Recommended Guidelines and Strategy for 2020-2021 SAFE Ecosystems Project Reforestation/Afforestation Activities

1. Background and Introduction:

Reforestation activities completed in 2019:

- 246,400 seedlings planted in 2018.
- 215,370 seedlings planted in 2019.
- In July 2019, during a M&E mission, significant issues were noted with the quality and survival rates of planted seedlings.
- As a result of this mission, reforestation plot surveys based on methods used by the Canadian forest industry were implemented to determine the success rate of planted seedlings. In total, 2,410 plots were taken in 492 hectares of areas planted in 2018 and 2019.
- The overall, success rate of reforestation in 2019 was **58%**.
- Three main issues were:
    - (1) Grazing by animals (likely cattle or goats)
    - (2) Seedlings were planted under the crown of grown trees
    - (3) Seedlings were planted too close to grown trees.
- Another issue noted was that some species did not grow well in the soil conditions and appeared to be in poor health (note: it is likely many seedlings in poor health may have been the result of grazing, but the grazing was not physically visible to the surveyors)
- The overall success rate of seedlings planted in 2018 was even lower at **33%**.
- The reasons for poor success rates are similar to those described above for 2019.
- One issue that should be noted is that during Q1 2020, there was a significant fire in the reforestation area at Nongsong Hong Village, Xonnabouly District which destroyed an estimated 50% of trees planted in 2019. However, as the plot surveys were conducted before the fore, this was not recorded.

Issues that need to be addressed:

- Regarding the three main issues contributing to the poor success rate (grazing, planting under crown, and planting too close to grown trees), these may be attributed to man-made origins.
- Grazing:
    - By far, the greatest contributor to poor success
    - Villagers allow their animals to roam freely and unattended during dry season due to lack of ability to care properly at farms; cattle and goats then feed off the young, green stems and leaves.
    - Villagers do not understand or are not aware of the reforestation sites, nor are there any rules/regulations governing activities at the reforestation sites.
    - It should be noted that the SAFE Ecosystems Project piloted plastic mesh fence cages for individual trees in 2019. However, the issue with these tree cages is that the materials and the labor to install can be costly. Additionally, as in the case of Nongsong Hong, if there is a forest fire, the cages are melted and destroyed creating an issue with plastic waste within the forest after a fire event.
- Planting under crown/too close:

    - The second and third cause of poor success is directly related to site selection by the villagers planting the trees.
    - This is mainly due to poor understanding/knowledge of tree ecology by both the villagers and in some cases, DAFO staff monitoring the reforestation activities.
    - This issue is particularly concerning as it could have been completely avoided through proper training and awareness.
    - As observed by the monitoring team, the actual reforestation sites selected by the villages and DAFO staff were not appropriate due to the fact that the sites could naturally regenerate without actual planting. Instead, rules/regulations prohibiting activities at the sites promoting the regrowth would have been more effective than planting.
    - Additionally, GIS analysis within the DDF shows that the greatest contributor forest landscape change is conversion from natural forest to agricultural lands (in particular, rice paddy land) and village lands (peri-urban areas).
    - It should be noted there are at least three native species which have nitrogen fixing abilities which could be planted for soil improvement and agroforestry:
        - Mai dou / Pterocarpus macrocarpus / FABACEAE
        - Mai ka yung / Dalbergia cochinchinensis / LEGUMINOSAE
        - Mai daeng / Xylia xylocarpa / TABACEAE
- <u>Poor health:</u>
    - The condition of seedlings in poor health (not being well suited for soil conditions and excluding possible grazing), were observed to be stunted in growth, lack of foliage, or foliage appeared to have rust or were pale yellow/green in color.
    - It is possible that the seedlings experienced shock being transported from the nursery (in which the grew under ideal conditions) and being planted in poor soils with dry conditions.
    - It should be noted that all seedlings planted are native species which are able to grow naturally within the DDF landscape.
    - Under these conditions, it was considered that if the seedlings planted were larger and had better root growth, the shock would have been less and improving survival rates.
    - In general, seedlings planted at the reforestation sites had only grown in the nurseries less than 6 months and were propagated in small planting bags (approx. 350-450 ml.) which limited root growth of seedlings.

Moving forward in 2020-21:

- Reforestation and tree-planting efforts will need to be revised for the remainder of the SAFE Ecosystems Project to address the above issues through the following:
    - Preparation of rules and regulations for reforestation/afforestation sites.
    - Use of GIS and Drone technology/techniques to identify the most appropriate reforestation/afforestation sites.
    - As part of site identification:
        - Identify pilot agroforestry sites in agriculture and rice paddy areas where “nitrogen fixing” native species can be planted in cooperation with individual households.
        - Identify peri-urban sites in village areas (i.e. schools, health centers, community halls, roadside, etc.) where tree can be planted in cooperation with communities.

- Improve quality of seedlings at tree nurseries by increasing growing time and planting bag size.

- In order to prepare and organize for the above listed issues, there will not be village tree-planting activities in 2020 – with the exception of annual "Tree Planting Day" events.
- Instead, the project will focus upon developing rules and regulations plus enfo

2. 2020-2021 Guidelines and Strategy:

Cooperation with Project Villages to Develop Rules and Regulations for Reforestation/Afforestation Sites	
Step	**Description**
1	• The project must host a workshop at the Ong Mang Eco-center; representatives from all villages that have been involved with tree planting activities and DAFOs to attend. • The purpose of the workshop will be to develop the rules and regulations for the reforestation/afforestation sites at each village. • **Reforestation/Afforestation Site rules and regulations** must be straight forward and easy to understand by villagers. They must also be compliant with the laws of Lao PDR. • After Reforestation/Afforestation Site rules and regulations are completed, they must be signed-off by highest authority possible (Savannakhet Governor or District Governor).
2	• Once there has been appropriate sign-off on the Village **Reforestation/Afforestation Site rules and regulations**, the Project must then disseminate this information to each village. • Community meetings must be held in each participating village: o Review existing Village Reforestation/Afforestation sites; determine if more tree-planting work is necessary. o Explain the rules and regulations o Conduct training on village reforestation activities using booklet prepared by Project Consultant as training materials. o Several copies of this booklet will be provided to each village. • Village Development Committees sign-off letter of understanding, or completion of training regarding the reforestation/afforestation site rules and regulations.
3	• Prepare and print signs (which can be attached to trees) based on the **Reforestation/Afforestation Site rules and regulations** to be used to delineate the reforestation areas. o Signs must clearly indicate the reforestation/protection site and have symbols indicating **"no fire"** and **"no cattle"** or similar (examples below). 

	• To conclude the dissemination of rules/regulation and training (under Step 2), the project team trainers, VDC members and participating villagers should go to the reforestation/afforestation sites and install signs around the boundary of the site.

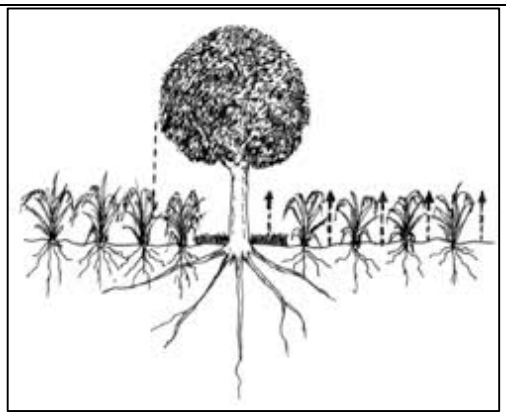
2020 Seedling Production	
Step	**Description**
1	• The 5 Village Nursaries and the Ong Mang Center nursery must aim to produce a minimum of 53,000 seedlings in 2020-21. o At least 13,000 in each of the village nurseries. o At 40,000 in the Ong Mang Center Nursery. • All remaining seedlings from 2019 at the nurseries that were not planted must be transferred from small planting bags to the larger bags. • The remaining numbers of seedlings are then to be propagated from seed. • The project must ensure that the village receives support to ensure trees are grown from 2020-21; this can be partly be done through village conservation contracts. • At the time of writing, it is still being discussed whether or not the project should be supporting the 5 DAFO nurseries as well. • These seedlings are to be planted within 5 litre growing bags and are to grow to a height of a minimum of 1 meter. • Key native species to be grown are: o Mai dou / Pterocarpus macrocarpus / FABACEAE o Mai ka yung / Dalbergia cochinchinensis / LEGUMINOSAE o Mai daeng / Xylia xylocarpa / TABACEAE • There will be no tree planting in 2020 with the exception of "Tree Planting Day" ceremonies to be organized by PAFO and DAFO's. o Note: trees planted will likely be from government nurseries.

2020 Maintenance Activities	
Step	**Description**
1	• Using reforestation practices from Canada, the project will procure equipment and supplies to install "tree cages" around individual seedlings. • A single tree cage consists of (i) plastic/nylon mesh fencing, (ii) 2-4 bamboo stakes (1-meter-tall), (iii) plastic/nylon zip ties (11 for 2 stakes / 22 for 4 stakes). • Plastic/nylon equipment will be procured in Savannakhet, while bamboo stakes will be sourced locally at the villages. • Once cages have been installed, local farmers will be asked to bring their cattle and goats to the Ong Mang Center to determine if the cages are effective against grazing.
2	• Upon assessing whether or not the tree cages are effective, the project will then upscale the protective measures and have villages install the cages at their reforestation sites.

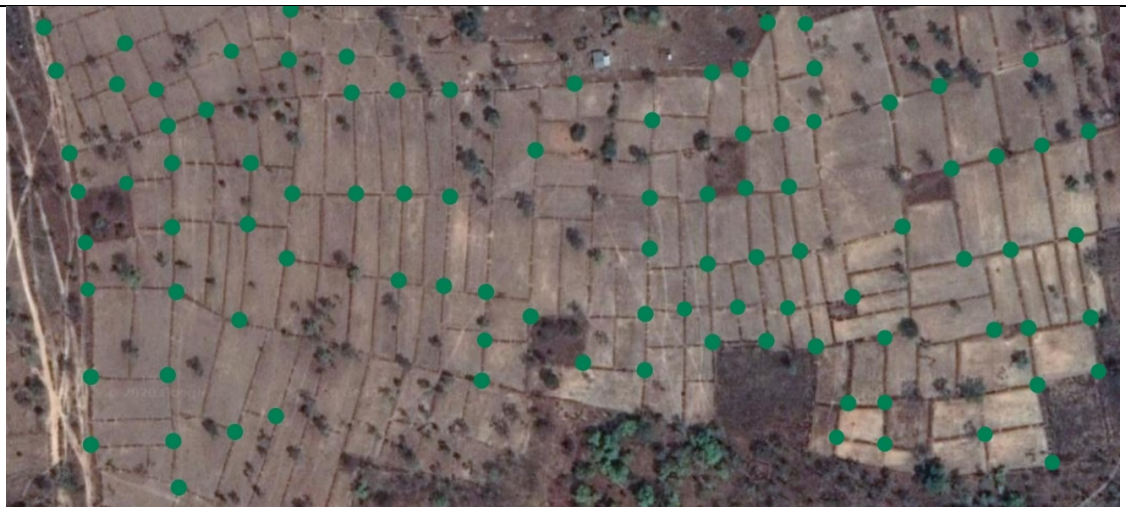
	• The project will only aim to install tree cages on 58% of the planted seedlings dependent up species and level of damage caused by grazing cattle (utilizing data from the 2019 monitoring survey). • Suitable protection should be installed ASAP to prevent any further grazing by cattle and goats.

2021 Tree Planting	
Step	**Description**
1	• The Project GIS volunteers are to conduct in-depth GIS analysis of the Ong Mang Sanctuary and surrounding areas. • Using a GIS Forest Cover Study and GIS Forest Conversion Study commissioned by the Project in 2017 and 2018, the GIS Specialist will use a scientific methodology to determine which areas may be suitable for reforestation in 2021. • Planting sites will focus upon peri-urban and agricultural sites. • Tree planting activities must be compliant with the training. Basic planting rules must be: o A minimum of 4 meters spacing between each seedling (600-625 seedlings per hectare). o No seedling may be planted within 4 meters of a natural standing tree. • No seedling planted under the foliage (leaf) cover of a natural standing tree. • Planting should commence by May or June 2021 (dependent upon the start of the wet season)
2	• <u>Peri-urban (Village) Tree Planting Sites</u> o Public areas in villages suitable for planting will be selected. o Such areas include: schools, health centers, community halls and even private homes. o This will also consider planting at roadside areas where appropriate and safe. o The aim of this strategy will be to plant trees in spaces that have been needlessly deforested and can serve to the benefit of the community. o Trees should be planted at all appropriate an available public spaces provided they do not: (i) block public transportation routes, (ii) disrupt livelihood activities, or (iii) become a safety risk. o Potentially, instead of native species, fruit tree species could be planted in peri-urban areas such as: Jackfruit, Mango and Tamarind. o The project will need to work with the villages to ensure proper fences are built around the young tree once planted and that they are adequately protected. **Reforestation/Afforestation Site rules and regulations** may need to be applied to ensure they receive adequate protection by the community. • An example of how Nathaman Village peri-urban tree planting could look like this:

	 
3	• <u>Agroforestry tree planting in agricultural and rice paddy areas:</u> ○ The three prioritized native species have nitrogen fixing capabilities within their root stuctures. ○ **Nitrogen fixation** is the process by which atmospheric **nitrogen** is converted either by a natural or an industrial means to a form of **nitrogen** such as ammonia. In nature, most **nitrogen** is harvested from the atmosphere by microorganisms (see above) to form ammonia, nitrites, and nitrates that can be used by plants.



  - As such, if planting these species on the edges of agricultural areas or rice paddy area, it is possible that soil conditions could be improved naturally. In theory, planting such trees combined with other soil improvement actions (i.e. natural fertilizer, mulching, composting, etc.) could increase agricultural yields and quality.
  - Therefore, the project should pilot such agroforestry tree planting methods directly with families committed to this process a process of improved agricultural practices. Such practices include:
    - No burning of agriculture areas during the dry season.
    - Mulching of rice stocks when preparing fields
    - Applying organic fertilizer and compost
    - Utilization of improved rice seed varieties
    - Where applicable, interspersing legumes and other appropriate plants and vegetables which can improve soils and diversify crops.
- The FAO "Agroforestry in Rice-Production Landscapes in Southeast Asia: A Practical Manual" will serve as a guide (click on link above to view this manual).
- An example of how Agroforestry tree planting in the rice paddies directly East of Sanamxai Village (note: more than 80n trees could be planted in this example):

4	• <u>IMPORTANT</u>
	  ○ Once nurseries have distributed trees to the peri-urban and agroforestry planting sites, the nurseries must be re-stocked to commence planting activities by 2022.
	  ○ Repeat the steps for, “2020 Seedling Production”.
	  ○ This should be commenced by July or August 2021.