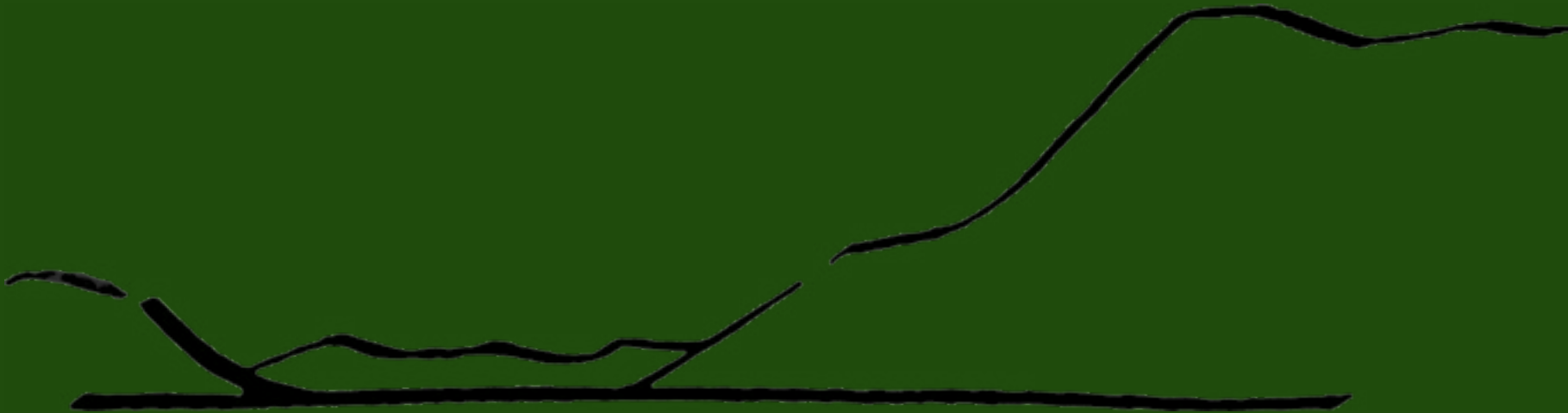


# Pha Tad Ke Botanical Garden, Luang Prabang, Laos

*Three Years Report - 2019/2021 and onwards 2022 ...*

*... fresh starts in times of continuing uncertainty*





***"You must be the change  
you wish to see in the world"***  
**Mahatma Gandhi**

<b>Content</b>	<b>3</b>
<i>Foreword from Rik Gadella, Founder and General Director</i>	<b>4</b>
<i>Mission Statement</i>	<b>5</b>
<i>2019 ... a storm is a brewing ...</i>	<b>7</b>
<i>2020 ... the storm breaks loose ...</i>	<b>8</b>
<i>2021 and onwards 2022 ... fresh starts in times of continuing uncertainty ...</i>	<b>8</b>
<i>2019 financial statement</i>	<b>9</b>
<i>2020 financial statement</i>	<b>10</b>
<i>2021 financial statement</i>	<b>11</b>
<i>Some Key Numbers and Accomplishments in 2019</i>	<b>12</b>
<i>2019 In the Press</i>	<b>20</b>
<b>Second Phase Development - 2024/2029</b>	<b>24</b>
<i>Capital and Endowment Fundraising Campaign - Budget and Project Implementation</i>	<b>25</b>
<i>Proposed Five Years Plan for Research, Education and Capacity Building Program</i>	<b>32</b>
<i>A General Introduction to Plant Collecting and the Flora of Lao PDR</i>	<b>37</b>
<i>Pha Tad Ke Legal and Financial Structure, Donors and Partners</i>	<b>40</b>



## *... how a week stretched into eleven years ...*

*As I related in our ten years report in 2018, our journey at Pha Tad Ke hasn't always been a straight one. When we opened to the public November 2016, we hoped that in 2019, our third operating year, we would continue to grow as before, but from March 2019, visitor numbers were down 30% all over Asia, and this put an abrupt end to the prognosis and we finished 2019 on a par with 2018.*

*And then came April 2020 - Covid lockdown - our visitor revenues went down overnight to zero and have stayed there. Seeing how things were developing, the world economy, global viruses, buffoon presidents and more, we immediately closed our reception facility in town to reduce costs, and had to let go of 70% of our staff. Until now, the situation, if and when we can reopen to the public remains unclear and will require a significant investment to bring our facilities up to normal again.*

*Despite these setbacks, we were able to accomplish in 2019 most of what we had set out to do, and, when in 2020 visitor revenues disappeared overnight, we were able to find grants and donations to give training programs in permaculture. In 2021 we launched our new Insect Food Demo and Training Farm with programs for local villagers. In 2022 with support from BGCI, ArbNet, Franklinia Foundation, and in collaboration with Joeri Strijk from ACTG we have started up Fieldwork and Conservation projects and are collaborating on the next volumes of the "Flora of Cambodia, Laos, Vietnam".*

*Rik Gadella, Founder and General Director*

*“One invents and one creates; one’s whole being is carried away in action.  
That action, that’s the all-important thing.”*

**Le Corbusier**

## Mission Statement

**The Mission of Pha Tad Ke is to stimulate a fundamental change of awareness that leads towards a holistic view of nature and society for sustainable ecological and biodiversity conservation.**

Pha Tad Ke has created the first botanical garden in Laos for the conservation and study of the Flora and ethnobotany of Laos. A regional biodiversity research and education centre with the first living collection of plants.

The centre, supported by the collaboration and exchange of information with prestigious botanical institutions of South East Asia, the United States and Europe has as its objectives the development of educational programs, the publication of books and scientific articles, research into environmental conservation, botany, horticulture, and ethnobotany in order to promote biodiversity and ecological conservation.

## Our four main goals are

- Research, Educate, Show and Preserve the Flora and Ethnobotany of Laos
- Promote Sustainable Organic Farming to Mitigate Effects of Global Warming and Support Biodiversity Conservation
- Promote and Develop Green Tourism Projects in Luang Prabang and the Region
- Develop and Promote Art and Cultural Programs to Engage a New Generation in Creative and Intelligible Thinking

A close-up photograph of a yellow flower with a dark, circular center. The petals are bright yellow and slightly blurred, creating a soft, artistic background. The text is overlaid on the upper left portion of the image.

2019/2020/2021

*... and onwards 2022*

## ***2019 ... a storm is a brewing ...***

- The launch of the Alliance for Conservation Tree Genomics with Dr. Joeri S. Strijk & Damien D. Hinsinger. In recognition of the urgent need for on-the-ground conservation and research efforts in the mega-diverse tropics, the Alliance for Conservation Tree Genomics has partnered with Pha Tad Ke Botanical Garden in Luang Prabang, Lao PDR. The Alliance conducts tree genomics research with the aim of understanding and conserving biological diversity.

- Opening and first trainings in the Permaculture Demonstration and Research Farm

We are particularly pleased that we were able to install and open our Permaculture Demo and Research Farm with a program supported throughout 2018/2020 with a GEF/UNDP grant, a DAP grant from the Australian Embassy and finally with a grant from the Spellbrook Foundation facilitated through the Global Development Group.

Further support for this program was confirmed for 2020 with grants from donors from the Netherlands and a CEGGA Grant that allowed us to provide more trainings.

- Farm Installed;
- Three Trainer Teaching workshops;
- Ten farmer trainings given;
- First Volume of Permaculture Manual published.

- Field Work

Pha Tad Ke conducted field work in various locations in Laos with among others Projet Anoulak, Queen Sirikit Botanical Gardens from Chiang Mai and Celia Koh Conservation Centre from Taiwan.

- Installation of a Butterfly farm with community development programs

The first phase was completed and in collaboration with Banteay Srey Butterfly Centre we installed facilities for farming butterfly pupae for scientific research and conservation projects. This project aims to promote alternative livelihoods and to protect biodiversity by supporting sustainable natural resource management in Luang Prabang province as well as research and provide better knowledge about butterfly breeding habits and habitats.

## *2020 ... the storm breaks loose ...*

- A new collaboration with Child's Dream Association which began in 2020, allowed us to expand the permaculture farm, install a dormitory for trainees, start new series of training courses and publish the second volume of our Permaculture Manual.
- Project Space: Another main development was started in 2019 to install Project Space Gallery in the gardens. This was to be an important development to do more cultural, educational and artistic activities so close to the heart of our work. In the first quarter of 2020 we finished 90% of the first gallery building and the first artist residency house. But then on April 1st - Covid lockdown meant that we had to stop construction, close the reception facility, let go of staff, take a deep breath and think about what to do next...

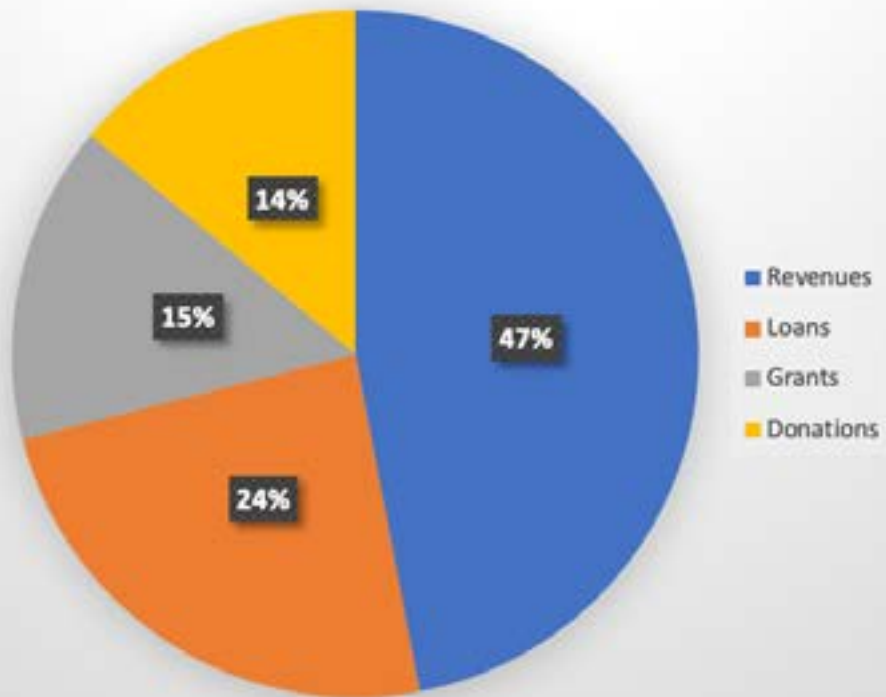
## *2021 and onwards 2022 ... fresh starts in times of continuing uncertainty ...*

- Insect Food Farming - With support from a Baf II / World Bank grant we researched and developed a new Demo and Training Farm for Insect Food Farming with a Lao language manual. Further support from Child's Dream Association and a GEF/UNDP grant provided the resources for the first trainings in 2021. In 2022 we launched more trainings with support from a SGP grant from the Australian Embassy.
- Fieldwork and Tree Conservation - In 2022 with support from BGCI, ArbNet, Franklinia Foundation, and in collaboration with Joeri Strijk from ACTG we have started up Fieldwork and Tree Conservation projects on Dipterocarpaceae and Fagaceae Trees and collaborate on the next volumes of the "Flora of Cambodia, Laos, Vietnam".
- Art & Culture - Even though Project Space is still waiting for financing to finish the last 10% of the buildings started in 2019, in June 2022 with support from The Heinrich Böll Stiftung, we start our first research project "*Women in Lao Contemporary Art Culture from 1975 till Now*", and with generous private support provided Art School Scholarships.

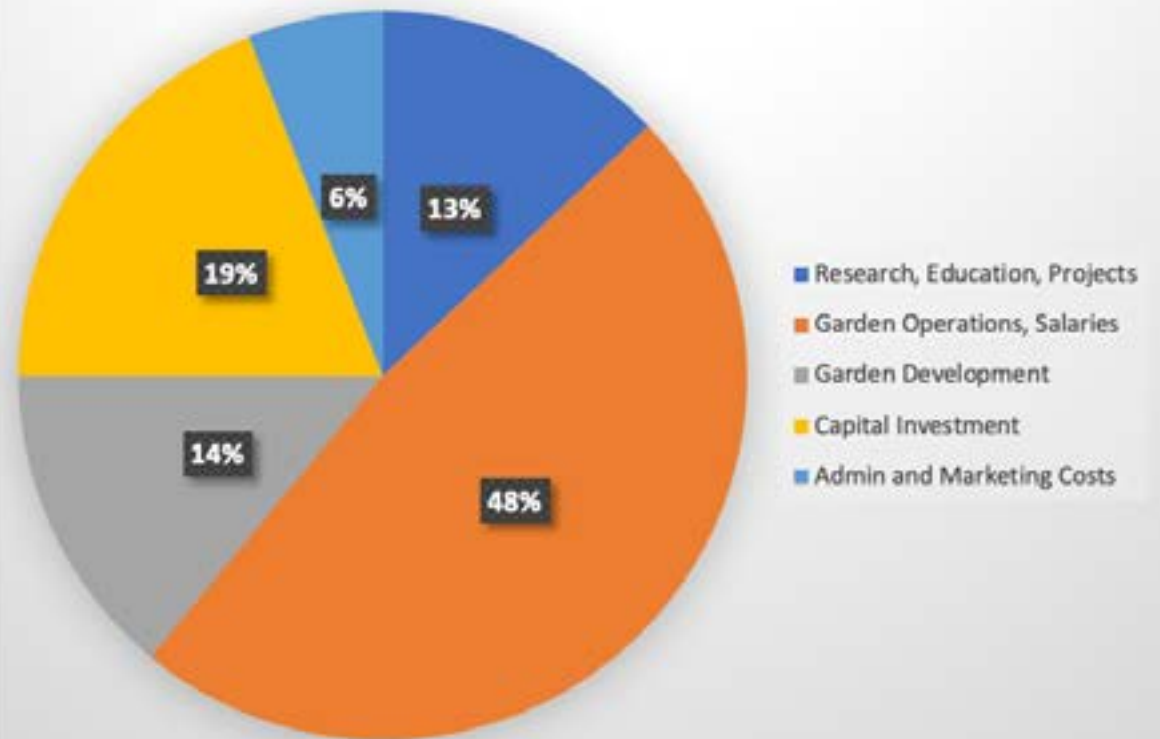


## *2019 ... a storm is a brewing ...*

**Income 2019 - 234.557 US\$**

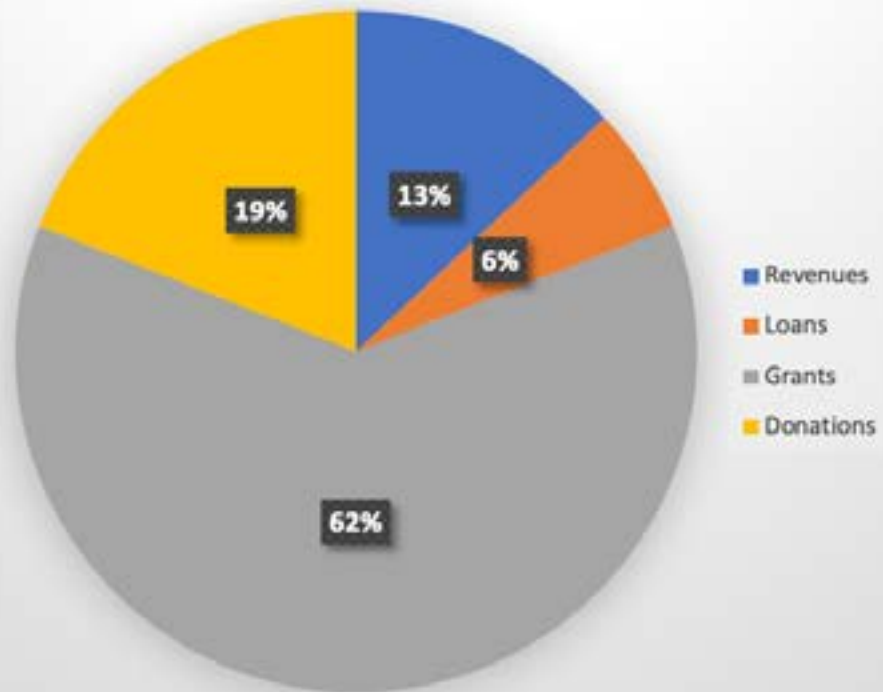


**Expenditure 2019 - 244.500 US\$**

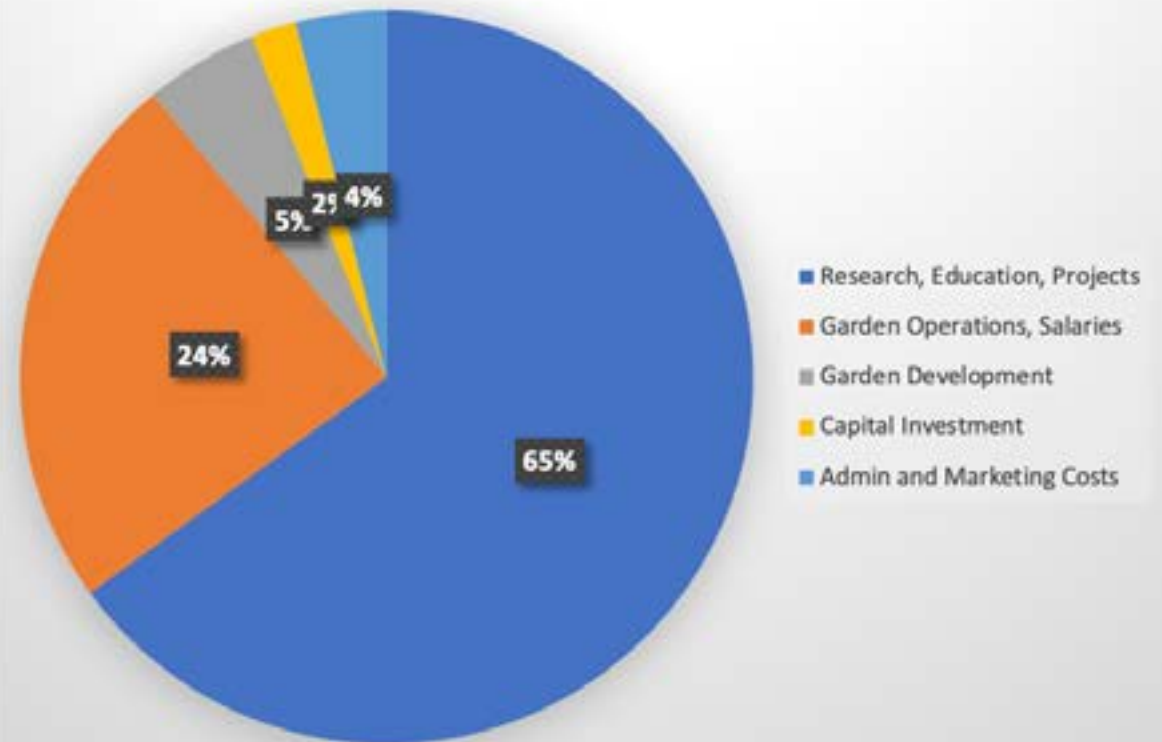


## *2020 ... the storm breaks loose ...*

**Income 2020 - 172.824 US\$**

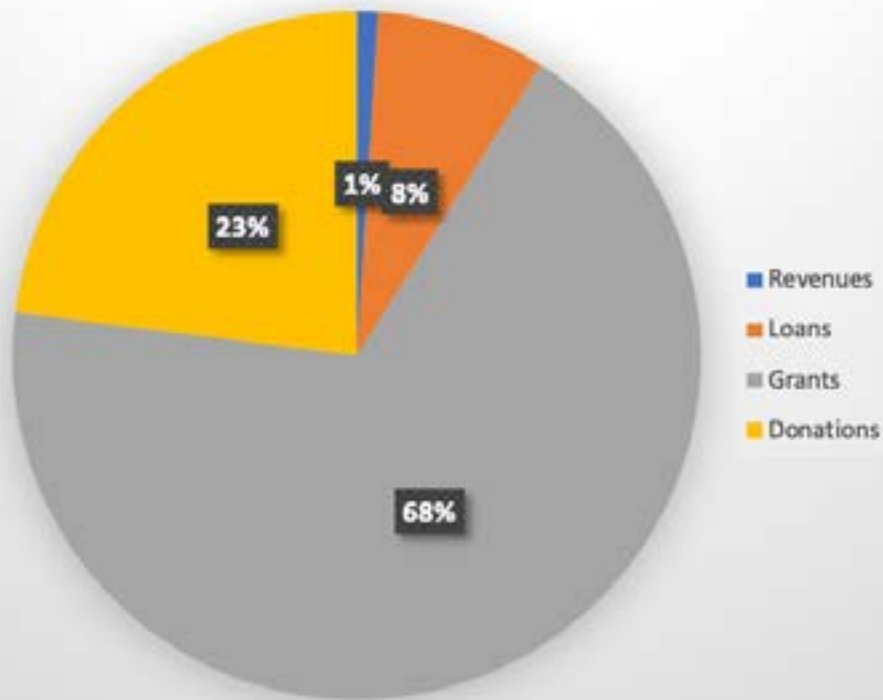


**Expenditure 2020 - 195.200 US\$**

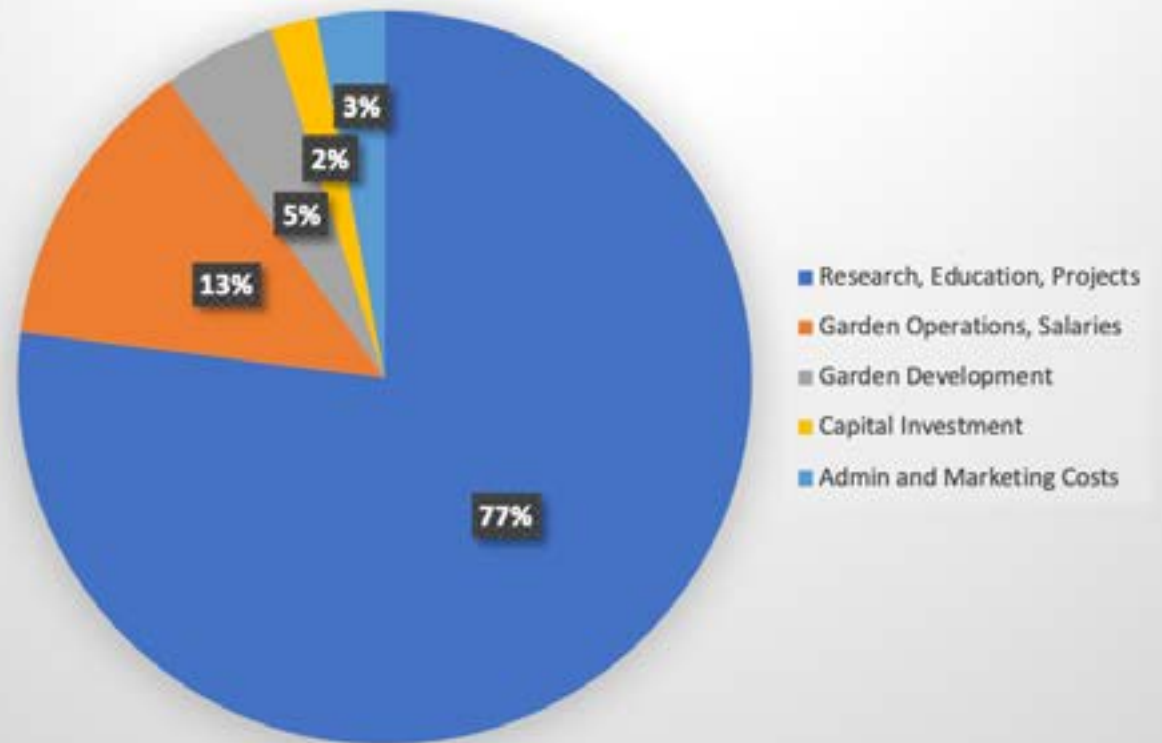


## *2021 ... fresh starts in times of continuing uncertainty ...*

**Income 2021 - 151.426 US\$**



**Expenditure 2021 - 164.400 US\$**



# Some Key Numbers & Accomplishments in 2019/2021





*The publication of the First Permaculture Manual in Lao language in 2019, the second volume came out in 2020.*

*“Pangolin” written and illustrated by Josephine Billeter, published in collaboration with CCL and Association Anoulak.*



ປຶ້ມຄູ່ມື

~ ສຳຫລັບ ~

# ກະສິກຳແບບຍືນຍົງ

ທາງອອກເພື່ອການດຳລົງຊີວິດທີ່ຍືນຍາວ



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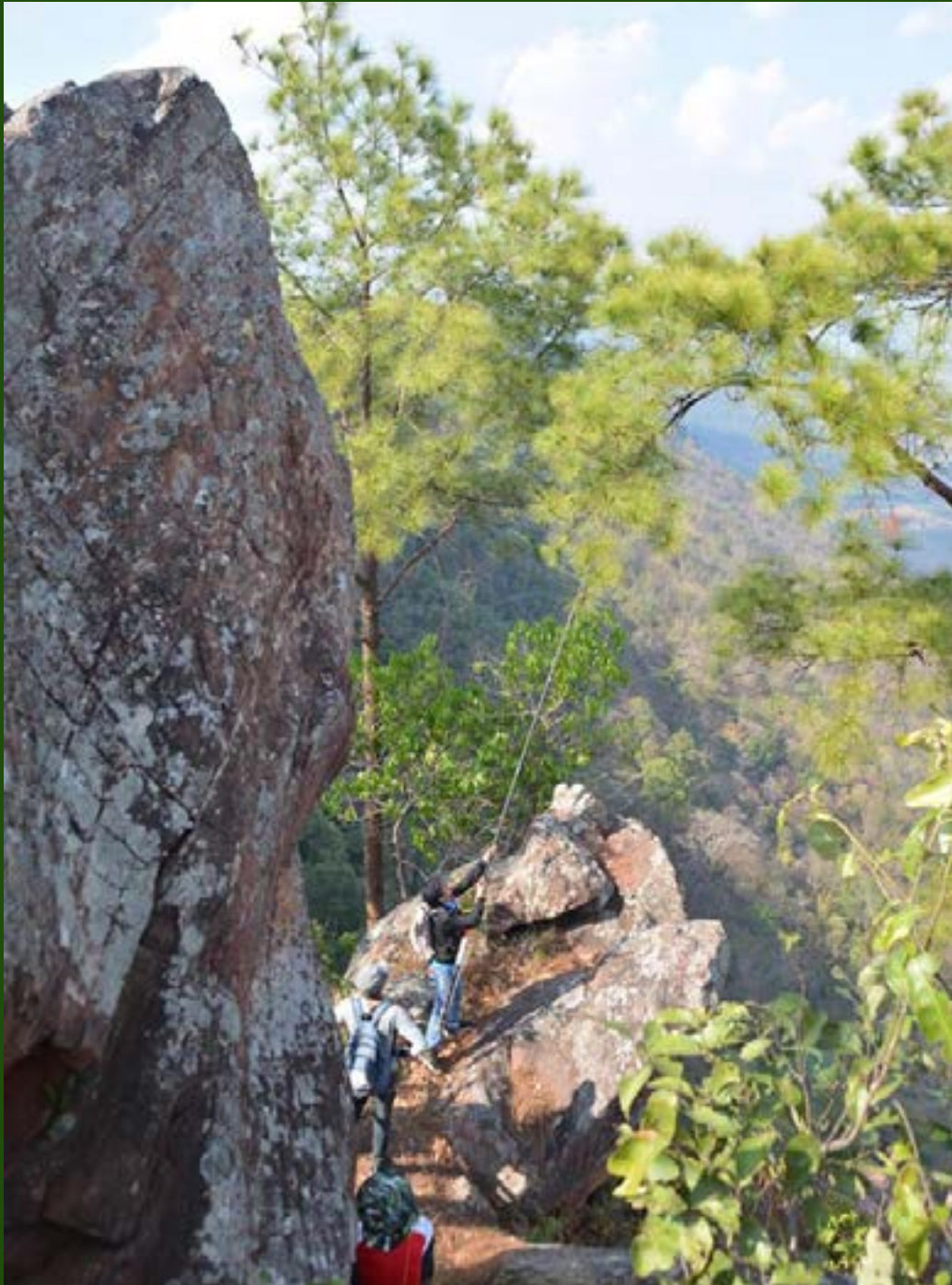
ຈັດພິມໂດຍ ສວນພຶກສາຊາດຜາຕັດແກ້ - ຫລວງພະບາງ - 2019

- Last lunch for VIP group of 85 pax under our centennial wild mango trees, just before lockdown

- Presentation for HRM Princess Sririndhorn of Thailand at the IBD 2019 in bangkok





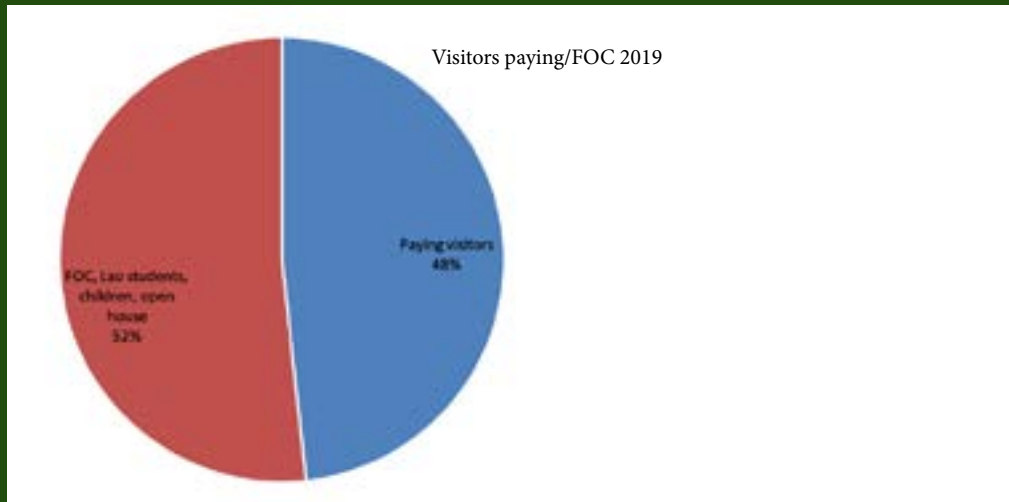


- Fieldwork in Xaiyabuly province with QSBG

- Camera trap image of great Indian Civet on our PTK mountain, now becoming rare in Luang Prabang







- Open House 4/5 May 2019 over 1.800 youngsters from Luang Prabang came and enjoyed a day in the gardens







**Permaculture trainings with support from:**

- CEGGA Project GIZ
- Child's Dream Association
- Direct Aid Program from the Australian Embassy
- Spellbrook Foundation through GDG
- UNDP/GEF grant





**Insect Food Farming project with support from:**

- BAF II / WorldBank
- Child's Dream Association
- Direct Aid Program from the Australian Embassy
- UNDP/GEF grant



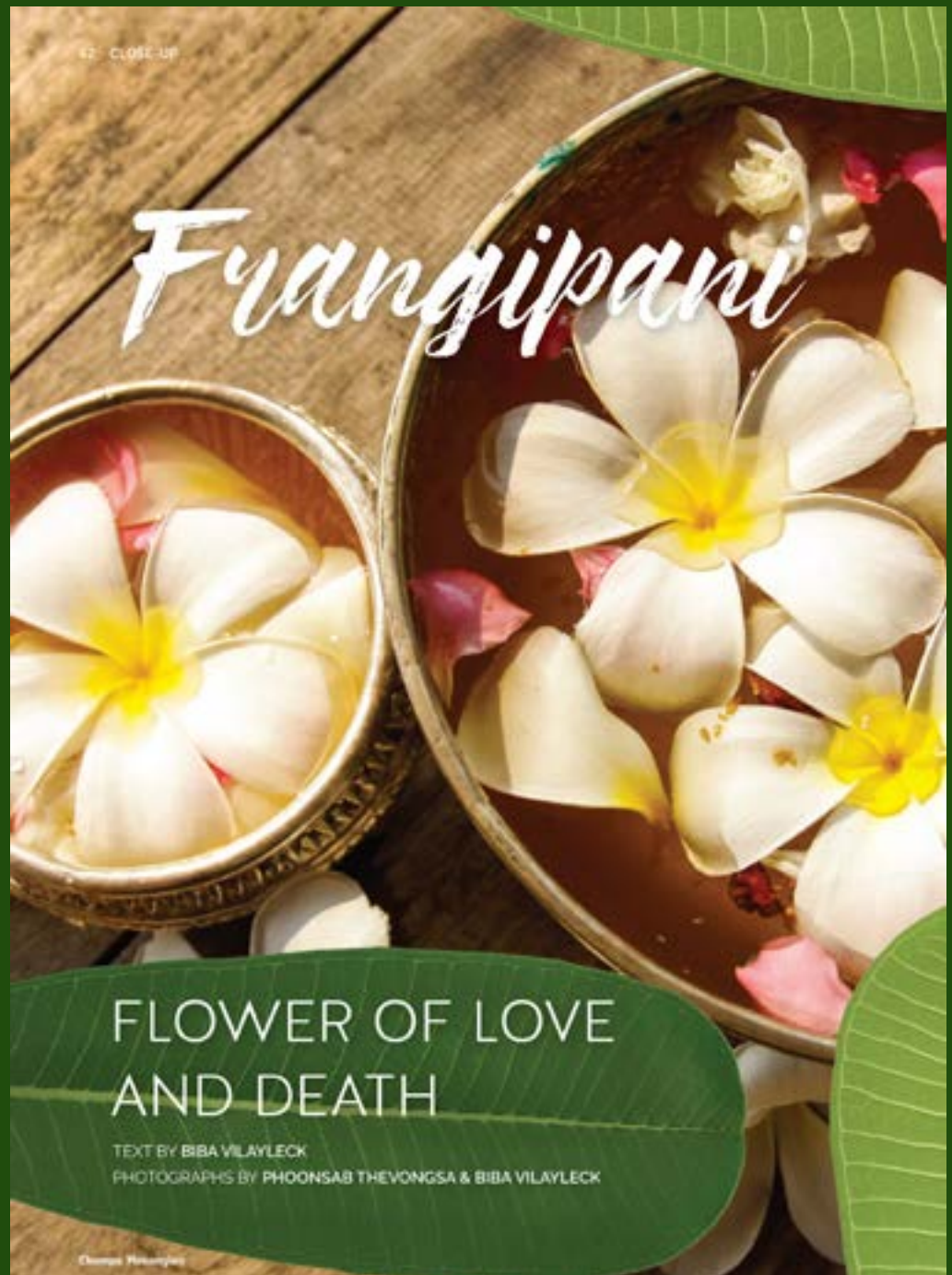


**Fieldwork and Tree Conservation with support from:**

- ACTG
- ArbNet
- BGCi
- Franklinia Foundation



# 2019 In the Press





# 2019 In the Press



Home » Culture » Travel » A new botanical garden – in South East Asia

By Phyllis Stephen • July 1, 2019 11:10 am • 387 • 0

On a visit to South East Asia recently I went to see a new botanical garden in Laos. Coming from Edinburgh where the Botanics are such a popular attraction it seemed like an interesting place to go. The garden, Pha Tad Ke, is the first ethnobotanical garden in the country, shining a spotlight on the local and traditional knowledge of the plants found there. It is setting an example of environmentally responsible tourism by preserving the local culture and environment, giving jobs to locals and providing them with a learning platform.

Healthcare in Laos was in part historically based on medicine produced from plants, and the idea behind the garden is to preserve that knowledge and teach locals and visitors about them. Nature and these plants are important to the people of Laos, but the rapid development of the country threatens old knowledge, often handed down without record. The idea is that those working in the garden will document and research the biodiversity of Laos to preserve it for future generations. There are 42 Lao staff who now work at Pha Tad Ke.

The garden is located in South East Asia's most biodiverse region near Luang Prabang in 14 hectares with a cliff which gives the garden its name soaring upwards just behind. From the top you can see across the Mekong and spy the odd boat plying up or down the river. You can buy tickets for the garden at the Reception Centre in Ban Wat That.





## L'arbre et le

Les essences représentées dans l'art

Texte : Rika VILAYECK

J'ai vécu plus de quarante ans sous les tropiques (Caribbes et Asie du Sud-Est) où ma passion a été d'acquiescer sur les noms de plantes et leurs usages.

Au début, en Asie surtout, c'est l'émerveillement devant l'ingéniosité des hommes qui utilisent les plantes, par exemple pour élever des

cochenilles, dont on extrait un colorant rouge, ou qui emploient le bambou de mille façons différentes. Cela prend plusieurs années... On s'enfonce tout doucement dans une culture que l'on comprend de mieux en mieux, jusqu'à ce qu'elle a de plus mystérieux : les lieux de culte, les pagodes. Les sculptures, les peintures murales, les bas-reliefs que j'avais longtemps négligés sont devenus un terrain de perpétuelles interrogations sur les plantes représentées et leur raison d'être : ces plantes étaient-elles identifiables ? Avaient-elles un référent naturel ? De quoi ou de qui étaient-elles le signe ?

Les fleurs et les feuilles constituent un système décoratif de rinceaux, de fleurons, de rinceaux, dans lesquels les espèces sont difficilement reconnaissables. Mais les arbres, eux, sont bien individualisés et le travail de l'artiste permet peut-être de les identifier.

Pour commencer ce travail, il faut remonter à l'Inde d'il y a 2500 ans, lorsque le bouddhisme est né, en opposition aux religions existantes mais cependant imprégné de leurs mythologies et de leurs codes iconographiques. Dans les premiers siècles du bouddhisme, aucune image du Bouddha n'est représentée sur des monuments, où fonctionnent pourtant des compositions arantes et complexes ; selon Paule Mus, « sur ces monuments, par une véritable gageure, les vies illustrées de Sakyamuni se passent de Sakyamuni ». Ce sont des symboles : le stupa, le trône, la roue et surtout l'arbre, qui indiquent sa présence. Non seulement l'arbre signifie « le Sage » dans l'art bouddhique ancien

## bouddhisme

bouddhique et leurs significations

mais encore chaque moment important de son histoire est représenté par un arbre d'une espèce différente : l'arbre jalonne ainsi la voie que suit Sakyamuni vers l'éveil. En outre, le Bouddha historique n'est pas le seul, d'autres bouddhas (entre six et vingt-huit), en d'autres temps, ont existé et ils sont également représentés dans l'iconographie ; une façon de les distinguer est de regarder l'arbre sous lequel ils sont assis.

L'abondance des arbres figurés sur les grands stupas indiens de Sanchi et de Bharhut est étonnante. L'art du Gandhara, qui donne un corps et un visage au Bouddha et attribue parfois aux fucus des feuilles d'acanthé, est tout aussi instructif. L'explication de ces monuments avec l'aide d'indianistes reconnus (Alexander Cunningham, Alfred Foucher, Ananda Coomaraswamy, Colene Vienneu) est passionnante et permet de mieux comprendre les sculptures et les peintures murales des temples d'aujourd'hui, ceux du bouddhisme Theravada, au Sri Lanka, au Myanmar et en Thaïlande, au Laos et au Cambodge.

Le figuier des pagodes (*Ficus religiosa*, Moracées) sera donc le premier de ces arbres : on peut admirer ses feuilles, en forme de cœur et à la pointe allongée, déjà dans la civilisation de Mohenjo-Daro et sans interruption jusqu'à dans les pagodes modernes, toujours avec le même vocabulaire plastique. Il est à la fois le Bouddha et l'arbre sous lequel il atteint l'éveil et, à ce titre, honoré par tous les bouddhistes. Un autre fucus, le banian (*Ficus benghalensis*), qui joue un rôle très important dans la vie des Indiens, prend parfois sa place dans l'art mais jamais dans le culte ; il est reconnaissable à ses racines aériennes.

Un des arbres dont le nom revient régulièrement dans tous les textes est le sâla. C'est en prenant appui sur l'une de ses



*Shorea robusta*, Plaque extraite de *Plants of the coast of Cochin*, vol. 3 (1818), de William Roxburgh.

branches basses que la reine Maya donne naissance au futur Bouddha. C'est aussi entre deux sâla que le Bouddha se couche pour mourir. Les botanistes (comme William Roxburgh) et les historiens considèrent que cet arbre est un *Shorea robusta* (Diptérocarpées), arbre originaire d'une région relativement restreinte au sud de l'Himalaya. Parce que cet arbre est rare en dehors de sa région d'origine, les représentations qui en sont faites sont très fantaisistes et même contraires à la connaissance botanique, si l'on pense à la confusion avec l'arbre boulet de canon (*Couratpis guianensis*, Lécythidacées. Voir *La Guinée voyageuse* n° 303).



Sakjamuni prêchant. Miniature roère (bas-àli), AP siècle, monastère de Taling, Ouest du Tibet.

Les mots pour le dire

Stupa : ruit, structure architecturale bouddhiste et jéna que l'on trouve dans le sous-continent indien, dont il est originaire, mais aussi dans le reste de l'Asie, où il a suivi l'expansion du bouddhisme. C'est à la fois une représentation aniconique du Bouddha et un monument commémorant sa mort.





*Syzygium malaccense*. Plancher extrait de *Indigones*.  
Flowers of the Hawaiian Islands (1897), d'Isabelle Sauter



*Bombax cecilia*. Plancher extrait de *Flores de Filipinas* [...]  
1880-1883, de Francisco Manuel Blanco



*Mangifera indica*. Plancher extrait de  
*Flores Sinensis* (1858), l'un  
des livres d'histoire naturelle  
de la Chine les plus anciens,  
d'un auteur missionnaire  
jésuite anonyme.

Les mots pour le dire  
sugata : nom signifiant  
« le Bienheureux ».

Ce qui permet d'« identifier » l'arbre dans les œuvres plastiques, ce n'est pas l'arbre lui-même mais l'attitude de la femme qui en tient une branche : celle, classique, de la déesse à l'arbre, *śālabhāṃśikā*, littéralement « déesse qui enlace l'arbre sâla ».

Le jambou (*Syzygium jambon*, Myrtacées), lui, a une longue histoire dans la mythologie indienne puisqu'il engendre l'Inde, toutes ses rivières et tous ses fruits. Il apparaît sous toute une série de noms vernaculaires et s'appelle jambosier ou pomme rose en français. Dans le bouddhisme, il est lié à la première méditation du jeune Sakyanami qui, au lieu d'assister au labourage rituel mené par son père, préfère s'asseoir sous un jambou dont « l'ombre n'abandonne pas le corps du Sugata », selon la *Lalitā Vistara*, l'une des premières biographies du Bouddha.

Les fromagers (*Bombax* spp., Malvacées) donnent lieu à de terribles images des enfers où les pêcheurs s'empalent sur leurs épines redoutables.

Les *asoka* (*Saraca* spp., Fabacées), qui console de tous les chagrins, sont

représentés de façon très réaliste dans la sculpture indienne et font l'objet d'un culte courant dans le bouddhisme.

Le cocotier, le mangouier, le bananier, sont eux aussi représentés pour créer un univers villageois où règnent le bonheur et la sagesse.

On ne peut rendre compte des univers culturels et culturels de ces pays bouddhistes sans citer, d'une part, les plantes de l'alliance, le bétel (*Piper betle*, Pipéracées) et l'arec (*Areca catechu*, Arécacées), d'autre part, celles qui sont supports des textes sacrés, les arbres-livres : le rônier (*Borassus flabellifer*, Arécacées), les palmiers *Corypha* spp.

Enfin, comment ne pas parler du lotus (*Nelumbo* spp., Nelumbonacées) ? Certes, ce n'est pas un arbre au sens où nous l'entendons mais, dans la mythologie, c'est l'arbre matriciel sorti du nombril de Vishnu assoupi sur les eaux primordiales, et c'est lui qui donne naissance à Brahma et au Bouddha. Ce qui m'a le plus intéressé en triant le nombre incalculable de documents sur cette



*Saraca asoka*. Plancher extrait de *Curtis's botanical magazine* (1838).  
L'arbre d'*Asoka* peut être désigné par les autres noms vernaculaires suivants :  
*angougrila*, *angougrila*, *angougrila*, *angougrila*, *angougrila*, *angougrila*, *angougrila*, *angougrila*, *angougrila*, *angougrila*.

plante, c'est le réalisme avec lequel elle est toujours figurée. À Sanchi, il y a 2500 ans, les sculpteurs représentent le lotus sous toutes ses formes botaniques : la feuille peltée qui se déroule hors de son bourgeon, le réceptacle rempli de graines, les rhizomes et les pousses qui, comme des guirlandes, rythment les histoires racontées. Sur les murs des temples birman, dans les manuscrits thaï, ce sont jusqu'aux rugosités des tiges qui sont visibles.

Avec le lotus ou les ficus, on admire les imagiers qui reproduisent ce qu'ils voient, mais avec le *sâla* et plusieurs autres on est bien forcé d'admettre qu'ils représentent le plus souvent ce qu'ils croient. ■



### La voie des arbres dans le Bouddhisme. Du lotus originel aux grands ficus de Bibo VILAYLE

Chêne Massonnet, *livre d'Asie et d'Orient*, 2021,  
22 x 25 cm, 200 p., 32 €

Il était un temps où la tronçonneuse n'existait pas. Les arbres étaient alors des êtres vivants, utilisés certes, mais aimés, respectés, intégrés dans la civilisation. Ce

livre raconte l'histoire d'une vingtaine d'arbres au Cambodge, au Sri Lanka, au Laos, en Thaïlande et au Myanmar (la Birmanie). Il montre comment, dans le bouddhisme de ces pays, ils accompagnent « les moments les plus significatifs de la vie du Bouddha : celui de la naissance, celui de la mort et surtout celui de l'éveil ».

Pour chacun d'entre eux sont proposés des éléments de botanique, est illustrée leur symbolique, sont décrits leurs usages pratiques, est précisé le code iconographique qui leur est attaché.

L'auteur, qui a longuement parcouru ces pays et vit désormais dans « la péninsule indochinoise », nous propose un récit somptueusement illustré par ces arbres et leurs représentations dans les temples, pagodes, maisons et paillottes. Rien que l'on trébuche souvent sur des termes étrangers, on se laisse facilement aller à la poésie de ces mots inconnus, à la beauté d'images dans lesquelles, toujours, l'arbre accompagne les divinités, à la découverte d'un monde au sein duquel une religion propose la beauté et l'apaisement.

JPG

**Second Phase Development - 2024/2029**





**Pha Tad Ke is setting new standards in sustainable and environmentally responsible tourism, giving back to Lao communities, preserving local culture and the environment. The garden provides jobs to local villagers and creates a nurturing platform for young talent to develop new skills from gardening to science, education and hospitality.**

**To bring the garden and our vital work for biodiversity conservation to the next level we will be establishing a capital campaign to improve our facilities and create an ambitious five-year research, education and capacity building program. With this Pha Tad Ke Botanical Garden will take a major step towards the realization of its goals.**

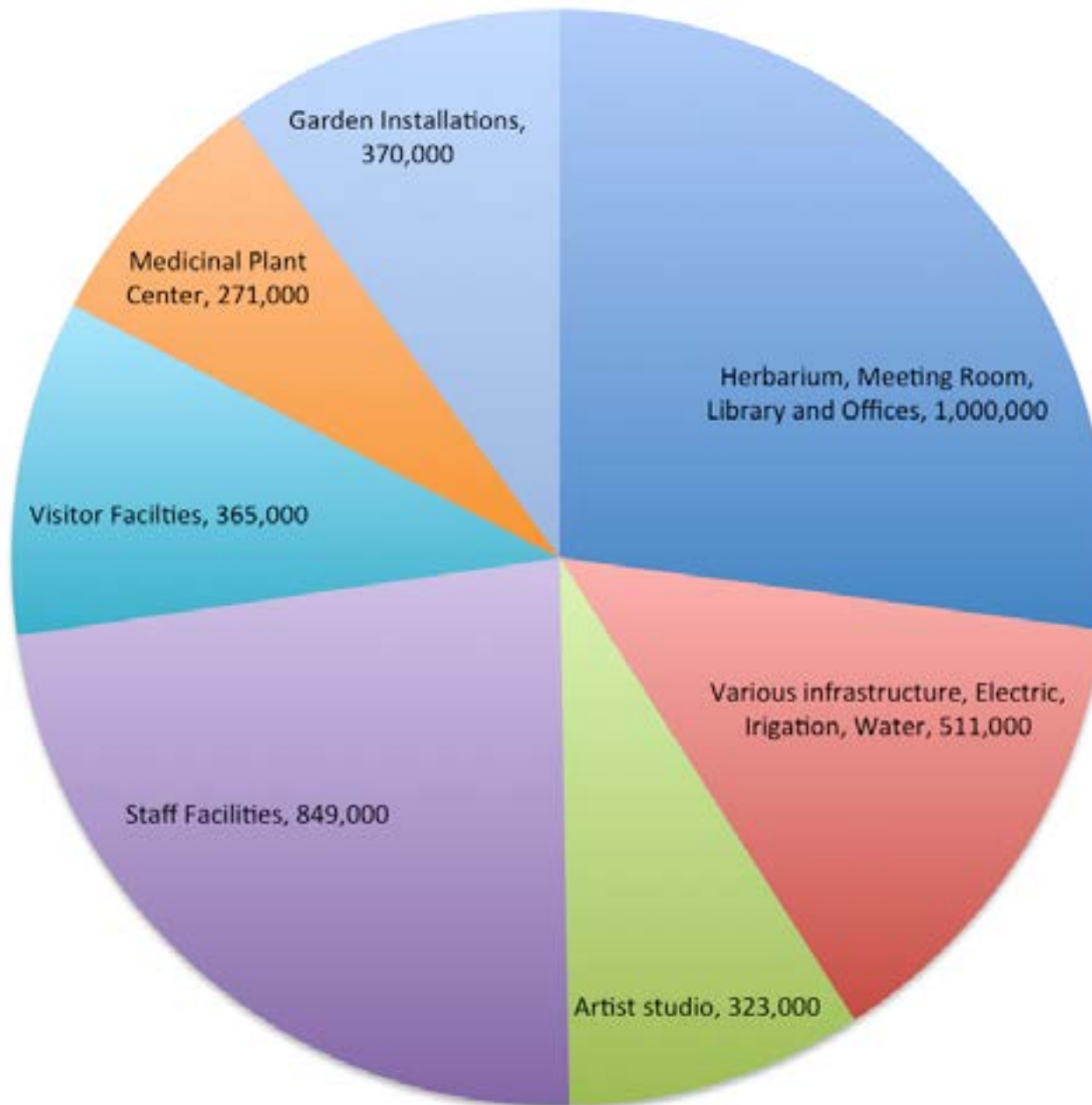
**The proposal for our Five-year plan, followed by A General Introduction to Plant Collecting and the Flora of Lao PDR, is included. This summarizes why the Flora of Lao PDR is one of the least known in Asia, and why this work is needed in order to be able to study and conserve one of the worlds least known bio-diversity ecological hot spots.**

***Our goals are:***

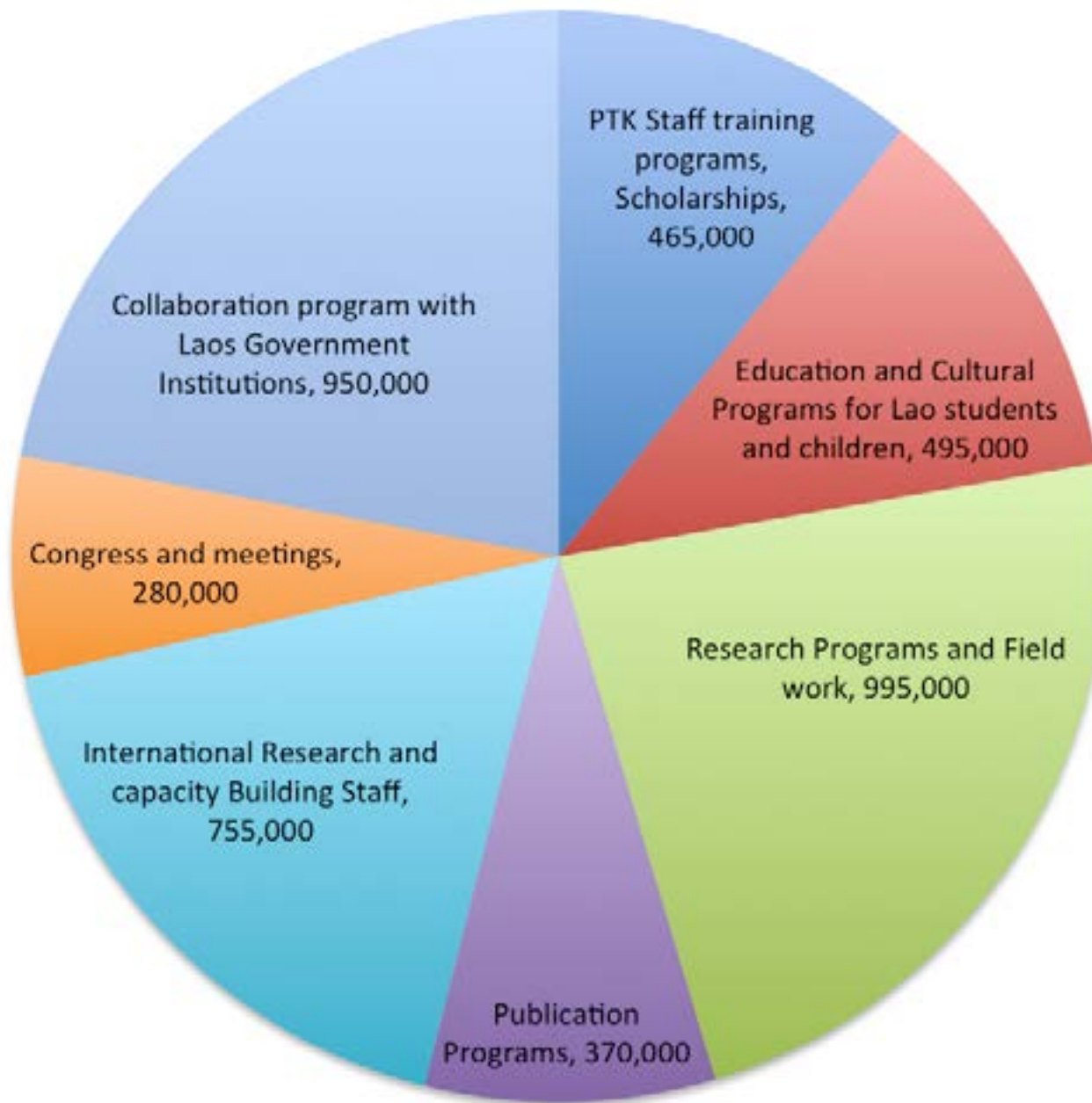
- To establish an endowment fund to support 32% of our yearly overhead, the other 68% coming from our own revenues from visitors and donations and;**
- To raise Eight-million US\$ for the installation of our necessary infrastructure and buildings (3,7mln) and 4,3mln for the five-years Research, Education and Capacity Building Programs.**

## 2nd Phase Capital Fundraise Drive

### Garden Development and Infrastructure - 3,689,000 US\$



## 2nd Phase Capital Fundraise Drive Research, Education & Capacity Building - 4,310,000 US\$



## **Collecting**

The mission of Pha Tad Ke Botanical Garden is to establish a collection of living plants with ethnobotanical information and a biodiversity conservation program that will be useful for botanists and their research projects. This project is the first of its kind in a country suffering from a lack of knowledge in this field. Our objectives are to establish a number of specialized collections of native plants, to preserve the customs and uses associated with these plants, and to promote their future use both in ceremonies and as medicines or in traditional construction. The Garden is creating five thematic collections, which will make possible research directed at the reintroduction of wild plants and their restoration into the natural environment. To date over 140 botanical field trips have been organised in collaboration with international botanical gardens and several in and ex-situ conservation projects are in development.

## **Herbarium & Offices**

Pha Tad Ke will create a 400m<sup>2</sup> herbarium to accommodate specimens collected in the field, to facilitate biodiversity research and to encourage the study of the preservation of the Flora of Laos. In addition to the Herbarium, there will be a 400m<sup>2</sup> area for the library, meeting room, staff offices and a seed bank.

The herbarium will be a tool for training and also for providing subjects for study in the flora and biodiversity, and will eventually consist of more than 15,000 indigenous species. This herbarium will demand rigorous discipline in its development and careful conservation work. Each collected specimen will be given a classification, a description and precise details of its collecting history.

## **Medicinal Plants & Nursery**

Laos has many medicinal plants. The uses of these were once the province of minority groups living in the mountains, and little remains known by the greater Lao population. Pha Tad Ke has created a medicinal garden of about 4,000m<sup>2</sup> to show and evaluate the usage of these plants through research, educational programs and publication of academic works on the subject. Already ten thematic ethnobotanic plots have been established and two more are in development. We create a 4,000m<sup>2</sup> nursery for our scientific and garden collections of over 1,500 different plant and trees species we currently have in the gardens.



## **Mist House**

To show our scientific collections of orchids, ferns and carnivorous plants, Pha Tad Ke Botanical Garden will build a Mist House. A 300m<sup>2</sup> structure will hold 900 species from Laos and neighbouring areas. The purpose of the house is the protection of these fragile and sensitive plants and to improve their visibility and accessibility. Once they are in place and have been developed and studied, the house will give visitors the opportunity to discover the orchids of Laos in an environment designed for serenity and peace.

## **Education**

One of the main goals of PhabTad Ke is that, within 20 years, it will be directed and run by an all-Lao team (administration, training, and reception) and to transfer the ownership to a foundation. The population of Laos to date has not had the benefit of the necessary resources to conduct such a project, and there few Lao botanists. For this reason, Pha Tad Ke created these teams and promotes botanical and horticultural education in Laos. Thus, an important part of the budget of Pha Tad Ke is used for training and capacity building. Over 3.00 staff training days have been organised in Laos and over 1.00 training days completed internationally. Over 84 workshops have already been given to Lao college and university students in Field botany, Green horticulture, Ecology, Management coaching, Photography and Botanical drawings.

## **Publications**

To promote our goals and to reach a broad public, in Laos as well as internationally, we have published 16 books, over 36.000 copies of our books have been distributed free of charge through local schools and libraries. We are preparing several new book publications: Children's Books, Field Guides as well as Teachers Manuals and to be able to reach a public as large as possible we will create several online databases and have already started to make available through our website important source materials.

## **Ecological Awareness & biodiversity conservation**

Among its principal objectives, Pha Tad Ke seeks to support environmental education in Laos, a country blessed with a considerable degree of biodiversity, an essential keystone for the region in terms of natural resources. At this point,

it is imperative that Lao people understand the importance and uniqueness of their natural heritage and want to preserve it. Pha Tad Ke seeks to involve institutions in financing teaching programs in environmental awareness aimed at the Lao people and the general public.

To this end we have published a manual for primary school teachers and provided trainings to teachers on how to set up simple school gardens. Over 2.900 school children have visited PTK as part of organised garden excursions, and over 1.100 university and college students.

### **Sustainable agriculture**

Part of PTK's research and education work will focus on sustainable agriculture through permaculture and organic gardening practices. A large area of the garden is currently being developed for a permaculture demonstration and research farm and will open to the public and for teaching courses in February 2019. Sustainable, ecologically sound agricultural practices and trainings will be developed in partnership with local and international organisations.

PTK will run trials of the "Alley Cropping" farming technique pioneered in Central and South America. These trials will be conducted next to the permaculture farm on 2ha of land and will include the investigation of potential local leguminous tree species that are good nitrogen fixers, fast growers, take pruning well, provide good mulch, shade-out weeds and provide secondary products (such as timber). The results of these trials will be used to improve the alley cropping technique best suited to the environment of Lao PDR.

### **Arts & Culture**

It is our conviction that biodiversity conservation can only be attained through a fundamental change of awareness that leads towards a holistic view of nature and society. Arts and Culture play a vital role in this, as they facilitate our reconnection with our imagination and guide us to embrace our relationship with nature, as an integral part of the whole. Through the installation of an artist studio where we can receive artists in residence as well as provide workshops and trainings and host festivals in the garden we strive to achieve these exciting goals.





## **Pha Tad Ke Botanical Garden**

### **Proposed Five Years Plan for Research, Education and Capacity Building Programs**

*Currently the flora of Lao PDR is poorly studied and barely understood. There are many potential avenues of plant research to pursue and over the next five years, research at PTK will be focused along four of them: important plant groups, ecological profiles and biodiversity conservation projects, ethnobotany and sustainable agriculture with a permaculture demo and research farm.*

#### **Important plant groups**

The plant groups that will be worked on are the Gingers (Zingiberaceae), Orchids (Orchidaceae), Dipterocarp trees (Dipterocarpaceae) and Ferns (various families). PTK has established Orchid and Ginger collections and gardens. These were created and are managed with help from expert collaborators at other institutions. Staff at PTK work with the National University of Laos on Orchids and with Singapore Botanic Gardens and the Royal Botanic Gardens, Edinburgh on Gingers. These plant groups are very diverse in Lao PDR and continued study is crucial.

The Dipterocarps and Ferns are very poorly documented and understood, and yet are of key importance in many ecosystems. The Dipterocarps are under serious threat due to their high timber value, and Lao PDR has a number of Critically Endangered and Endangered species. PTK will research on where to find these trees and how to conserve them, as well as establishing a comprehensive living collection at the garden. The first stages of this work will involve extensive fieldwork. Dipterocarps do not fruit and flower regularly, but only do so when the conditions are exactly right. Each species has a unique phenology, and there will be regular trips to field sites to establish what this is for each tree. Only once this is established will PTK be able to plan ex-situ conservation efforts. The seeds of this family cannot be stored (they are recalcitrant) and they must be collected and planted within about one week of maturing. This presents obvious challenges, and it is expected to take many years to perfect horticultural processes and gather all the necessary information. The initial work will be done in collaboration with South East Asian Botanic Gardens network partners.

Work on the ferns of Lao PDR will be undertaken with researchers at Singapore Botanic Gardens, and potentially other institutions, and will include the establishment of

a Fern Garden for public display. There are many fern families represented in Lao PDR, and their taxonomy is not always clear. The information gathered from the plants in the collection and from field surveys/collection trips will assist in undertaking more complex botanical taxonomic work in the future. The initial, small field guide on ferns to be published will be a starting point.

All of PTK's planned field guides will be of general use, as well as useful scientific documents.

### **Ecological profiles**

PTK's work on ecological profiles will result in the publication of six books (80 pages) each dealing with one type of environment. These six profiles books will be created in collaboration with other Lao organisations, National Protected Areas Management and will consider environment types found in Nationally Protected Areas (NPAs). Of general interest, they will include information on key plants and animals, and will provide a foundation for future scientific work in these areas.

Limestone karst areas are unique ecosystems, and have high rates of endemism and speciation, particularly in plant groups such as Gesneriaceae, Balsaminaceae,

Orchidaceae, Dracaenaceae and Araceae. They will be a focus for one of the books. Due to the climatic regime of Indochina (particularly the long dry season) many of the species found on these karsts are found nowhere else in the world. The Laotian areas have not yet been greatly disturbed, and there are good-sized areas remaining. Information gathered from this work will be used to inform documents such as the IUCN (International Union for Conservation of Nature) Red List, a globally important conservation document used by governments to decide conservation strategies.

Another important environment to be worked on is the unique forest found in the Nam Nakai Theun National Protected Area (NPA) in central eastern Lao PDR. Project Anoulak, a conservation NGO based in this NPA, will work with us on this. PTK will also work with botanists and field staff from the National University of Laos and international gardens/research institutes such as the Royal Botanic Garden, Edinburgh. PTK is in discussion with a number of other organisations, both national and international, to establish working partnerships for this work in other NPAs.



## **Ethnobotany**

One of the central themes of our garden is the rich cultural history of the use of a wide range of different plants by the people of Lao PDR for everything from food and medicine to clothes and construction. The people of Laos are still very connected to this heritage, but the knowledge is being steadily lost as Lao PDR develops. Preserving this ethnobotanical knowledge through PTK's ethno-botanic garden, teaching and publications is something PTK is doing, and it will continue to be developed with the help of PTK's resident ethnobotanist, Dr Biba Vilayleck.

PTK will publish at least two more ethnobotany books during the next five years and collaborate on the National Biodiversity Web Portal. This will be based largely on PTK's existing ethnobotany garden and living collection, which will be expanding and diversifying. Dr Vilayleck has extensive information on plants currently not grown at PTK. New plants will be acquired. PTK staff will continue to gather information from local contacts and through organisations such as the Elephant Conservation Center, whose mahouts are able to provide new information on plants of importance for elephant husbandry.

The garden includes a section dedicated to the medicinal plants of the Hmong ethnic group. This will be expanded to include areas dedicated to some of the other ethnicities found in Lao PDR, such as the Khmu and Akha and an area with the historical Heritage plants of Luang Prabang.

## **Sustainable agriculture**

PTK's research and education work will focus on sustainable agriculture through permaculture and organic gardening practices. A permaculture demo and research farm will open in 2019 and will provide trainings to local farmers as well as the international public. Sustainable, ecologically sound agricultural practices will be developed in partnership with local and international organisations, as well as proposing international level permaculture design courses.

Climate change and its global impact presents enormous challenges and stress on biodiversity conservation. The climate in Lao PDR presents a challenge for year-round growing due to the long dry season, and there is inadequate knowledge currently available on how to combat this issue without resorting to measures such as

using large quantities of chemical fertilizer and extensive irrigation. PTK staff are researching and teaching more environmentally friendly organic methods to increase crop yields and to expand the growing season.

PTK will also be running trials of the “Alley Cropping” farming technique pioneered in Central and South America. These trials will be conducted in conjunction with the permaculture farm, and will include investigation of potential local leguminous tree species that are good nitrogen fixers, fast growers, provide good mulch, shade-out weeds and provide secondary products (such as timber). In the future, the results of these trials will be used to intensify alley cropping techniques best suited for the Lao PDR and help mitigate climate change effects and reduce slash and burning.

### **Capacity Building**

Since the start of our project a major part of our work has focussed on capacity building for our own staff as well as university and agricultural college students, primary and secondary school children. In collaboration with the Royal Botanic Garden Edinburgh, Queen Sirikit Botanic Garden Chiang Mai and the Singapore Botanic Gardens much in

and ex-situ trainings have been provided.

We have published six books in Lao on ecological and ethnobotanic subjects as well as three manuals; on horticulture, a Teachers’ Manual for school gardens and a Permaculture Manual. We intend to expand these activities on a larger scale by developing more research projects and collaborations with national and international colleges and universities as well as providing study grants for Lao students and organize regional and international workshops at Pha Tad Ke.

**Bryony Smart**

*Botanist at Pha Tad Ke 2016/2018*





## A General introduction to plant collecting and the Flora of Lao PDR

The flora of Lao PDR is one of the least known in Asia. Although it was revised in the *Flore générale de l'Indochine* (Lecomte 1907–1950) and is being revised again in the *Flore du Cambodge, du Laos et du Viêt Nam* (Aubréville 1960–present), neither of these projects has treated Lao PDR independently. Both these studies group the flora of Lao PDR with that of its neighbours, Cambodia and Vietnam and the great majority of specimens cited are from Vietnam.

The earliest botanical collectors in Lao PDR were French. Clovis Thorel was the first to make a significant contribution, collecting along the Mekong in southern and central Lao PDR from 1866–1868. He was followed by Jules Harmand who also worked mainly in the south in the 1870s. These pioneers were followed by Henri D'Orléans (1892, in northern Lao PDR), Clément Dupuy (1900, around Louangphrabang) and Jean- Baptiste Counillon (1909, along the Mekong). The most prolific collector in the 20th century was Eugène Poilane who worked in various provinces of Lao PDR from the 1920s–1940s.

At the same time Camille Joseph Spire was collecting in Xiengkhouang. More detail about the flora and collectors in Cambodia, Lao PDR and Vietnam may be found in the “*tome préliminaire*” to the *Flore générale de l'Indochine* (Gagnepain 1944).



Historical events all but prevented botanical work in Lao PDR between World War II and the 1990s though some collections were made by Jules Vidal, Pierre Tixier and Allen D. Kerr in the 1950s and early 1960s. Taking all these collections together, it's roughly three specimens per 100 km<sup>2</sup> that have been collected in Lao PDR up until the early 1990s. Such figures bear comparison with statistics such as 50 per 100 km<sup>2</sup> in Thailand, and 1.500 in the UK.

Starting around 1990, Lao botanists began to intensify their study of the flora, often in cooperation with foreign scientists. They have contributed to accounts of families for the *Flore du Cambodge, du Laos et du Viêt Nam* and several broadly based forestry projects with a taxonomic component, such as the DANIDA funded Lao Tree Seed Project (LTSP) that formed part of the regional Indochina Tree Seed Project. A significant output of this project was the manual, *Forests and Trees of the Central Highlands of Xieng Khouang* (Lehmann et al. 2003). Other studies have focused on plants which yield non-timber forest products such as rattans or medicinal plants (for example Evans et al. 2001, Somsanith Bouamanivong 2005) or on particular National Protected Areas (Maxwell, 1999; Chansamone Phongoudom, 2000).



Orchids have been of special interest and there has been a considerable increase in our knowledge of this group (Schuiteman & De Vogel 2004, Svengsuksa & Lamxay 2005). This is continuing through the work of the ORCHIS project ([www.orchisasia.org](http://www.orchisasia.org)), a collaboration between the National University of Lao PDR (NUoL), Centre de Coopération Internationale en Recherche Agronomique pour le Développement (CIRAD) and the Nationaal Herbarium Nederland. Other botanical work that is currently under way in Lao PDR includes Biodiversity Informatics and co-Operation in Taxonomy for Interactive shared Knowledge base (BIOTIK), an EU funded project concentrating on large tree species, and a number of MSc and PhD ethno botanical projects based at NUoL and Uppsala University.

Three checklists for the plants of Lao PDR have been published:

1. *Noms vernaculaires de Plantes en Usage au Laos* (Vidal 1959), lists more than 1000 species with their local names and uses.
2. *Checklist of Lao Plant Names* (Callaghan 2004) lists more than 2000 taxa, including more than 300 cultivated and introduced plants. This second checklist



is primarily based on Vidal's work, the fascicles of the *Flore du Cambodge, du Laos et du Viêt Nam* that have been published since 1960, enriched with a range of unpublished field surveys.

3. A checklist of the Vascular Plants of Lao PDR was published in 2007 as part of the Darwin Initiative project: Taxonomic Training in a Neglected Biodiversity Hotspot in Lao PDR. This checklist was made by:

Mark Newman - Royal Botanic Garden Edinburgh

Sounthone Ketphanh - Forestry Research Centre, National Agriculture and Forestry Research Institute, Laos

Bouakhaykhone Svengsuksa - Department of Biology, Faculty of Science, National University of Laos

Philip Thomas - Royal Botanic Garden Edinburgh

Khamphone Sengdala - Forestry Research Centre, National Agriculture and Forestry Research Institute, Laos

Vichith Lamxay - Department of Biology, Faculty of Science, National University of Laos

Kate Armstrong - Royal Botanic Garden Edinburgh

The checklist includes 4,850 species of native, introduced, cultivated and naturalised vascular plants.

The information in this checklist derives from several sources. The first was an electronic version of Latin names

contained in Callaghan's *Checklist of Lao Plant Names* (Callaghan 2004) and generously donated by the compiler. The second is the specimen based accounts in the fascicles of the *Flore du Cambodge, du Laos et du Viêt Nam* that have either been published since 1960 or are due to be published in the near future. For each taxon, at least one specimen per province was selected for inclusion in the database. The third source is the records of specimens collected during recent botanical projects in Lao PDR. In most cases the specimens are lodged in Lao herbaria with duplicate sets at Paris, Edinburgh and Leiden.

In addition to the specimen-based records, a range of non-specimen based electronic and printed literature sources have been used. Published and unpublished accounts for the Flora of Thailand and the Flora of China have been consulted and taxa that have been noted to occur in Lao PDR included in the checklist. The *World Checklist Series*, both published and available on the internet has also been used. These records are not directly supported by specimens and are therefore not as reliable.

# Pha Tad Ke Legal and Financial Structure, Donors and Partners

Pha Tad Ke Botanical Garden is a Foreign Investment company registered in Luang Prabang, Lao PDR.

As a social '*profit-for-purpose*' business 100% of our revenues are reinvested in the garden development, research, education and community projects. To support the work of Pha Tad Ke Botanical Garden several non-profit associations help us with scientific, educational and financial support.

Donations to these organisations can be tax-deductible if you are a citizen of that country.

**Les amis de Pha Tad Ke Botanical Garden, created in 2010 in Paris, France.**

President Hugues de Saint Simon / Secretary Nathalie Amae / Treasurer Alexandre Espenel

**Stichting Vrienden van Pha Tad Ke Botanical Garden, created in 2011 Rotterdam, the Netherlands**

President Koos de Wilt / Secretary Peter Happel / Treasurer Krijn de Koning

**Laos Friends of Pha Tad Ke Botanical Garden, created in 2012 in Luang Prabang, Lao PDR**

President Michel Somsanouk / Secretary Bouakhaykhone Svengsuksa / Treasurer Sith Nithaphone

**Luang Prabang Fund for Culture and Conservation (LPFCC)**

Founded in 2011, the mission of LPFCC is to celebrate cultural and natural diversity in Luang Prabang and Laos, through education, research, exhibition, and dissemination. LPFCC supports innovative projects and activities that share the same goals upon which the Fund was founded. LPFCC is a United States-based 501(c)(3) organization.



# Donors

## PLATINUM - upwards of 100.000\$

*Jean-Pierre Dovat, Switzerland*

*Private Foundation, Netherlands*

## GOLD - 25.000\$ to 100.000\$

*CEPF Program – Conservation International, USA*

*CHK Foundation, UK*

*FSD Program – French Embassy, Laos*

*John and Monique Hummel, Netherlands*

*Maxwell Family Foundation, Australia*

*SDC, Swiss Agency for Development & Cooperation, Laos*

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## SILVER - 5.000\$ to 25.000\$

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*Giancarla and Michael Alen-Buckley, Ireland*

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*Agence Francaise de Developpement – AFD*

*Alliance for Conservation Tree Genomics*

*Arbnet – USA*

*Australian Embassy – Lao PDR*

*BAF II – Business Assistance Facility – Lao PDR*

*BKF – Bangkok Forest Herbarium – Bangkok, Thailand*

*BGCI – Botanic Gardens Conservation International – UK*

*Chanticleer Botanic Garden – USA*

*Child's Dream Association – Switzerland*

*Conservation International – CEPF Program – USA*

*Dr. Cecilia Koo Botanic Conservation Center – Taiwan*

*Embassy of the United States – Vientiane, Lao PDR*

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*Fondation Cartier – Paris, France*

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*FSD – Ambassade de France, Vientiane, Lao PDR*

*IRI – International Republican Institute, USA*

*IRIS-BG – Database & Collection Management, Norway*

*IUCN – Lao PDR*

*Khon Kaen University – Thailand*

*LUXDEV – Luxemburg*

*Missouri Botanical Garden – Sacred Seeds – USA*

*National Herbarium Laos – Vientiane, Lao PDR*

*NAFRI – Lao PDR*

*Northern Agriculture and Forestry College – Lao PDR*

*PUM – Netherlands senior experts – The Netherlands*

*Queen Sirikit Botanic Garden – Chiang Mai, Thailand*

*Royal Botanic Garden Edinburgh – UK*

*Royal Horticultural Society – UK*

*Swiss Agency for Development and Cooperation – Lao PDR*

*SEABG – South East Asian Botanic Gardens Network*

*Singapore Botanic Garden – Singapore*

*Souphanouvong University – Luang Prabang, Lao PDR*

*TABI / SDC – Lao PDR*

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*Thip Khao & Chef Seng – Washington DC, USA*

*The Royal Botanic Gardens Domain and Trust – Australia*

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*University of San Francisco – USA*

*Xishuangbanna Tropical Botanical Garden – China*

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