the collection of the wild food plants for daily use at home with their female relatives. The respondent boys showed a greater knowledge of wild animals.

Children's Acquisition of Knowledge on Local Wild-Food Resources

On the basis of the interviews, focus group discussions, and observations, the study found that the children had gained their knowledge of locally-based wild-food resources through their lived experiences, as they hunted and collected wild foods around the community; also by interaction with peers and other community members.

Interviews and focus-group discussions revealed that, for the girls, older women, especially the mothers and grandmothers, were often regarded as the primary transmitters of knowledge and skills on wild-food resources. It was also observed that, while parental transmission was undoubtedly important, other knowledge-acquisition channels were important. This was the case in the situation where the parents were absent. The role of other social contacts and interaction channels became important. In the study a community in which most of the parental generation was absent, grandparents, especially grandmothers, were the main caretakers of children. Children spent a large portion of their time with grandparents and friends. Respondent children reported that they learned about wild-food resources from grandparents, brothers/sisters, cousins, friends, other adult relatives and neighbours, when their parents were not around. Interviews and focus-group discussions revealed that children generally started to learn

about gathering and hunting wild-food resources at the age of 7, when they joined adults on gathering and hunting trips. At the age of 10–12, the children had already gained a large percentage of the skills and knowledge apropos wild-food resources. Children who learned less from their caretakers had the opportunity of learning the practical skills and knowledge of wild-food resources from friends during their play and interaction in the fields.

CONCLUSION

The study investigated children's theoretical and practical knowledge of wild-food resources in three rural communities in Western Usambara, Tanga Region, North-East Tanzania. This included the sources, channels of transmitting, acquiring and using the wild food resources. The channels included grandparents, peers, and other community knowledge-holders, including close relatives and neighbours. The knowledge and skills were acquired from experience as they saw, collected, hunted, prepared, and ate these wild foods. They also heard others talk about these foodstuffs; hence they learnt what they were called in the local language, Kisambaa, and the national language, Kiswahili. The study revealed that the theoretical knowledge of the children in general was quite high, as was shown in their ability to name the wild food plants and animals during in-depth interviews and focus group discussions.

This has implications on the school curriculum, especially the learning of science because the theoretical and practical knowledge which the children have could provide an important basis for the integration of indigenous knowledge and modern science. Currently, there is a gap between the science taught in the school curriculum and the holistic and practical knowledge which children, both boys and girls, acquire from society. The integration of the two knowledge systems will offer children the opportunity to learn science as they experience it in real life situations.

RECOMMENDATIONS

The study recommends that more research studies in local communities should be conducted to establish the indigenous knowledge systems which children at different age groups and

gender possess in their life situations. This should form a basis for determining the way in which indigenous knowledge and modern science could be integrated. The objective is to remove the gap which currently exists between the school curriculum and society. The curriculum is dominated by modern science which marginalizes indigenous knowledge possessed by learners. There should also be an increase in awareness among different sections of society including the elderly, teachers, curriculum developers and educational policy makers on the importance of recognizing and valuing the community-based knowledge which children have on the various aspects of society. The government which has expressed recognition of the value of Indigenous Knowledge Systems in education and sustainable development must have a clear strategy on how this knowledge, especially the experiences which children bring to school, could be integrated in the curriculum. This aspect tends to be ignored in the current educational system.

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