REPUBLIC OF KENYA

MINISTRY OF AGRICULTURE, LIVESTOCK, FISHERIES AND COOPERATIVES

STATE DEPARTMENT FOR FISHERIES, AQUACULTURE AND THE BLUE ECONOMY

Concept Note

Upscaling Food and Nutrition Security- Fish Dryers & Smoking Kilns

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CONCEPT NOTE

Fabrication and distribution of Fish Dryers and Fish Smoking Kilns to increase availability of dried/smoked fish in urban and peri-urban areas	
Background information	Fish is highly perishable and requires proper post-harvest handling to prevent post-harvest losses. However, fish harvested from Inland waters in Kenya (Lake Turkana, Lake Baringo, Lake Naivasha and farmed fish) suffers high post-harvest losses due to lack of hygiene and sanitation facilities for its handling and processing resulting in a five-fold loss in market value, exacerbating poverty among the fisherfolk. Post-harvest fisheries losses are of great concern because they equate to a loss of valuable animal protein for consumers and lost income for fishers, processors and traders. Reducing fish post-harvest losses is therefore an important development goal in the fisheries sector and this calls for deliberate and concerted measures to develop, improve and transfer innovative technologies to reduce fish post-harvest losses. This will greatly contribute to ensuring food and nutrition security as envisaged in the Big 4 Agenda by the Government of Kenya. The target is to reduce fish post-harvest loses from 25% to 15% by the year 2022. Most of the fish harvested from Lake Turkana is cured in various forms for marketing mainly to the Democratic Republic of Congo (DRC). Fish exports to DRC in 2017 and 2018 amounted to 850 MT and 890 MT respectively comprising mainly sun dried tilapia. These fish can no longer access the DRC market in full due to the Covid-19 control measures. To make these fish penetrate the Kenyan market and acceptable among Kenyans, the fish has

	to be handled in hygienic and in high phytosanitary environment through proper fish handling and processing.
Strategic Context	Proper fish handling and processing is meant to; i. Maintain the physical quality of the fish ii. Maintain the biochemical quality of the fish so that the nutritional quality of the fish is preserved iii. Maintain the acceptability of the commodity as required in trade and commerce as fish are tradable commodities in world markets. The major challenges fish-post harvest handling includes; i. Fish harvested from the lakes suffers high post-harvest losses due to lack of hygiene and sanitation facilities for its handling, and the bulk of what remains is dried under dusty conditions, resulting in a five-fold loss in market value ii. Lack of ice infrastructures at landing sites/farms for fish preservation iii. Lack of nearby markets and the remoteness of production areas iv. In most scenarios, fish drying often occurs on bare ground where the product is exposed to soil, bacteria, vermin, birds and other threats. Even though it is usually cleaned before sale, the gills entrap substantial dirt, and this compromises the keeping and eating quality of the fish v. Poor market linkages between production and marketing sites

	Studies have shown that the percentage moisture loss after 44 hours for fish dried in solar dryers was 55.98% and the fish had no visible spoilage one month into storage. This proves the effectiveness of solar dryers in moisture reduction.
Proposed Intervention	Cleaning and processing facilities (clean water, gutting and descaling stainless steel benches). Fabrication and distribution of Fish Dryers and Fish Smoking Kilns to increase availability of dried/smoked fish in urban and peri-urban areas.
Concept	Fabrication and distribution of Fish Dryers and Fish Smoking Kilns in urban and peri-urban areas to encourage the fishers and traders to avail commodity in Kenyan markets. Fish from inland fisheries targeting Lake Turkana, Lake Baringo, Lake Naivasha and aquaculture farms will be transported in refrigerated trucks from the lakes and farms to urban and peri-urban centers. The fish will then be dried/smoked at the fish marketing outlets ensuring that hygienic and phtosanitary standards are adhered to. Subsequent marketing of the dried/smoked fish will be undertaken at the marketing outlet or transported to other markets.
Advantages of fish dryers and smoking Kilns	Fish dryers and kilns have the following advantages; 1. Reduces the moisture content of fish up to 25% and thus increases shelf life 2. Can easily be fabricated using locally available materials 3. Can be solar powered reducing need and cost of electricity
Design	Utilize fabricated Solar Fish Dryers and Charcoal Fish Smoking Kiln.

	The models are available locally having been developed and their effectiveness tested by KMFRI. These designs will be fabricated locally reducing the cost. Public Private Investment is recommended in this case.	
Materials and Equipment		
	Component	**Estimate cost (Kes)**
1.	Stainless Steel Benches	50,000
2.	Fabricated Solar Fish Dryer (Capacity 25 kg of fish)	70,000
3.	Fabricated Fish Smoking Kiln (Capacity 25 kg of fish)	70,000
4.	Refrigerated Fish Track (10 Tons)	10,000,000

References

1. Keyombe J.L.A., Bironga H.C., Obiero M.O., Malala J.O., Olilo C.O., Aura C.M. and Njiru J.M. (2018). Monitoring the Effectiveness of Interventions of Solar Polyethylene Dryer in Reducing Post-Harvest Losses in Lake Turkana and Share the Findings. Technical report KMF/RS/2018/C2.1(i). Kenya Marine and Fisheries Research Institute (KMFRI). 42 pp.