SUSTAINABLE APPLICATIONS BEHIND GEOGRAPHICALLY INDIGENOUS PRODUCT CULTURES
A study of village communities in central high valley, Sri Lanka.

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Abstract

While going through the existing creative knowledge applications of the present day world, it is a fact that all of them are not applicable to all the contexts that one might come across. Hence there is a need of finding new paradigms in order to develop sustainable knowledge in a way that it would adopt to address any of the creative needs that would arise in different contexts. There are plenty of fossilized knowledge that can be found in the deeper layers of the community, mainly in the indigenous communities which could be extracted to address the present day issues. This research attempts to explore how these geographically indigenous communities respond to their day today needs and sustainable potentials of their product culture. It will analyse the means of knowledge maintenance and transmission, with a particular focus on the day today products as well as at alternative strategies implemented by them. The study was undertaken in selected four geographically indigenous villages in Central high valley, Sri Lanka; Udugaldebokka, Galamuduna, Narangamuwa and Rambukkoluwa. This research used qualitative and quantitative methods to gather factual data through dialogic interviews and video recordings of the same discussion and local literature sources. The whole research process was carried out through hand on experience and observations done on real time product applications within the community. It was guided by the principles of community-based participatory research and was theoretically grounded by the methods of visual ethnography. Followed by an analysis on product application methodologies. Thus based on its findings, research will conclude that geographically indigenous communities of the region are great knowledge holders and serves as an important resource to decode their knowledge to present sustainable design applications by the means of connecting sources and needs, plotting resources, ethical frameworks, exploring alternatives, sharing abilities and framing intentions..

Keywords: *Indigenous, Sustainable Applications, Product Cultures, Creative Knowledge*

1. Introduction

Sustainability focuses on meeting the needs of the present without compromising the ability of future generations to meet their needs (Investopedia, 2018). When one looks at it from an ancient land of Sri Lanka, with thousands of years of history of codified human knowledge, People thought of minute details around people, objects, emotions and existence to understand problems comprehensively and solving it in sustainable a way. The current creative knowledge applications fall short without a respond to many unanswered questions and problems with regard to the integration of contextual need in design (Richie Moalosi[1], 2007).

In order to analyse the knowledge of these communities had used in their own sustainable applications, the places where those are fossilized and still remaining have to be studied and contexts and activity scenarios where such products are being used, have to be studied and analysed.

Over exposure of the indigenous knowledge of Sri Lanka to the main stream and the lack of proper methodologies to preserve the indigenous knowledge have resulted in gradual decline of them from practice and some have already faded away. But the argument that there are some villages which have not yet been exposed to the main stream that still have the indigenous sustainable practices, can be raised with facts. It is through this work that we will develop to start a proper understanding of what will be required to generate sustainable knowledge paradigms that suitable for our own needs.

2. Knowledge of Sustainability, Habitualization and Indigenous Communities.

Human knowledge is not only the product of past experience, but also the product of anticipating the future. Knowing things involves feedforward as well as feedback, anticipating how things may be used, manipulated or acted on in the future and this leads to application. Humans create new knowledge by acting on and working with knowledge. Knowledge creation requires social context and individual contribution. This involves an effort to render tacit or unknown explicit and known. This context base knowledge creation can be seen as pattern in to practice.

2.1 KNOWLEDGE OF SUSTAINABILITY

Biological life on our planet has existed for billions of years. The many forms of life over those years shaped a rich enough environment to permit hundreds billions of different events, manifestations, behavioural patterns, evolutionary streams. Some of those manifestations gave the creatures manifesting them competitive advantage in local environments to sustain. These creatures survived to pass their knowledge of sustainability, sustainable applications and thinking on (Friedman, 2000). Whereas the concept of sustainability is broadly acknowledged as being multidimensional, its various dimensions have brought to light different discourses over time and have often been treated separately. By relying upon a review of the relevant literature which addresses the notion of sustainability, remain diverse and produce everything it needs to remain in balance and to maintain certain levels without depletion (Investopedia, 2018).

2.2 INDIGENOUS COMMUNITIES AND KNOWLEDGE
Every culture have their own knowledge applications but it is important to discuss and define what to gather and where to gather.

"Indigenous communities, peoples and nations are those which, having a historical continuity with preinvasion and pre-colonial societies that developed on their territories, consider themselves distinct from other sectors of the societies now prevailing in those territories, or parts of them. They form at present non-dominant sectors of society and are determined to preserve, develop and transmit to future generations their ancestral territories, and their ethnic identity, as the basis of their continued existence as peoples, in accordance with their own cultural patterns, social institutions and legal systems" (UNDESA, 19-21 January 2004).

As acknowledged in the Principles and Guidelines for the Protection of the Heritage of Indigenous people, indigenous knowledge is a "complete knowledge system with its own concepts of epistemology, and its own scientific and logical validity" (Battiste, 2002, p.7). Among its characteristics there is its practicality and dynamicity, derived mainly from contextual and cultural changes, which requires indigenous peoples to constantly renegotiate with their environment (Sillitoe, 1998), sustaining their knowledge system in constant evolution. Indigenous knowledge "represents generations of creative thought and applications within each individual community, as it struggles with an ever changing set of conditions and problems". Because of these strong contextual and cultural connections indigenous knowledge becomes an essential part of indigenous peoples' lives as it provides the necessary means of survival and sustainability.

2.2.1. *Geographically indigenous communities*
"Geographically Indigenous people are regarded as indigenous on account of their descent from the populations which inhabited the country, or a geographical region to which the country belongs, at the time of conquest or colonization or the establishment of present state boundaries and who, irrespective of their legal status, retain some or all of their own social, economic, cultural and political institutions. (ILO, 1989) The argument here is if we can dig deep into their roots we can analyse the most pure version of knowledge. Even though Sri Lanka is exposed to globalization and other global effects, there are still some less exposed indigenous communities trying to overcome their difficulties and seeking to adapt their households to modern life, whilst at the same time retaining or reviving the knowledge of previous generations. The most interesting aspect of these communities are they still practice their day to day activities within their indigenous knowledge range based on sustainability.

2.2.2. *Geographically indigenous product cultures*

Indigenous product cultures; a more specific form of the general concept of product cultures in which a knowledge collaborates with an indigenous community; is a collaborative process between knowledge and the Indigenous community. Just as each Indigenous culture has its own customs and traditions, the initiation of each product are also different. Ranging from a smaller-scale kitchen utensils to a substantial living space, each product met a specific need in its respective context. This characteristic is not specifically different from traditional product practice, but it is particularly important when it comes to applications due to the unique sustainable approaches and few examples were discussed accordingly (see sec; 4.).

3. Identification of Geographically Indigenous Village Communities in Sri Lanka and Their Life Styles

Four selected villages from the high central valley were studied and documented (see attachment 1). The information concerning approximate data of villages which are periodically released by the Ministry of Public Administration and Management, were refined using reports and accompanying stories from travellers and hikers before the research journey. The research sampling focused on knowledge comparability within the documented villages. Further, only civilized lands within the study area that have not been a part of large-scale deforestation were considered because the research addressed indigenous communities led a life associated with the fields and living practices. The resulting study site included 80 km2 of forest in Acre, 43 km2 of forest in Knuckles, 28 km2 of forest in Yahanagala and 22 km2 of forest in Hasalaka.

Vast areas of these villages are covered by mountains and bogs, and there are many water streams and rivers. Fog, strong winds, long rains (lasting from December/January until June), wind, and scanty vegetation are only a few of geographic features that illustrate the challenges faced by any creatures living in these areas. Thus, the lifestyle as well as thinking patterns of these indigenous people have been mainly determined by the extreme conditions and the associated severe constraints imposed on human communities. Due to the climate and the contextual natural resource base,

Figure 1, Research journey to the villages
(*Source: Authors collection*)

Figure 2, People of Galamuduna
(*Source: Authors collection*)

the agricultural and subsistence practices of these villages differ from those found commonly in main stream village areas. As a result, different sustainable approaches to develop the primary economies are taken by these communities.

The main activities undertaken by these people include Chena cultivation, paddy cultivation, toddy tapping, and farming. Also they have their own craft activities to produce their day to day domestic products. All these activities are normally maintained by one extended family or a group of relatives and oriented towards nature. Tree barks and Clay and buffalo dump are used for the construction of '*warichchi biththi*' houses and made with mud and thatched with '*Illuk*' leaves. Mainly Rice, '*kurahan*', '*kurahan thalapa*' and other vegetables from Chena cultivation are consumed, both fresh and processed. Rituals are still practiced which are pretty much linked to the nature.

4. Decoding Sustainable Applications from Identified Product Culture

The most critical phase behind a product application is its thinking phase in which most decisions were made. This means when we have to analyse a thinking behind a product application or a culture by looking at it that in live user scenarios we need to predict and argue on users' behaviour and operation of products or systems. (Popovic, 1983)

The most important step during this decoding process is that the product applications should manifest indigenous villagers' point of view, from initial thinking of the product to their usage in the context. This means that user constrains should be included into this product application analysis from its initial stage and followed throughout the user journey. The nature of their product applications define which kind of methods, strategies, knowledge and thinking patterns were used.

4.1 APPLICATION FOR STIRRING OF FOOD.

Within a community that functions according to the two 'kanna', the 'Pol katu handa' serves as a sustainable application with functionalities that defers with the time. During one season where rice serves as the staple food the '*pol katu handa*' is used in cooking rice, whereas the same device is used in making '*kurahan*' with the separated tail of the utensil.

i.   The scenario of village ladies using their own 'pol katu handa' for preparing rice.
ii. The flat thin hole made in the '*pol katta*' to get the maximum tightness in to the tail for continues removing and attaching.
iii. The pointed tail shape which use to tight the tail into the '*pol katta*' when it loosen up, because when removing the tail for make '*kurahan thalapa*' it gets loosen and the sustainable approach here is to tight towards the pointed direction to get the maximum usage of the product.
iv. Unusual proportions of the tail, which makes the product multifunctional.

The device is not distinctly identified to be a multifunctional device by the term, but the understanding or the ideology of the ability to shift the functionality of the product according to the two seasons prevail within the community as sustainable application.

Figure 3, Stirring *kurahan* using the tail (*Source: Authors creation*)
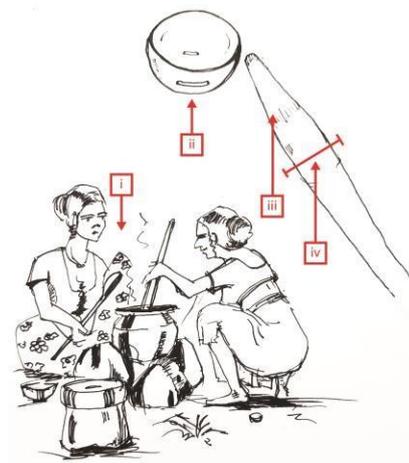
Figure 4, Food stirring (*Source: Authors creation*)

Figure 5, '*pol katu handa,* with the tail (*Source: Authors collection*)

Figure 6, removed tail from the shell (*Source: Authors collection*)

4.2 APPLICATION FOR CLEANING THE FLOOR

'*Bol pana*' is an equipment made out of the twigs of the '*Bol pana*' tree used as a product application for cleaning purposes that can be seen within the subjected community. The user interviews revealed that the same equipment is being used in cleaning different places other than their houses including

the '*udu pila*' and '*kamatha*'. Deeper study on the usage of the equipment and the hand on experience with its usage reveals that the same equipment has been used for cleaning the houses, '*udu pila*' and the '*kamatha*' respectively with the maturity stages of the '*Bol pana*' twigs.

   i.   At the younger stage of the twigs which are used to make the product, they are soft and tender and the equipment is used in cleaning the insides of the houses

   ii.   When the twigs mature a little they become harder than the early stage and the equipment is used in cleaning the '*udu pila*' of the house

   iii.   At the well matured stages of the twigs the equipment is used in cleaning the '*kamatha*' since they become hard and tough

Thus the study shows that there has been a proper understanding within the community on possibilities of using the same product with changes the product undergoes during its life span accordingly as living product.
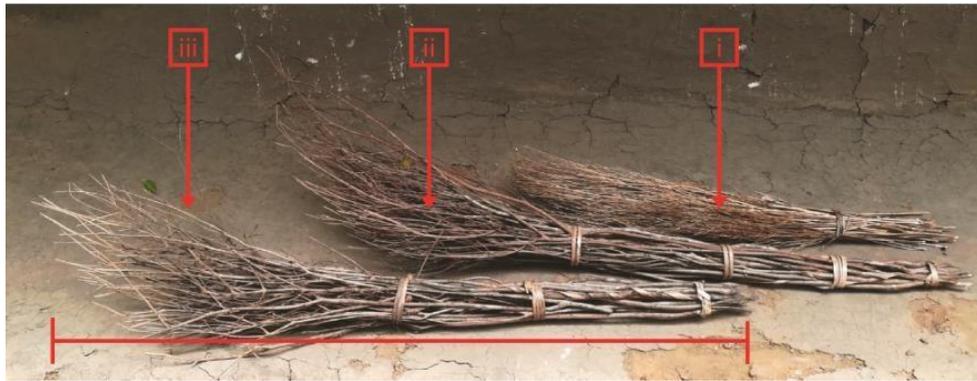
Figure 7, three stages of *Bol Pana* (*Source: Authors creation*)
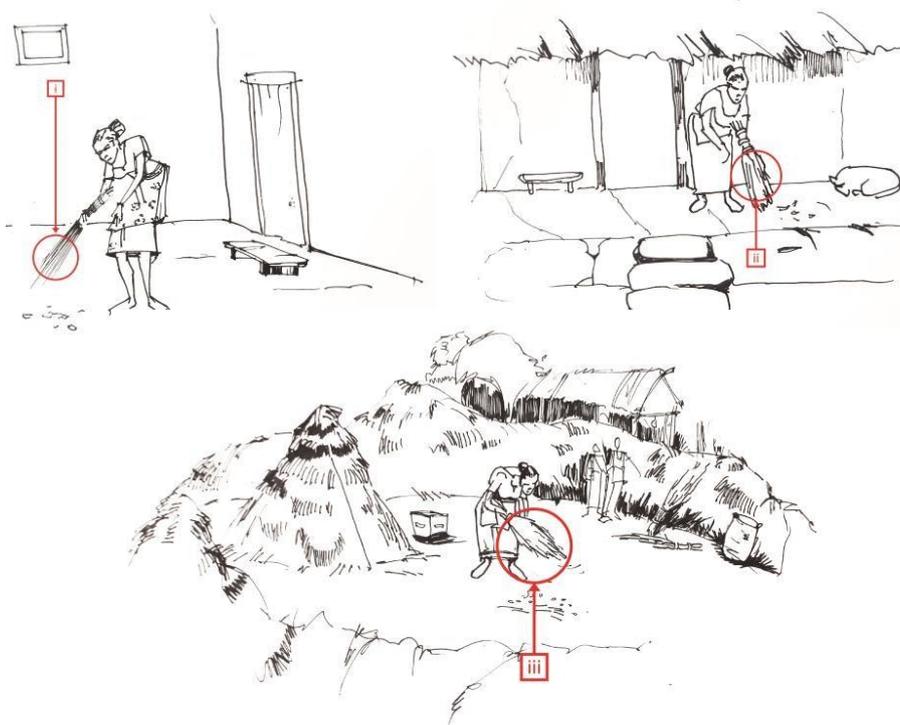
Figure 8, three stages of user scenarios in the context (*Source: Authors creation*)

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4.3 APPLICATION FOR STORING MATS

Unlike the usual '*paduru aana*', the application that can be seen in these communities are made out of a variety of '*pan*' plant found in the forests around these villages and does not contain any motifs. The methodology of storing the mats is very simple that it does not involves any complex tying methods or knots and the wrap that is used to store the mats is also a mat that can serve the functionality same as the stored mats. This particular ideology behind the '*paduru aana*' suggests on giving a functional value even to the packaging as sustainable approach in terms of reducing.
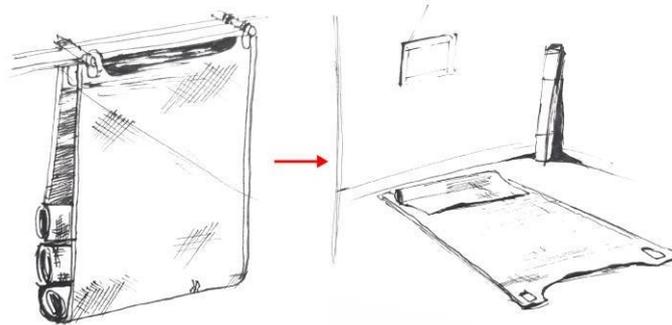
Figure 9, thinking behind application of *Paduru ana* (*Source: Authors Creation*)

4.4 APPLICATION FOR ALTERING STRAW

'*Ukunu deththa*' is a wooden rod with a curvature at one end whereas the '*Gadallakaru*' is also a wooden rod but with a fork at one end. The '*Ukunu deththa*' is used to bring out the straws remained among the '*Baru eta*' which are scattered around the '*kamatha*' after the harvesting. The '*Gadallakaru*' which is similar to an ekel broom which is used to remove the leaves and other scatterings around the Chena. It was clear that the ideology on the relation between the form and function prevails among these communities more importantly they have always tried to find the forms that is ideal for a certain function directly from the nature.
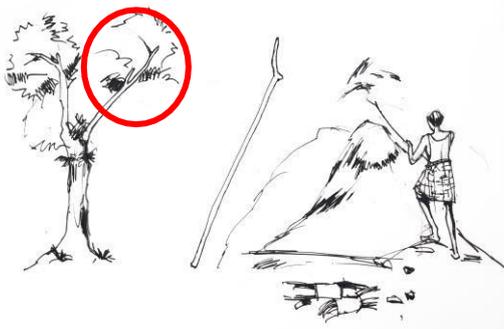
Figure 10, highlighted concepts from
ukunu deththa (*Source: Authors creation*)
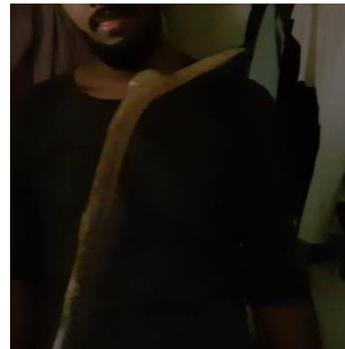
Figure 11, *ukunu deththa*
(*Source: Authors collection*)

4.5 SYSTEM APPLICATION FOR THRESHING RICE

The process of threshing rice can be defined to be a system design where the involvement of people in the process changes according to the size of the machine and the labour required for the machine.

Figure 12, *threshing rice* (*Source: Authors collection*)

The machine is operated with the involvement of a group of people formed by few families joined together when it requires more space and more labour. When the amount of such requirements reduces, the number of people involved in operation of the machine also reduces. Initially the harvested rice which is with a very rough and hard coating is grinded with a grinding stone which is larger in size. Since the device needs more human labour and space, this is operated by a group of people from two or more families. When a machine like mortar and pestle or the grinding stone is used, it is operated by a single family whereas a single person is involved when work- ing on a machine like '*udu mathe*'.

4.5. APPLICATION FOR STORAGE OF RICE

The '*wey path pettiya*' is used to both store and sow the '*biththara vee*'. The vessel is commonly known as the '*Bata pothu pettiya*' where the selected communities of the researcher refers this vessel as the '*wey path pettiya*' since the product is made out of '*wey path*' which is a plant variety which can be found within the selected geographical location. The '*hee nati*' rice grains are the type of rice that is grown in these areas due to the nature of the soil and this particular village community believes the '*wey path*' to be ideal for storing this rice grain variety. The raw '*wey path*' used in making the vessel gets toughen with the time and the mould become more stable. During the manufacturing phase of the product a special paste is applied to the base which prevents any damage to the vessel by insects. The paste gets absorbed to the '*wey path*' with the time and eventually becomes a part of the product.
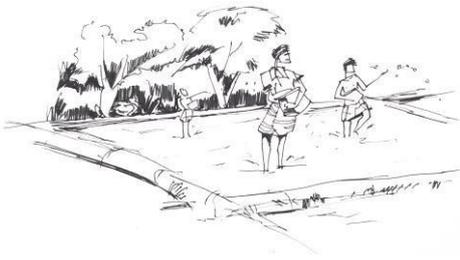
Figure 13 application of *wey path pettiya* in the context (*Source: Authors creation*)
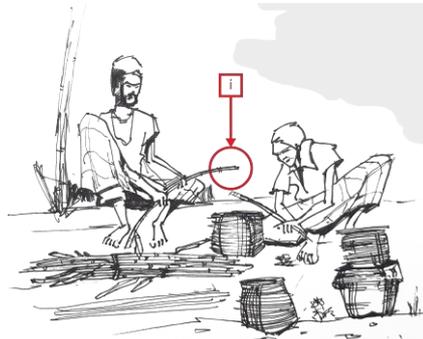
Figure 14, making of *wey path pettiya* (*Source: Authors creation*)

5. Potentials in Decoded Sustainable Applications for Present Day Creative Knowledge.

5.1 IDENTIFIED SUSTAINABLE PARADIGMS
After analysing the thinking behind each and every product application researcher have identified six sustainable paradigms that can habitualize in to practice, through documented product applications.

5.1.1 Framed Intentions and Goals
This framing acts as a core that directs towards a thought or a sustainable ac- tion, for example, '*Pol katu handa*' for the product application of stirring, has been framed within a clear intention but with multiple iterations. The us- age of multiple iterations and convictions that comes within this framing process is a point that can be integrated in to present knowledge. Such sustainable paradigms lead towards the building of some convictions that are supported by the faith of experiences of a community.

5.1.2 Connected Sources and Needs
Connecting and balancing the sources and needs was significant within their applications. The thinking of these communities has been able to equate the sources to the need within the product applications that involve '*wey path pettiya*', '*bol pana*', and '*ukunu daththa*'. Products like '*wey path pettiya*' made out of '*wey path*' which is suitable to the variety of rice. However the fact that they are being made out of '*wey path*' due to the absence of '*bata pothu*', has not been made any obstacle and it has been connected as the suitable source to the need of storing '*hee nati hal*' intentionally or not. Here accessing and processing of sources has been based on to direct connect with a need.

5.1.3 Plotted Resources and Opportunities

The usage of the understanding on the way that the resources and opportunities have been plotted within the communities was observed to be a significant factor. Product applications which are related with the livelihood such as '*ukunu deththa*' and '*gadelkaru*' are the best examples that can be given for this particular scenario. Here the paradigm is not created based on the making of the product but with mapping of the required resources. Cutting down a tree branch by obtaining the required shape for the '*ukunu deththa*' while it is in the tree, is a methodology that must be necessarilydecoded. Here other than mapping of the resource or the opportunity, re-shaping of the resource with respect to the product also takes place.

5.1.4 Ethical Frameworks through Holistic Models
This paradigm was highlighted among the facts that have been discussed throughout the research. A connection can be observed that this fact and the conviction that comes under the framing intentions. A sustainable application like '*bol panawa*' can be taken as a result of thinking of the process as a whole through an ethical framework rather than considering it part by part. Thinking of a system application related with threshing rice through a holistic model has shown how social equity, participation can be applied in sustainable applications.

5.1.5 Explored Alternatives
Even though some sustainable applications may necessarily not a result of an intentional exploration but that of a gathering and development of a progressive knowledge. Their thinking has been able to find alternatives while associating with holistic models and even segmenting it. As mentioned earlier, it is a gathering of knowledge throughout a time period. Further inquiry regarding this concluded that it is a sustainable paradigm with adaptation and flexibility as its core. Therefore the communities have created the space for any of the identified part of a product application to survive within the context itself. The stone and the wooden part used for the product identified as the grinding stone have been developed to survive within the context with few other alternatives. Even in '*paduru aana*', the product application is combined with functional alternatives. If there are four members in a family, there are three mats and the other is the same '*padura aana*' that serves as a mat.

5.1.6 Shared Abilities
The applications of these communities have changed progressively. In the meantime, thinking with an aim of sharing the things within it was also a special paradigm that was emphasized. Their ability to share with the environment as well as in community at large is a fact that must be highlighted. These paradigms are interconnected to each other and features of this similar shared thinking can be seen in ethical frameworks and explored alternatives as well. The shared abilities or the shared thinking has been well used sustainably in a system like threshing rice. They have focused on ways where the benefits are divided between all the participants by dividing requirements among themselves when the magnitude of the task is higher, and to divide the effort and the benefit equally with respect to the task at the next step. Sharing of skill sets has been developed with their requirement of surviving themselves within the context. One group of people is expertise on making of the grinding stones whereas one group is expertise on making mortar and pestle. However the fact that their thinking has been built up in a way to share the ideas on the place that these devices will be operated, could be observed.

5.2. INTEGRATING SUSTAINABLE PARADIGMS IN TO PRACTICE
Sustainable paradigms can be integrated into practice by enlarging it, internalizing it, transmitting it, shifting it, re-contextualizing and transforming at certain applications. The potentials of doing so can be concluded as follows. Internalization and reconceptualization are the two main factors that arise mainly because the probability of a knowledge application to fail is more if it cannot adopt to a particular context. During enlarging the knowledge should be done while considering the technological advancements and other background factors rather than directly implementing the paradigms that were decoded from the indigenous communities. This is because the background factors and the nature of the problems that they have come up with a solution might differ from the situation of the modern society. However even at this stage it is much preferred if the holistic model can be maintained without a much effect on it. It is difficult to transmit the extracted sustainable applications directly into the existing creative knowledge as a whole. Instead it is required to be first transmitted into places where the existing creative applications could not achieve sustainability and then observe the results and thus gradually introduce the paradigms as a whole.

6. Conclusion.

Based on the fact that for a creative application to be more sustainable in reaching different contexts it should be based on human adventure and emotional factors. The study has focused on discovering how the relationship of the people of these selected communities with their context and has been related with their sustainable applications, as the research has identified the fact that the existing creative knowledge lack this particular area in its applications resulting it to fail within some contexts. The research has been able to decode six main sustainable paradigms that can be habitualized into present knowledge namely, connected sources and needs,

plotted resources, ethical frameworks, explored alternatives, shared abilities and framed intentions. The research has gone slightly beyond the conventional path and has tried to go deeper in the thinking behind each identified product culture, rather than going deeper into its physical attributes where several number of product applications were studied in this manner. The research thus has focused and discussed on decoded possibilities and identified the potentials that these indigenous sustainable applications could be extracted to the modern creative knowledge by means of enlarging it, internalizing it, transmitting it, shifting it, re-contextualizing and transforming it. One can study deeper into each of these sustainable par- adigms in order to discover possible applications and develop practices that are more human and context oriented.

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8. Glossary and Index

NOTE. Words in italics are usually Sinhalese unless otherwise stated. The following abbreviations were used;
CP – Central Province
UNDESA - United Nations Department of Economic and Social Affairs ILO - International Labour Organization
Bol pana: A product application for cleaning where *bol pana* is the name of the plant from which the twigs are obtained to make it
He nati hal: A traditional variety of rice
Kanna: A single season of paddy cultivation. There are two "*kanna*" per year
Kurahan: Finger millet
Kurahan gala: A grinding stone made to grind finger millets
Kurahan thalapa: A porridge made out of finger millet
Pol katta: The coconut shell
Pol katu handa: A spoon made with a coconut shell as the head and a wooden stick as the tail
Wey path pettiya: A box or a carrier made out of wey path to store and sow rice
Paduru aana: A holder used to store mats
Udu pila: A veranda attached to the outside of the house
Kamatha: threshing floor or an area of ground that farmers store their harvested paddy *Warichchi gewal*: Traditional rural houses, made of clay earth walls and thatched roof *Undumathe*: A simple device similar to a drill machine, which is used to grind cereals *Ukunudeththa*: A wooden rod with a slight curvature at one end which is used to bring out straws among the harvest
Gadellakaru: A wooden rod with a fork at one end which is used to remove leaves around the chena
Illuk: A grass variety

Attachment 1: Documented area (*http://lk.geoview.info/galamuduna,1246578*)