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General Practices on Indigenous Knowledge System Technology in Selected Regions of Namibia

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Abstract: Research into Indigenous Knowledge System Technology (IKST) has been receiving increasing attention from research institutions and Government Ministries in Namibia during the last five years. Indigenous communities in Namibia possess a rich traditional knowledge expressed in many practices in their communities. This study aims to present and identify general indigenous practices that have potentials for development in four regions in Namibia. These regions were Omaheke, Oshikoto, Omusati and the Kavango. These indigenous technologies covered medical, pharmaceutical, indigenous food, tanning, construction and infrastructure technologies and household equipment of the local. This research article also presents Namibia's best Indigenous Knowledge System Technology practices as compared to United Nations Educational, Scientific and Cultural Organization (UNESCO) and the Netherlands organisation for international cooperation in higher education (Nuffic) protocols. The comparison shows the potentials of these technologies despite their simplicity and poorly developed structures. The local communities need be educated on the importance of these indigenous technologies. The youth should also be encouraged to learn these knowledge systems to preserve them from being lost with the older generation.

Key words: Indigenous knowledge system technology, traditional knowledge, indigenous technology, Namibia

INTRODUCTION

It is common knowledge that peoples, throughout the ages and from all nations and communities under different environmental conditions in the world, developed knowledge and skills which enabled them to live and survive under such conditions. The common knowledge to a particular community or people living together in a certain area, generated by their own and their ancestors experience is generally referred to as Indigenous Knowledge (IK) to that specific society (Ohiokpehai, 2003), this term has been described as the local knowledge that is unique to a given culture or society (Dan *et al.*, 2010). IK is the basis for decision-making by respective communities in developing and finding solutions to day-to-day problems in relation, e.g., to food security, health, social life, environment, spiritual or the transformation of natural resources into useful products and services in order to enhance their livelihoods (Boven and Morohashi, 2002). Such body of

knowledge is sometimes referred to as Indigenous Knowledge System (IKS) (De Guchteneire *et al.*, 2003). IKS is embedded in each specific culture; in this sense, this knowledge is the local people's capital (Mapaure and Hatukulipi, 2007; Cheikhyoussef *et al.*, 2011a).

IKS has been developed, practiced and adapted and tested over the years based on experiences of such specific community where it is created (Zwahlen, 1996). As such, IKS, of a particular community, is seen to 'withstand the test of time and therefore it is considered to be in congruence with the living conditions of that specific community. During the 90's and early 21st century, there has been a keen interest in utilizing IKS into the development process. Agrawal (1995) emphasized that IKS can be linked to the development process of any community. The IK can be seen as an alternative way of promoting development in poor rural communities in many parts of the world (Briggs, 2005). The centralized technical knowledge is very often imported (western) and the peasants do not possess that knowledge. By making use

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of IKS in development agenda, the peasants and the poor will be empowered to act. Much of the IKS discussion for development concentrated on notably agriculture, medicine, food production and environment (Wienecke, 2001).

In this study a number of traditional/indigenous production and or processing technology systems, by specific population language groups, in Namibia, will be presented with the aim to document and identify practices that have potential for commercialization. The identified practices will be assessed for their development potential using the Best Practices (BP) criteria as developed by United Nations Educational, Scientific and Cultural Organization (UNESCO) and The Netherlands Organization for International Cooperation in Higher Education (Nuffic). The aim and purpose of developing BP criteria is to encourage the researchers, planners and other policy-makers to incorporate IKS in their development processes (Boven and Morohashi, 2002).

The Best Practices Criteria for IKS as developed by UNESCO and Nuffic has the following characteristics: IKS should be innovative (Innovative in addressing poverty and social exclusion). IKS should make a difference (IKS Best Practices must have tangible impact on living conditions of community). IKS should have a sustainable effect (IKS Best Practices to sustain eradication of poverty or social exclusion). IKS should be able to serve as inspiration to others (IKS Best Practices to serve as model for others to replicate).

The aim of the study is not to declare these practices as Best Practices as per UNESCO criteria but to use these measures to present and identify practices that have potential for replication and development in Namibia.

MATERIALS AND METHODS

Study locations: This study was conducted in the four regions of the 13 political regions of Namibia. These were the Omaheke, Oshikoto, Omusati and Kavango regions. Geographically the Omaheke region lies in the eastern part of Namibia; the Kavango is in the north east, while Omusati and Oshikoto regions are situated in the north and north central, respectively. Those regions were selected because of their cultural and plant species diversity. Furthermore diverse socio-economic aspects were also considered in selecting the study area in the sense that all the authors of the four pilot studies were originally from those respective communities/regions. They could speak the main language spoken in those regions and they share same cultural values and norms by understanding of the technological concepts which are under review in this study. In addition, Namibian society

is a diverse society hence each of those regions visited had more than three ethnic groups.

Methodologies: The implementation of the field work was coordinated by the Science and Technology Division at the Multidisciplinary Research Center of the University of Namibia. The identification of the respondents was done informally by discussing with local people about IK and asked them to identify people with IKS in their localities with reference to the focus of the study which was mainly focusing on medicine, food, mining, construction and household's equipment. Respondents were interviewed alone in their working places or at their respective homes. Where necessary; working stations were visited separately.

In each region the specific type of medicinal or food technology or products may differ because of the geographical distribution and cultural differences. With respect to the practical IKS issues in the studied areas, the elements of the UNESCO and Nuffic IKS Best Practices criteria included the following:

- The title
- Theme of the practice
- Introducing the process (including location, local context, social features, time of the year, is it current/relevancy?)
- Context and approach (including: purpose, how it is implemented? Who participate?)
- The role of IKS (including: specific IKS features, relation to community values, already recorded? How does knowledge transfer takes place?)
- Achievements (including: qualification features as Best Practices?-giving attention to: sustainability, innovativeness, cost effectiveness, strengths, weaknesses, opportunities and threats (SWOT) of practice, lessons learnt, potential for fostering development/commercialization)
- Source of inspiration (including: possible replication in part or whole, community participation important)

With respect to this study, the general criteria will be used to assess the characteristics of IKS practices in Namibia but the format of description may differ from case to case.

RESULTS AND DISCUSSION

Indigenous medical and pharmaceutical technologies/products: There are many indigenous technologies regarding medical and pharmaceutical treatments practiced by the traditional healers of the local

Table 1: Indigenous medical and pharmaceutical treatments practiced by the traditional healers in the studied regions

Omusati		Kavango		Omaheke		Oshikoto	
Indigenous name*	English name	Indigenous name**	English name	Indigenous name***	English name	Indigenous name****	English name
Oipute Nozido	wounds and swelling	Ruvaro	Infertility	Omuhana	Diarrhoea	Omutse	Headache
Endjandja	stomach-ache	Musira	Haemorrhoid	Otjikoroha	Small pox	Okupanga Oshimela	Diarrhoea
Oshinona	Epileptic fit	Kukwika	Surgery	Okusenina	Constipation	Okupanga Uuwehamekehe	General sickness
Ouzio	Poisoning	Mukongo	Polio	Ombindu	High blood pressure	Endjandja	Stomach-ache
Okuhena Oluvalo	Infertility	Mukota	Bleeding			Onkungo	Voluntary Vomiting
Oupulile, Eemhepo	Bad spirits					Oipute	Wound
Veakwamhungu						Ezimba lyetse lya kuku	Mosquito repellent
						Okupanga Omayeyo	Dentistry

*Oshimbanhu/Oshindonga; indigenous languages in Omusati region, **Rukwangali; indigenous language in Kavango region, ***Otjiherero; indigenous language in Omaheke region, ****Oshindonga/Oshimbanhu; indigenous languages in Oshikoto region

communities in the studied regions; these treatments are shown in Table 1. According to Gracey and King (2009), virtual 400 million indigenous people have low standards of health care due to poverty, malnutrition, overcrowding etc. However, it is essential to mention that though the local community might face the above condition of health services, there is quite a number of locally available health services to the community. As Table 1 indicates, medical and pharmaceutical technologies under study were those concerned with the treatment of: wounds and swelling, stomach pain, epileptic fit, poisoning, bad spirits, infertility, hemorrhoid, surgery; polio, bleeding, headache, diarrhea, constipation, general sickness, stomachache, vomiting mosquito repellent, dentistry, small pox and treatment of high blood pressure. These ailments or diseases have been treated by medicinal plants elsewhere as reported by Chaudhary *et al.* (2006), Ao *et al.* (2008), Cheikhoussef *et al.* (2011b) and Agrawal *et al.* (2011).

For the socio-economic significance of these Indigenous Technologies; the few selected indigenous technologies represent a fraction of larger Namibian IKS which in turn constitute the socio-economic fabrics of the indigenous peoples of Namibia before the era of colonialism. Other forms of IKS are among others: philosophy, religion believes mathematics, astronomy, culture, geo-science, navigation, etc.

Indigenous Knowledge Systems Technology (IKST) on the other hand constitutes and it signifies the ability and ingenuity of the indigenous communities in Namibia to integrate nature and their environment into their way of life. The few of the IKST recorded in the studied regions represent the methods and systems by which the indigenous communities in various regions transformed the nature and their environment to advance their livelihood.

The cultural practices and the social needs of the indigenous communities living in and around these regions are the driving force behind the formation of specific indigenous technologies. Wanjala *et al.* (2006)

stated that some aspects of indigenous knowledge may be adopted in development projects; some may be adopted after validation research while some aspects of the knowledge may hinder successful project development and hence need corrective action. For many technologies and products, there is no continuity in terms of imparting skills to young people. On the other hand, it is quite clear from the study that the socio-economic changes which colonialism brought about destroyed the viability of the indigenous operating context, particularly, among the young. On the other hand, imported western technologies have not yet established operating social context. Due to the lack of any appropriate operating context, young indigenous Namibians, particularly in the studied regions; are largely unemployed because they lost/missed relevant indigenous skills to implement indigenous technologies and they have not achieved the westernization (colonization) level sufficient to enable them to operate in the technological operating context of the west. Relevant IKST should be preserved for relevant purposes of commercialization or cultural heritage.

As the western (colonial) influence is likely to continue in Namibia, the more the mismatch continues. On the other hand, indigenous people can never become Europeans however, much they try the western way of life. The best way out is to understand and where possible develop and commercialize indigenous technologies as well as assimilating western technologies into the indigenous technological operating context. Inadvertently, this will close the gap between the indigenous and western operating context in terms of technological performance (Gupta, 1999).

It is understandable that the medical and pharmaceutical products have to undergo number of tests with regard to their short and long-term effects on patients. Also, one need to do a thorough chemical and biological composition analysis to identify chemicals within those products in order to say for sure that the product does treat disease A and B. It is evident enough

from the findings in Table 1 that indigenous people depend on the traditional healers in these regions and had very strong ethnopharmacological knowledge on the medical uses of medicinal plants to treat many ailments and diseases. This result is in agreement with Cheikhyoussef *et al.* (2011b) who, reported that the traditional healers in Oshikoto region used 61 medicinal plants species for the treatment of various diseases and disorders with the highest number of species being used for mental diseases followed by skin infection and external injuries. It is also in agreement with Busia (2005) who, reported on the common ailments in Africa such as headaches or coughs are considered to be diseases with natural causes and hence their symptoms are treated at the household level.

Similar ethnobotanical knowledge studies have been reported in other Namibian regions and local communities; these include Oshikoto region (Shapi *et al.*, 2009), Caprivi region (Chinsembu and Hedimbi, 2010), San community (Dan *et al.*, 2010). Also this knowledge on the medical uses of medicinal plants is starting to be acknowledged by the rest of the world; so it shows the role played by indigenous people African traditional healing system (Idu and Onyibe, 2007), This also explaining why close to half the world's best-selling pharmaceuticals were either natural products or their derivatives (O'Neill and Lewis, 1993). Therefore, investigation of natural remedies as a source of new drugs gained great interest in recent years (Abdelrahman, 2011).

The socio-economic importance of traditional healing is enormous in the sense that a number of the IK holders we spoke to get involved in the practising more than 40 years ago. This is an indication that there were people using the services. Furthermore these types of health services are usual locally found.

Indigenous food and brewing processing technologies

/products: Under food and Brewing processing, a number of indigenous food and brewing processing technologies were studied. Table 2 depicts the various food and beverage technologies studies in the selected regions. However, the absence of food and brewing technologies in Kavango region does not mean there is nothing happening in that area but it was deliberately not studied.

Omalovu: It is a popular traditional beer to all Oshiwambo and Rukavango speaking Namibians. It also has potential to be popularized into other population groups in Namibia as well as in neighboring countries. The raw material of omalovu is sorghum and pearl millet which are locally available. Both Oshiwambo and Rukavango speaking subsistence farmers know and have skills how to farm it. It is therefore viable and sustainable to commercialize the production of omalovu in Namibia, southern Angola and south western Zambia. Omalovu not only has potential for commercialization in Angola and Zambia but in Namibia interior as well. This is so because there many people in Windhoek and other towns from the northern part of the country and making omalovu available to them connects them to their original places and keeps the culture and tradition alive. The spinoff would be large scale long-term employment of subsistence farmers, the mechanization of agricultural production; utilization of locally established resources and the preservation of culture. Commercialization would make omalovu accessible, preserve-able and easy to store and transport.

Oshikundu, oshikwiila and oshinghandeba: These products are value-added products from pearl millet (mahangu). Like Omalovu; Oshikundu is similarly popular to the population of North central and Kavango region. In

Table 2: Indigenous food and brewing processing technologies /products by the local people in the studied regions

Omusati		Omaheke		Oshikoto	
Indigenous name*	English name	Indigenous name**	English name	Indigenous name***	English name
Okuhanga omalovu	Brewing traditional Oshiwambo beer	Ongondivi	Traditional butter spread	Omagadhi goongombe	Butter made from cow milk
Ongaa yomalovu	Preparing sorghum flour for Omalovu	Omaze Uozongombe	Traditional fat from cow milk	Omagadhi goongongo (Ondjove)	Cooking oil from marula nuts
Oshikwiila	Processing an Oshiwambo mahangu cake	Omaere	Fermented milk	Omagadhi goontanga	Cooking oil made from
Oshikundu	Processing an Oshiwambo mahangu and sorghum beverage	Madila	Milk dish of the Tswana	Omalovu giilya	Traditional brew from sorghum
Omashikwa	Traditional fermented buttermilk	Omaavi	Processing marula oil	Omagongo	An alcoholic drink
Okweenga omaavi	Processing marula oil from marula (<i>Sclerocarya birrea</i>)	Okweenga omaavi			
Oshinghandeba	Chocolate cake from omuye or eembe (<i>Berchemia discolor</i>)				

*Oshimbaanhu/Oshindonga; indigenous languages in Omusati region, **Otjiherero/Oshimbaanhu; indigenous language in Omaheke region, ***Oshindonga/Oshikwanyama; indigenous languages in Oshikoto region

Kavango; it is called Shikundu in Rukwangali language. However, Oshikundu is a non-alcoholic beverage and is culturally used as a home drink for both elderly and children alike. Oshikundu is regarded as a soft drink as well as juice of these populations. It is very nutritional especial for babies and children alike. Commercializing the production of Oshikundu would guarantee the utilization of local traditional resources, preservation of culture, jobs creation for subsistence farmers and the reduction of poverty. What is left is to identify the principles behind the traditional processing technologies? and there after develop an effective production system which would allow the products to be commercialized. Oshikwiila on the other hand is very delicacy pearl millet cake which is also liked by the inhabitants of the two regions. It is also value-added product. It is tastier when it is prepare freshly after the flower is miller.

The processing of oshinghandeba (making of cake from *Berchemia discolor* “eembe” fruits) and edible oil from marula nuts (*Sclerocarya birrea*) are equally value-addition to locally resources. Currently attempts are being made to commercialize the processing technology of oil from marula nuts in Omusati region. A cold-pressing process has been identified. For large scale processing both the supply of raw materials and the processing technologies need to be improved. Oshinghandeba has potential but more studies in terms of demand quantification have to go hand in hand with the identification of the principles behind the traditional processing technology of oshinghandeba. It is mainly processed from indigenous fruits; these indigenous fruits are generally regarded as food for children and don't forms a major parts of the indigenous peoples meals (Okeke *et al.*, 2008).

Specific products such as Oshikundu, omalovu, oshinghandeba and the Oshiwambo/eambaanhu traditional homestead design are products which in terms of origins are only linked to the indigenous communities, part of whom inhabit north central regions. Omashikwa in oshiwambo, Mpofu in Rukwangali and Omaere (traditional fermented buttermilk) in Otjiherero culture is one of the most popular sour milk product processed in the rural areas Namibia for quenching thirst or as a condiment for use with stiff porridge (Oshifima in oshiwambo; Yisima in Rukwangali and Oruhere in Otjiherero), or for mixing with gruel and for income generation. Omashikwa is the main product for the family and for income. The product has a composition of 3.28% crude protein, 1.6% fat, 89.8% moisture, 0.76% ash, 4.56% lactose, 10.2% Total Solids (TS) and 8.6% Solids-Not-Fat (SNF) with a pH of 3.25 and no whey separation (Bille *et al.*, 2002).

Ongondivi and Omaze Uozongombe in Otjiherero, Omagadhi goongombe in Oshiwambo and Magadi gongombe in Rukwangali are value-addition milk products and are highly valued in all the northern and eastern regions of Namibia. There is potential in commercializing most of the IKST found in the studied regions if some have not been commercialized already like the Omaere (sour milk), Omatuka (buttermilk in otjiherero) and Ongondivi (butter) products by rietfontein or Namibia dairies. The commercialized products are strikingly similar in the taste and sometimes texture but if one looks at Small and Medium Enterprise (SME) and employment creation one can promote this product by the people.

For socio-economic significance of Indigenous Technologies; brewing and food products have the greatest potential in R and D for value -addition. This is in agreement with (Ohiokpehai, 2003) who, emphasized on the importance of traditional foods as a source of local income to the household in villages as it provides foods all times and times of foods scarcity. The majority of Namibians are subsistence farmers and any value addition to their products would have socio-economic significance. Omaze Uozongombe has many uses apart from cooking and is therefore rated very highly by most of the Namibian communities in country. Normally, in some culture, ghee is stored for later use during the drought and added to dry meat or for spreading on traditional bread. It is also mixed with traditional red powder and used as lotion for the skin and as a protective aid against cracking of calabashes. The elders of Herero community use it for lighting of the sacred fires and as a medicine to treat constipation and to facilitate proper digestion (Bille and Kandjou, 2008). Ghee producers in Namibia can benefit from producing quality commercial ghee for their own use and for marketing in both the urban and rural areas of Namibia and in the neighbouring regions. In addition, the current influx of Asian community in Namibia can benefit from locally produced ghee and the small-holder milk producers can benefit from ghee processing technology. Also the country can save some foreign exchange from importing cooking oils and fats (Bille and Kandjou, 2008).

However, it should be noted though that even though there is potential for commercialization of a number of technologies some of the products like Omagadhi goongombe and Omagongo are more seasonal. And the supply side of their production is very limited due to the long and cumbersome process involved. Omugongo tree where these two products are delivered take years to grow in order to get ongoongo nuts. Even if one decides to set up an irrigated plant of such tree,

production will only be realized after ten years at most. The root of *Boscia albitrunca* tree is believed to add flavor to the traditional butter, increasing the rate of milk fermentation and helps in churning (Bille and Kandjou, 2008).

Some of these indigenous foods undergo some form of processing (e.g., fermentation) but in most cases, traditional foods do not undergo serious processing before consumption apart from the normal cooking process (Okeke *et al.*, 2009). The fermentation processes normally add different special flavor and extend the shelf life of milk products. This is in agreement with Van den Berg (1985) who, stated that in Africa, Asia and Europe, fermented milk is known to be more stable and beneficial to people than fresh milk because of its medicinal, cosmetic and other usage of which sour milk has been developed mainly as a means of providing a variety of foods and of preserving it against spoilage. The traditional/indigenous food and beverages varieties are of important potentials for commercialization to many industrial sector in Namibia such as dairy and bakery products. Present results from the present study are in agreement with Cheikhyoussef (2011c) who, surveyed the indigenous knowledge on traditional foods and beverages in Karas region and reported the rich indigenous food culture and many of these fermented beverages would have a great potential for industrial application.

Mining/ metallurgy indigenous technologies /products:

Under mining/metallurgy processing, several technologies/products in the Omusati and Kavango region were studied (Table 3). The potential for commercializing traditional iron ore processing technology for purposes of value-addition was somehow favorable. Moreover, the art, the skills and tradition to process household equipment such as knives, spears, hoes and other equipment from raw iron ore is useful in order to upgrade the trade and skills in iron monger. These technological systems and methods have evolved over time. Products such as axes, knives, hoes are products, which in terms of origins are only associated with cultures of some specific indigenous communities, part of which still inhabit these regions. Further research in this area for preservation of cultural heritage and the collection of artifacts for museum collection is necessary.

Tanning technologies: Under tanning technology in Omaheke regions; two indigenous tanning methods from two ethnic groups in the region were documented. These ethnics were the Tswana and Herero speaking Namibians.

Making blankets from jackal or big eared jackal hide in the Tswana culture:

The technical steps in this process are presented in the Fig. 1. The making of blanket from jackal or big eared jackal hide is very essential to the livelihood of Setswana people. It is important to them because it preserves their identity as one of Namibian population groups. Many Setswana people make use of this blanket as a decoration in their house. It has the potential of job creation.

Making mats from Hartebeest Hide in the Setswana tradition:

The flow chart for this process is presented in Fig. 2. The making of mats from hartebeest hide is very essential to the livelihood of Setswana people. Many Setswana people make use of these mats as decoration in their house. They prefer to decorate their house with is mate as source of their identity and proud. Recently, mats from animal skins have entered formal market and as a result it has a potential for job creation.

Making ropes and horse saddles from hide in the Herero tradition:

The steps of this process are presented in Fig. 3. Horses are prestigious animals in the Herero community and virtually every Herero house has a horse. Because of the fact that many Herero house have horses the demand of horse saddle is very high in this community. As a result the manufacturing of horse saddle has a high potential to create jobs for the rural folks. Further, ropes made from the animal skins are very essential to almost in all communities of Namibia especially in the northern part of the country. These are ropes from cattle skin. They are made for various purposes similar to the modern ropes in the formal markets. The potential for commercialisation is limited but it is vital for the preservation of cultural heritage. The reported technologies/products fit with the technology definition of Ibitoye (2011) as he considered the technology refers to tools such as a crowbar or wooden spoon or complex machines that may be used to solve people’s problems.

Table 3: Mining/metallurgy indigenous technologies/products

Omusati		Kavango	
Indigenous name*	English name	Indigenous name**	English name
Outale	Iron ore extraction and processing	Magonga	Making of spears
		Nombere	Making of knives
		Mauta gonkanza	Making of bows and arrows
		Nonzumbu	Making of axes hoes
		Nomatemo	Making of hoes

*Oshimbaanhu; indigenous language in Omusati region, **Rukwangali; indigenous language in Kavango region

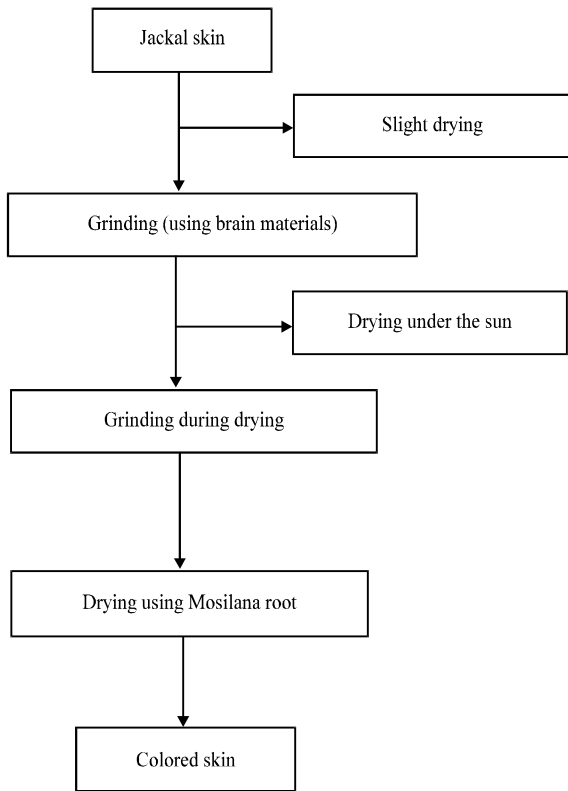


Fig. 1: Dyeing process for blankets from Jackal in the Setswana tradition

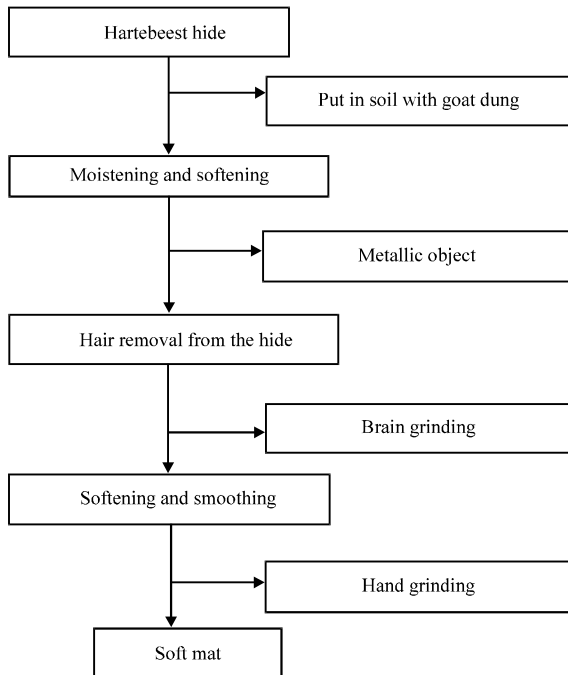


Fig. 2: Making mats from Hartebeest Hide in the Setswana tradition

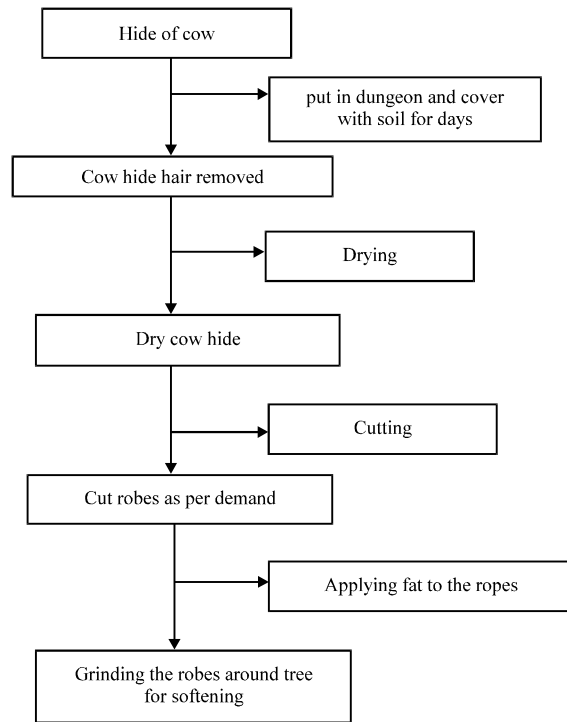


Fig. 3: Making ropes and horse saddles from hide in the Herero tradition

Table 4: Indigenous construction and infrastructure technologies by the local people in Omusati region

Omusati region	
Indigenous name*	English meaning
Eumbo	Design of an Oshiwambo (Ombaanhu) homestead
Ozibolo	Building of an Oshiwambo clay pottery drying structure
Eanda	Oshiwambo granary

*Oshimbanhu; indigenous language in Omusati region

Construction and infrastructure technologies: With regard to construction and infrastructure the following indigenous building technologies were studied in the Omusati region (Table 4). Oshiwambo Traditional homesteads are usually built out of Mopani palisades. The materials, although renewable, are currently in short supply. Oshiwambo traditional house designs offer privacy and abundant space at minimum costs. Due to the lack of Mopani palisades and limiting measures against deforestation, houses are nowadays made out of tarred poles, reeds, mahangu straws or from bricks in order to insure privacy. These materials are also freely available and can be obtained by everyone. The collection and use of the materials may offer jobs to the unemployed traditional builders. However, more young people need to be trained in order for the traditional trade and skills to continue. Pottery offers job opportunities and livelihoods

for artwork, tourist trade by communities or individuals based on existing traditional skills and technologies.

Commercialization using these materials is going to be difficult. However, the identification of the principles and skills behind the traditional building technologies and practices would be useful to develop building methods and practices how to integrate the choices of building materials and environmental considerations into those building practices. The potential for commercialization and value-addition in terms of developing appropriate design and building technologies is very much necessary. It is also important to record Namibia's own cultural heritage in terms of design and building technologies in our museums. This line of judgment applies equally to the construction of eanda (Oshiwambo granary).

Household equipment/ technologies: Under Household Equipment/Technology, the following indigenous technologies in the tree regions of Oshikoto, Omusati and Kavango were studied (Table 5). The commercialization of the traditional processing technology of mining clay pottery on the other hand is important (Fig. 4). The regions have the potential to establish a modern clay pot industry in Namibia. What need to be done is to identify the principles and skills behind the traditional mining processing technologies of clay and see if these can be commercialized for mass production of clay products. Clay deposits are here and there in the north and north central regions but the extent to which the size of such deposits need to be established. A full scale demand and supply analysis for commercialization of traditional mining processing technology of clay needs to be carried out. Clay works can be extended to include the making of utensils, fine arts and bricks. This form of traditional technology can provide employment and income for a number of people and communities (Fig. 4). The local vocational schools and community centers should incorporated pottery as a subject in their training to insure sustainability of the survival of all of the household products are already being sold in the region. The main

emphasis therefore, should be on the production scale. Palm leaves are the sources of many baskets which are used as household utensils in many rural homes especially in Omusati and Oshikoto regions. The raw materials are renewable and the basket products are in demand across the north central regions. Though the ram material (palm trees) plenty in these regions the problem is the rate at which they grow. These trees they grow very slowly and this makes them to be easily exhaustible. The potential for commercializing the principles of indigenous production technology of basket-making is there, provided the supply side of the raw materials is sufficiently established (Fig. 4). Traditional shoes are in demand. The problem is the organization to bring existing skills together in order to supply the market. The potential to commercialize the principles of indigenous shoe processing technology is viable. More unemployed people would get jobs in such shoe making factories and of course many local people can afford to have shoes at a low cost.



Fig. 4: Clay pots and other traditional products in local market in Kavango region

Table 5: Indigenous Household Equipment/ Technologies by the local people in the studied regions

Omusati		Kavango		Oshikoto	
Indigenous name*	English name	Indigenous name**	English name	Indigenous name***	English name
Oimbale	Making of Oshiwambo traditional basket	Kuhonga vapoto verova	The making of Kavango traditional clay pots	Oontungwa	Basket made using dried palm trees' leaves
Eenghaku	Making of Oshiwambo traditional leather shoes			Oompamba	Mug-like that grows on Oompamba plants
Eemia	Making of Oshiwambo clay pots			Omatenga	Basket from Omukanga tree
				Omatemba	Plates made from Omupopo tree

*Oshimbaanhu; indigenous language in Omusati region, **Otjiherero; indigenous language in Omaheke region, ***Oshindonga/Oshikwanyama; indigenous languages in Oshikoto region

Table 6: Namibia Best Practice comparison with UNESCO & Nuffic Protocol criteria

UNESCO and Nuffic							
Region	Title	Theme of the practice	Introducing the process	Context and approach	Role of IKS	Achievements	Source of inspiration
Omusati and Oshikoto	Pottery	Poverty eradication	Household table utensils, art work	Women as pot makers, various usages	Pottery tradition still in practice, not recorded	Accessible, little cost, sustainable	Replicable where clay is
	Leather products	Job creation	Foot wear, clothing	Male duties, dry season, offer protection	In practice, not recorded	From cattle hide, sustainable	Most hides currently unused
	Ointment for wounds	Traditional healing	Medication from plants	Male/female practice for community, health	Collected from forest, unrecorded	Sustainable, traditional med. Still used	Easily replicable in Nam. rural areas
Kavango	Treating people with traditional medicinal plant	Traditional healing	Practiced across the region, provided to both locals and	Individual based health need	Value added products, elderly peoples based non-locals, year-round	Locally accessible material	Replicable across the country
	Manufacturing of clay pots	Pottery	Practiced along Grootfontein-Rundu road, sold to locals and tourists, year-round	Household needs, individual based	Value added products, both elderly and young peoples based	Locally accessible material, little cost	Replicable especially in the northern part of the country where clay is plenty
Omaheke	Making blankets	Tanning	Practiced in Aminus village, sold to locals and tourists, year-round	Household needs, individual based	Value added products, elderly peoples based	Animal skin, locally available, all additives are natural	Setswana tradition has potential in other regions.
	Omaere	Fermented milk	Traditional home made yoghurt, popular among Herero culture	Household needs, individual based	Value added products, both elderly and young peoples based	Locally accessible material	Replicable across the country

Production technologies in transition: The impact of colonialism on IKST is the mismatch between a western way of life which the people aspire to live and the indigenous technological context which the young people want to leave behind. Indigenous young people living in a largely indigenous environment of Omusati, try to assume the western way of life which cannot be sustained by the abundant indigenous technological skill-base, which is freely available to them. As the western (colonial) influence is likely to continue in Namibia, the more the mismatch continues. On the other hand indigenous people can never become Europeans however; much they try the western way of life. The best way out is to understand, develop and commercialize indigenous technologies as well as assimilating western technologies into the indigenous technological operating context. Inadvertently, this will close the gap between the indigenous and western operating context in terms of technological performance (Gupta, 1999). The more the research and development is concentrated on IKST, the more local products and markets you have which are indigenous and the more jobs you have locally. Present study is in agreement with Gracey and King (2009) who, reported on the powerful effects of colonization on indigenous peoples worldwide of which this colonization adversely affected physical, social, emotional and mental

health and well-being in traditional societies. The extrapolation between different groups (indigenous and western) is unwise because local circumstances differ greatly (Gracey and King, 2009).

Namibia best practice comparison with UNESCO and Nuffic protocol: Using UNESCO and Nuffic Protocol as the base, Table 6 presents the some of the selected technologies/ products/ practices in the studied regions based on their importance and potentials for income generation and commercialization.

CONCLUSION

The research study presented in this paper gives an insight into many indigenous technologies and practices various Namibian communities having the potential for commercialization. The results of this study revealed that pottery, leather products, traditional treatments with medicinal plants, making blankets and fermented milk products such as Omaere have very important values and many of them have the potential to be carried to an industrial level. This indigenous knowledge should be considered for incorporation into industrial processes and the development of locally value added products. There is no doubt that indigenous technologies/practices

contribute significantly to the household security of which it is the main source of their daily life income. These indigenous technologies/practices have their own strong and weak points; therefore researchers have to conduct some scientific validations before incorporation into the national development process in Namibia.

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