

Developing a strategic program for safeguarding palm-leaf manuscripts in Sri Lanka

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Abstract:

Historical evidence proved that countries like Sri Lanka had their own heritage and indigenous knowledge in local life aspects for centuries. For thousands of years those indigenous treasures were transferred through generations by means of word-of-mouth and ancient documentation methods. With the advent of technology those methods had been evading in time, however, monasteries, museums and few individuals have preserved valuable vessels of indigenous knowledge in their custody. In this regard, palm-leaf manuscripts present to be stable carriers of traditional information, which are still preserved by using ancient techniques. National Library of Sri Lanka invests in research to improve these local techniques. At present, with the help of digitization, these resources are being copied to electronic form on digital repositories. However, simple digitization will not serve the purpose of these resources, thus they need appropriate metadata format to enable the exploitation and sharing across other databases. This article elaborates on the application of strategies that deal with both improved ancient methods and using suitable metadata schema in preserving palm-leaf manuscripts in Sri Lanka.

Keywords: Palm Leaf manuscripts, Preservation, Sri Lanka

1.0 Introduction

Palm-leaf manuscripts (PLMs) had been unique medium of traditional writing in Sri Lanka for many centuries. According to historical records PLMs were used as writing material in Sri Lanka since 3rd century B.C. Palm leaf manuscripts were common writing medium in some Asian countries at that time. Eg: India, Myanmar, Burma, kingdom of Cambodia. When the printing technology was introduced to Sri Lanka by the Dutch colonial government, during their administration, changed this traditional medium of writing to paper (Alahakoon, 2003). PLMs are hardly used in writing modern documents. However, what was preserved is now used only for educational purposes in ancient Buddhist temples and monasteries. Moreover, they are consulted by indigenous medical practitioners for their local health-care practices. The traditional knowledge on medicine, crafts and skills, astrology, etc. that were orally transmitted from one generation to the other, was subsequently documented on palm-leaf manuscripts. Thousands of palm leaf manuscripts were destroyed by South Indian invaders during their sporadic interventions took place between 5th and 17th centuries A.D. Large number of palm-leaf manuscripts is still available in the island awaiting better attention for preservation. These collections of PLMs are being considered to be Intangible Cultural Heritage (ICH) of the country which contained traditional knowledge practiced before the 18th century A.D.

A vast collection of palm leaf manuscripts is under the government custody. They are housed in the Department of National Museums, Department of National Archives, National Library and Documentation Services Board, Main library of University of Peradeniya, etc. A huge collection of PLMs other than those under the government custody is still remain under private custodians such as temples, native doctors and intangible cultural heritage practitioners. The PLMs which are under the private custodians are in danger due to reasons such as owners are not aware about the value of those documents and lack of preservation knowledge to keep it for a long period in good condition. Recent surveys on palm-leaf manuscripts conducted by relevant governmental institutions and non-governmental agencies (NGOs) have confirmed that a large number of these manuscripts are still deteriorated due to improper care in ancient Buddhist temples and private custodies.

The surveys that have been conducted in the past were inadequate in purpose and had not covered the entire Island. They contained only an overview of the distribution of PLMs in the country by location, number of manuscripts, subject, etc. Moreover, safeguarding PLMs are as important as archaeological artefacts and they serve as primary sources for research studies on various disciplines. Therefore, the present study is aimed at developing strategies for preservation, conservation, digitization, and effective exploitation of palm-leaf manuscripts among user communities by developing proper metadata schema for digitization as well as for transfer of information and resource-sharing in Sri Lanka.

2.0 Material and Methods

289 PLM collections of National Library, a total number of 47,250 palm leaves were selected for this study. PLMs on five subject areas such as medicine (52 collections), history (2 collections), Astrology (3 palm leaves), Buddhist philosophy (187 palm leaves), Sinhala language and literature (31 palm leaf), Social sciences (14 palm leaves) were included in the sample. Scanning electron microscope (Regulus 8100) and Microscope (Model 100 (230V,50/60 Hz)- W30600- 230 (1005402)) were used for this study.

Each palm leaf of the sample collection was individually and visually observed to identify the conservation problem and their condition. Two palm leaves from fragile manuscript were observed by Microscope and Scanning electronic microscope for further study.

All PLMs samples were treated by *Panhinda* herbal oil 5 years ago by National Library staff. *Panhinda* herbal oil is a product of National Library of Sri Lanka which was recommended to apply for safeguarding PLMs. Formula of the *Panhinda* herbal oil was obtained by former Director of National Museum Sri Lanka, Ms. S.Gunawardana from a traditional craftsman of Mr.Panvila. He is a descendent of a long line of manuscript-writers in Sri Lanka. This formula is heavily guarded and kept secret. It had been handed down for generations and known by only few families in the country (Cabral *et al.*, 2016).

Cabral *et al.*, (2016) tested the same *Panhinda* herbal oil against fungi commonly found in paper materials (*Cladosporium cladosporioides*, *Aspergillus sydowii*, *Penicillium citreonigrum*, *penicillum toxicarium*, *penicillum corylophilu*), two types of bacteria isolated from PLMs and the common insect pest associated with palm leaf manuscripts is *Lasioderma serricorne* (Cigarette beetles). The test demonstrated that *Panhinda* oil could control fungi and bacteria samples well and illustrated its insect repellent properties.

3.0 Results and Discussion

Table 1: Identified conservation problems of the palm leaf manuscripts sample of the National Library collection

Conservation problem	Number of PLMs
Fungi stains	31,256
Brittleness	8235
Holes/Insects attacks	17,589
Dryness	13,657
Adhere leaves	60
Dusty	9,254

Fungal (mould) stain was the common and major problem identified in the National Library palm leaf collection. Humid environmental condition throughout the year accelerates the mould growth on PLMs even though they have been applied with broad spectrum fungicide of *Panhinda*. Insect-attack was the second common issue identified in PLM collection of National Library. Obviously, fungi and insects rapidly grow in high moisture condition and moderate temperature between 280C to 300C which happens in the country throughout the year. Common crustacean pest found in libraries in Sri Lanka such as silverfish species was not found in this palm leaf collection. Both adults and larvae of *Lasioderma serricorne* (Cigarette beetles) were found in the collection. Even though the *Panhinda* acts as an insect repellent *Lasioderma serricorne* were found as colonies in 13 palm leaf manuscripts. It questions the validity of the result of the previous study and confirmation of the insect repellent activity.

Panhinda oil may be strong when it was fresh but as the time goes on the active ingredients of the oil may react with the air and moisture and lose its strength. High temperature may catalyse the reaction. This incidence would change the properties of the oil with the time. A research should help identify the maximum time of the *Panhinda* herbal extract that could maintain its inherent properties in natural environmental condition.

Dryness is the third issue identified in the study. The *Panhinda* herbal oil makes the leaf moist and prevents dryness but with time when the properties of the oil change it leads to dryness of the leaves. Repeated application of the *Panhinda* herbal oil treatment once in two years may reduce this issue. Fungus attacks are responsible for the brittleness. Figure 1 and 2 illustrate the fungal growth in the surface and core area of the palm leaf and figure 3 and 4 show the well growing old fungi colony. Hence there are fungi which cannot be controlled by the *Panhinda* herbal oil are living in the National Library palm leaf collections. PLMs are stored in closed cabinets in Thymol gas environment may reduce the growth of fungi or completely destroy it.

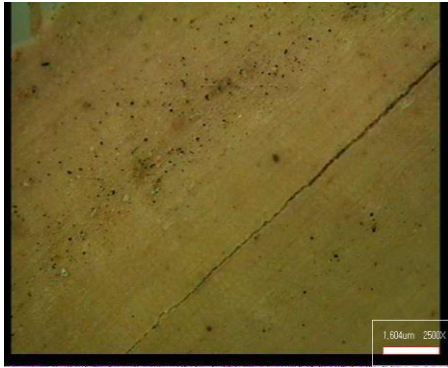


Figure 1 Surface of PLM X10

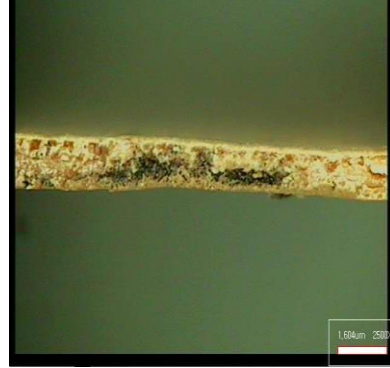


Figure 2 Cross section of PLM X40

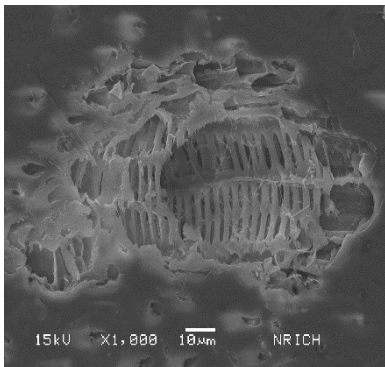


Figure 3 Surface of PLM X1000

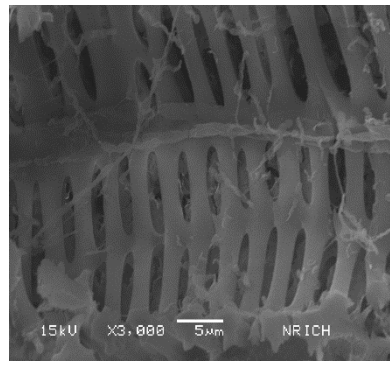


Figure 4 Surface of PLM X3000

The Scanning electron microscope and microscope pictures confirmed the threat caused by the mould spread entire core area of the palm leaf even though the leaf had been applied with *Panhinda* herbal oil five years ago. This experiment indicates that the *Panhinda* herbal oil is not much effective to preserve the PLMs against fungi.

4.0 Need for New Strategies

The study shows that new safeguarding strategies and remedies should be introduced for safeguarding the PLMs in the country. In a recent study, it was found that manuscripts should be treated by *Panhinda* herbal oil along with *Gadumba* charcoal powder at least once in five years. This oil has proved antifungal, antibacterial and insects replants properties (Cabral *et al.*, 2016). In addition, this oil makes the material soft and smooth thus prevents drying of palm leaves. Usually during the treatment excessive oil is removed from the leaf by a soft cloth.

Otherwise, it would cause the leaves to stick together. It causes sticking the leaves together (Agrawal & Sheshi, 1999). Palm leaf should be stored in a specially designed cupboard. Cupboard should be hermetically sealed and each row should be made of wooden bars to ensure the air circulation inside is thorough (Agrawal, 1999). Thymol 10g dosage is insulated at the bottom of the cupboard to prevent the mould growth on PLMs.

Results of this study directed the National Library to prepare strategic plan for preservation and conservation PLMs in Sri Lanka. A project commences to print the texts of selected PLMs. The UNESCO Memory of the World (MOW) program was set up in order to prepare national inventory on rare manuscripts and documents. The National Library was able to encourage the stakeholders for preservation the palm-leaf manuscripts. Herbal extraction had been used for preservation of palm leaves, which was distilled using specially designed machine and distributed among the stakeholders. A set of guidelines were drawn up in the light of scientific analysis including proper storage methods, care and handling of basic treatment methods. Awareness programs are being conducted to educate the custodians to make sure of the safeguarding of remaining palm-leaf manuscripts.

However, digitizing the original copies of palm-leaf manuscripts will be the undying solution to preserve the knowledge recorded in the manuscripts even after the original version themselves have deteriorated and it also prevents damages caused to the manuscripts by heavily using them in future. Therefore, a digitization program was commenced in the National Library to safeguard the existing manuscripts and provide easy access to the local readership. And it was identified a necessity of developing proper metadata schema for digitizing the manuscripts to provide efficient and effective dissemination of knowledge recorded in the palm-leaf manuscripts as well as for sharing resources among the researchers in the country and around the globe.

5.0 Importance of Metadata Schema for Digital Repositories

Metadata, a relatively esoteric term in the past decades, has been an inevitable format in many digital applications ranging from geospatial programmes to creative software tools. Hence, its focus has been broadened over the years to cover archives, libraries and museums. Surprisingly, libraries had already adopted this concept in the form of conventional card catalogues – a metaphor to describe data about data, although catalogue cards or books are not data but carriers of information (Gill, 2008). In the similar sense, palm-leaf manuscripts contain vast range of information of the past that need to be indexed on and shared across repositories alike. To serve this purpose the documents need to be associated with compatible metadata schemata so that the collections could be searched and retrieved.

5.1 Required Elements of a Metadata Schema for Digitized Palm-leaf Manuscripts

As it was long ago established, the metadata is essential in resource discovery (Gill, 2008) on the Internet, when many other institutions are presenting their indigenously ancient documents. However, PLMs widely differ from that of digital copies of print documents as their texts are mostly machine-readable. In this regard, scanned images of palm-leaf manuscripts may be viewable only as image files.

Digitized manuscripts are not just scanned images, thus they should enable resource discovery, retrieval, collation, analysis and re-use, if applicable. In other words, palm-leaf manuscripts in digitized form are not merely digital objects but to be represented by complex data format, in this case a metadata schema. To facilitate the metadata of digital contents the repositories adopt metadata schemas that are commonly available or developed locally.

Few metadata schema used for other digital documents are MARC, Dublin Core, EAD, MODS, etc. Certain factors such as type of documents, characteristic of collection, and purpose of use by the stakeholders are considered in selecting metadata and controlled-vocabulary schemata. Nevertheless, interoperability between metadata schemas will present a challenge when sharing data among repositories as many countries and institutions have created their own schemata (Park & Tosaka, 2010).

Most common metadata schema that fits majority of resources is Functional Requirements for Bibliographic Records (FRBR). Metadata of PLM has proven to be effective after a comprehensive survey with the findings of user communities' expectations. The schema used in Thailand for their manuscripts expresses and describes the special characteristics of the contents (Manmart *et al.*, 2012). Similar format could be adopted in Sri Lanka to address the challenges associated with special characters and content of local PLMs.

6.0 Conclusion

Rich collection of palm-leaf manuscripts of Sri Lanka have to be preserved for the next generations through both traditional methods and modern technology. Using time-tested preservation techniques for centuries has proven to be successful although the knowledge of such practices is evading in time. It is therefore libraries' responsibility to keep these valuable documents being intact. National Library of Sri Lanka has carried out research to validate those indigenous methods of preservation that exist in Buddhist monasteries and households of old individuals. Meanwhile, palm-leaf manuscripts are being digitized to develop national repositories in the country. However, the formats used in other countries will challenge if Sri Lankan collections adopt their own when search and sharing is executed across databases. In this regard, Sri Lanka has to develop compatible schema that allows interoperability across repositories around the globe. Furthermore, the texts in those palm-leaf manuscripts need to be read by OCR so that searching with subject-headings will be well-facilitated.

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