Recommended Guidelines and Strategy for 2020-2021 SAFE Ecosystems Project
SRI Rice, Soil Management and Fire Control

1. Brief Background and Introduction:

Activities completed in 2018 and 2019:

Rice / Soils

- To date, rice demonstration activities within the SAFE Ecosystem Project were limited a brief period of work completed by the PAFO Crop Extension Division in 2018.
- At the time, an Activity Plan had been prepared by the PAFO Division and a training session had been conducted at the Ong Mang Center, as well as demonstrations in 4 villages.
- Results from this activity were negligible and the Project has not worked with this PAFO Division since; it had been reported that while the theory of the training was good, actual delivery to the villagers was not; no villagers within the project villages have been reported using the techniques trained from 2018.
    - Organic fertilizer training was reported as part this training.
- Despite the poor results from this activity, it does not mean that this is unnecessary for a variety of issues to be in the next section.

Fire

- In 2018, the project listed fire management as one of the conservation actions required by villagers within the Conservation Contracts.
    - Specifically, the contracts state, *"Work with the PROJECT to organize and implement monthly Community Patrols within forested land as defined by the Village Forest Management Plan and the PROJECT. During these monthly patrols… (iv) stop/report wildfires to "Protected Area authorities" and/or "District Officials"."*
- However, there is no evidence to show that either villagers or District Authorities did anything to attempt to reduce or controls fires within the project area.

Issues that need to be addressed:

Forest Change for Agriculture

- In 2018 and again in 2020, the Project had GIS Technical Officers conduct geospatial analysis on forest cover and land use. The 2018 study indicated that 16,407 Ha (or 12% of the Ong Mang are) is rice paddy field.
- The preliminary analysis completed in 2020 indicates there has been a 28% increase in areas classified as "open forest".
    - Although this analysis is still being reviewed, it is possible that such forested areas have been degraded through illegal logging and are in the process of being converted to rice paddy or peri-urban areas.

Rice Demand vs. Population Increase

- According to Lao Decide (based on National Census data), the population density within the 5 Districts has increased between 10-30 people per square kilometer between 2005 and 2015.

    - This population increase may be a combination of new in-migrants to the area and natural population increases within the villages themselves.
- Based on this, it is likely the demands up land resources for agriculture production have also increased relative to population increases.
    - An issue with population increase is that villagers continue to use traditional rice production methods which are not as efficient as modern SRI techniques. The result is continued agricultural land expansion.

Soil Quality

- Soils within the Dry Dipterocarp Forests of Savannakhet are of poor fertility.
- Several studies indicate that poor soil fertility is identified as a major rice yield constraint in Savannakhet.
- The Soil Survey and Land Classification Centre (SSLCC) of Laos collected a total of 339 soil sample profiles throughout Savannakhet province and analysed them for soil physical and chemical properties (Phommachak and Vonghachak, 1996).
    - The dominant topsoil texture types are coarse textured−sand (4.5%), sandy loam (38%), and loamy sand (41%) while the clay loam and loam texture groups account for less than 20% out of the total areas of the province.
    - In the subsoil layer below 20 cm soil depth, sandy loam and clay loam soil textures accounted for 36% and 31% of the areas, respectively.
    - The soil depth also varies greatly among soil types, with deep (more than 100 cm) soils being the predominant category, covering about 78% of the province, whereas shallow and thin soils account for less than 6%.

Table 1. Soil fertility point in soil map of Savannakhet province, Laos (SSLCC, 1996).

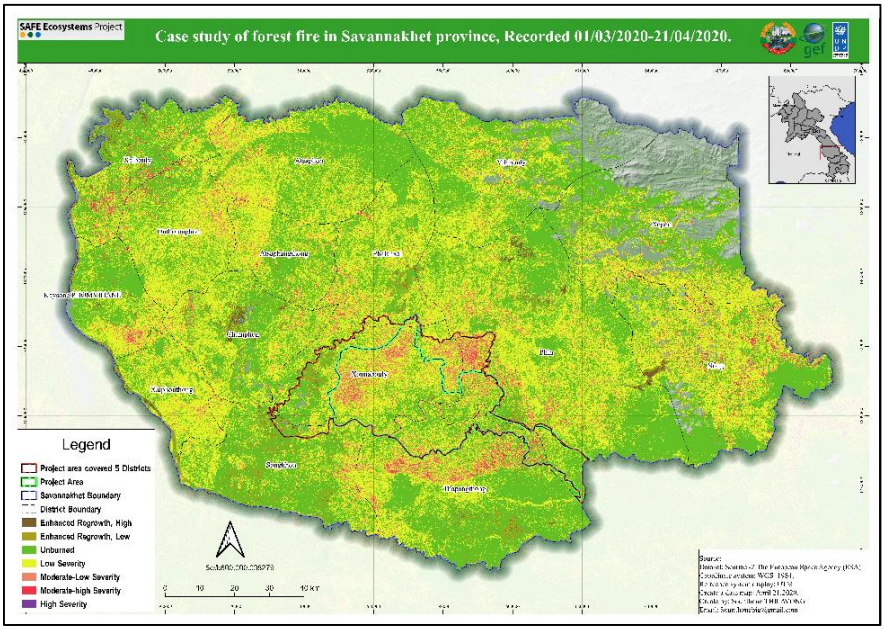
Point	OM (%)	BS (%)	P (ppm)	CEC (me 100g soil^{-1})	K_2O (mg 100g soil^{-1})
1	<2	<50	<10	<10	<4
2	2−4	50−75	10−25	10−20	4−12
3	>4	>75	>25	>20	>12

OM- organic matter content; BS - base saturation; P - available phosphorus; CEC - total cation exchange capacity; and K_2O - available exchangeable potassium.
Note that each parameter was equally weighed for calculation of soil fertility index.

Wildfires / Forest Fires

- A consequence of population increases, and traditional agricultural practices has been the proliferation of wildfires within the project area and 5 Districts at large.
- Often fires are intentionally set within the forested areas either for: (i) clearing forested areas for agricultural expansion, (ii) burning rice paddy areas for planting preparation, or (iii) for promoting grass growth for cattle grazing.
    - Additionally, fires that are not intentionally set are often the result of carelessness such as cigarettes being dropped.
- In 2019, satellite imagery analysis by the Project GIS Volunteer indicated that 1563.61 Ha of land within the Ong Mang Sanctuary had experienced fire between March and April 2020.
    - Furthermore, a total of 8072.46 Ha had experienced fire throughout the 5 Project Districts during the same time.

- While fire performs a role in the natural ecosystems of Dry Dipterocarp Forests, there is some question as to the current frequency of the fires. Annual fires may be having a negative effect upon soil organics and fertility.



<u>COVID 19</u>

- While not directly related to natural resource management or conservation, the recent global pandemic, **<u>COVID 19</u>**, will undoubtedly influence the success and outcome of the SAFE Ecosystems Project.
    - As of writing, only 19 individuals in Lao have been officially diagnosed with this virus, however, with the National lockdown and closure of International borders, thousands of Lao workers returned to Lao PDR and are currently without employment or incomes.
    - While the current medical emergency is not as dire as in other countries, <u>there is a real risk</u> of economic depression which could exacerbate illegal logging and other forest crimes within the project area. Gains that have been since Project inception in 2016 could be lost as a result
    - Therefore, all livelihoods activities, including home garden development, should only be implemented if they provide clear economic benefits and income generation.

Moving forward in 2020-21:

- Agricultural expansion for rice production needs to be addressed in order to ensure sustainable forest management.
    - Recruit Agricultural Specialist (related to Home Garden Strategy)
    - Develop multi-year training programme for SRI rice production to be developed to increase rice yields in limited lands.
        - SRI rice harvesting has been proven within Lao and regionally to increase rice yields within limited lands.
    - Improvement of rice yields to be linked to conservation contracts.
- Development of large-scale soil improvement programme for rice production

- Enhancing organic matter within DDF soils combined with Agro-forestry techniques (see tree planting strategy).
    - Mulching of rice stocks when preparing fields
    - Applying organic fertilizer and compost
    - Where applicable, interspersing legumes and other appropriate plants and vegetables which can improve soils and diversify crops.
- Utilization of improved rice seed varieties (work with NAFRI to acquire new rice varieties).

- Address issues related to usage of fire with agricultural practices. Prevent burning of agriculture areas during the dry season.
    - Conduct study to determine main reasons for burning forest and agricultural areas during the dry season.
        - This may require procuring a consultant to complete such a study.
        - Results must be presented to project villages.
    - Based on results, determine appropriate measure to educate communities on fire prevention and management.
    - Conduct training on fire suppression.
    - Purchase rural firefighting equipment and conduct training on wildfire suppression.

2. 2020-2021 Guidelines and Strategy:

SRI Rice Extension and Training Activities	
Step	**Description**
1	• Recruitment of Agricultural Specialist (Note: this action is to be combined with Home Garden Activities) to provide comprehensive support to ensure sustainable livelihoods opportunities links and benefit from forest and wildlife conservation inclusively. (i) Lead coordination and selection viable villages agricultural related activities and provide advice to the project team and government counterparts as well as communities. (ii) Facilitate adoption and provision of best technologies supporting better agriculture production and sustainable soil management. (iii) Assess the capacity of farmers in target areas and support in capacity building measures in areas such as sustainable land management, soil conservation, fertility management, pest management, production and marketing in collaboration with 5 DAFOs. (iv) Provide support to the participating households to generate appropriate sustainable livelihoods opportunities and ensure vulnerable groups such as youth, women and ethnic minority groups are engaged within the project target area. (v) Facilitate community consultations and training sessions, as well as follow-up with relevant stakeholders to support alternative livelihoods within the communities.
2	• Planning and implementation of SRI Rice Extension activities for villages supported by Project to improve rice yields on limited lands. • This will include preparation and maintenance of SRI demonstration sites and extension activities within multiple villages. o Note: while project will initially focus upon the demonstration sites, a phased plan will be to encourage individual villagers to implement SRI on their paddies. • Villages to be considered in addition to the current 16. • As SRI is not a single technique of planting, but rather a series of steps and techniques which enhances the growth of the plant in order to produce more rice. • In order to promote SRI, demonstration plots will need to be selected in each village; steps and techniques will then need to be trained at the village level.
2	• Training to be scheduled monthly and quarterly within villages. o Phased implementation of SRI rice extension training activities which corresponds with markets and seasonal activities. • Extension training activities to include: o site preparation, o seed / crop selection, including introduction of new rice varieties (NAFRI) o transplanting o soil management, o water management, o organic fertilizer, o plant management, o pest control,

	○ harvesting (among other activities).

Soil Improvement Activities	
Step	**Description**
1	• This activity is to be combined with SRI Rice Cultivation and Agroforestry Strategies • Planning and implementation of Soil Improvement activities for villages supported by Project to improve rice yields on limited lands. • Selection of soil improvement demonstration sites and extension activities within multiple villages. • Villages to be considered in addition to the current 16.
2	• Training to be scheduled monthly and quarterly within villages. ○ Phased implementation of soil improvement training activities which corresponds with markets and seasonal activities. • A major component of soil improvement training will focus upon education and controlling agricultural burning (the practice of farmers burning residue rice plant materials left over from harvesting). ○ Specific fire management techniques to be discussed in following strategy. • Soil improvement extension training activities to include: ○ Mulching/tilling rice stubble/residue materials into rice paddy soils instead of burning. ○ Preparation and application of organic fertilizers (usage of cow, pig, chicken manure). ○ Preparation and application of composting materials ○ If possible, rotating rice paddy areas annually between production and resting years. ○ If possible, rotating between rice crop and nitrogen fixing plant crops (i.e. peanuts or soybeans on an annual basis) ○ Dispersing legumes and other nitrogen fixing plants within paddies to improve soils and increase food varieties. ○ Usage of Agroforestry techniques (Note: this action is detailed within the Tree Planting Strategy). ▪ Planting native species trees with soil nitrogen fixing abilities on the edges of agricultural areas or rice paddy area, it is possible that soil conditions could be improved naturally. • Note: as part of soil improvement, consider potential of purchasing agricultural machinery for mulching/tilling to be managed by the Village Development Committee.

Fire management Activities	
Step	**Description**
1	• Conduct study/survey within the project villages to understand community relationships and attitudes towards the usage fire and annual burning. • Survey questions to be considered: ○ Why do villagers use fire?

	○ Do villagers understand the effects of fire upon soils? ○ Would villagers consider alternatives to fire if made available? • Study/survey could be conducted by either existing project/government staff or could consider procuring a consultant. • Results and outcomes of the study/survey to be presented to both villages and PAFO/DAFO and will guide Project actions until 2022.
2	• Based on results of study, develop and implement a village training course on fire and effects upon agricultural production, as well as dry forest ecology. • As part of training, consider procurement of firefighting equipment for suppression of both village house fires, as well as wildfires (pump, hose, water tank for 2-wheel tractors, water-packs with hose, fire foam, fire balls, etc.). ○ Equipment to be managed by Village Development Committees • Should equipment be purchased, consider requesting firefighting training from the Kaysone Fire Department.
3	• As a follow-up of training, development of Village Fire Regulations • Such regulations would be developed in a participatory manner. • Regulations would determine appropriate/acceptable usage of fire within the village; no burn areas; commitment to reducing fire usage; and organization of village firefighting team. • Aim to eliminate fire usage for agricultural practices provided sustainable alternative practices are available.