# 7.19 Freshwater fish seed resources in Uganda

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## ABSTRACT

The aquaculture sector in Uganda has started to grow very rapidly during recent years with the commercialization approach taken by the government. Aquaculture is now seen not only as source of dietary protein but also as a means of generating income through improved productivity and managing aquaculture production as a business venture. This has attracted a new class of farmers.The issues of fish seed availability and quality have become a major challenge. This new trend has made the government to turn to private sector for improved supply of the required quality and to meet the needed quantity of fish seed. Fish seed propagation in Uganda was, until the late 1990s, a remit of the public sector. Currently there are nearly 50 private fish hatcheries ranging from small- to medium-scale with a few large commercial operation. The country's projection for meeting the aquaculture and stock enhancement seed requirements is about 450 million fingerlings annually. The general plan is to meet this demand through privately-owned and operated fish hatcheries. Use of the private sector calls for trained manpower and exposure to appropriate technology. There is also urgent need to improve broodstock management skills and to initiate breeding programmes for improvement of the productivity of key aquaculture species. Although government has established some regulations under the "Fish (Aquaculture) Rules 2003" to regulate fish seed production and distribution, there is still a need for technical assistance to review and develop clear and implementable standards and guidelines for the private fish hatchery owners and operators in Uganda.

## INTRODUCTION

### Characteristics, structure and resources of the aquaculture sector

Fish farmers in Uganda, characterized as largely poor, practice aquaculture for subsistence. Uganda produces up to 15 000 tonnes of aquacultured fish, including production from small-scale fish farmers, emerging commercial fish farmers and stocked community water reservoirs and minor lakes. There are an estimated 20 000 ponds throughout the country with an average size of 500 $m^2$ of surface area per pond and production ranging between 1 500 kg/ha subsistence farmers to 15 000 kg/ha for emerging commercial fish farmers. With improved market prices, government

intervention, quest for profitable production and stagnant supply from the capture fisheries, the aquaculture sector in Uganda has started to attract more entrepreneurial farmers that are seeking to exploit the business opportunity provided by the prevailing fish demand. This latest upsurge in aquaculture development has also resulted in transformation of a number of small-scale fish farmers both in management and size of production.

The current estimate is that 20 to 30 percent of the smallholder subsistence ponds have been transformed into profitable small-scale production units. In total, it is estimated there are nearly 5 000 ponds owned by nearly 2 000 farmers practicing at this level with an average pond size of 1 500 m²/per pond. New entrants comprising of Ugandan "middle" or working class plus a few businessmen have adopted improved production systems with more technical management and more deliberate planning, closely working with private technical experts and growing fish for targeted and established markets. Pond surface is in the range of 5 000 m² to 50 000 m² numbering 500 and having an estimated 20 to 30 percent of active pond surface. This category includes commercial hatchery operators and a number of grow-out farmers that are already exporting fish to regional markets in the Democratic Republic of Congo, Kenya and Rwanda. Industrial and/or more intensified fish culture in Uganda is only beginning to take route and this is mainly driven by foreign direct investments or as joint ventures between local firms and foreign companies. Most farms/companies at this level are either in the stage of putting infrastructure in place or at the beginning of the production process. The targeted market of those companies is the regional market and the unutilized fish processing capacity in the country targeting international markets.

## HISTORY AND GENERAL OVERVIEW

Aquaculture in Uganda is recorded to have started in 1941 after importing carp. Fish farming was officially proposed for the country in 1947 by colonial officers with the establishment of the Kajjansi Fish Experimental Station. Because of controversies surrounding carp in the early years of introduction in Uganda, officers then chose to use tilapia for stocking purposes. A vigorous fish farming extension programme resulting in 1 500 ponds constructed by 1956 followed with most ponds made in the central region (Buganda) and southwest most part (Kigezi) of the country. Support from FAO was sought and received in 1959 to 1960 to evaluate the use of carp alongside with tilapia as culture species. This technical assistance endorsed the use of carp and further expansion of aquaculture in Uganda. With additional FAO support, aquaculture was promoted in Uganda under the rural development program and the Department of fisheries recorded up to 11 000 ponds by the late 1968 producing fish largely for subsistence. Fish farming was based largely on "farmer to farmer" supply of seed and/or from the government stations that greatly limited the expansion of the sector. With changed policies under successive governments, Uganda's progress was short-lived and farmers abandoned the ponds due to lack of stocking materials, limited technical guidance and excessive government regulatory regimes. In 1999, at the time of the Fisheries Master Plan study, it was established that Uganda had only 4 500 functioning ponds with only a portion stocked producing 285 tonnes of fish annually. With the government's strategic intervention and support from development partners including FAO, aquaculture picked up once again reaching 15 000 tonnes of fish produced out of 20 000 ponds with an average size of 500 m² by year 2003. Due to the limited fish seed, carp has overtime fallen out of favour and instead the African catfish alongside Nile tilapia took its place. Fish farming in Uganda has up to date been pond culture-based but with the urge to engage in profitable and commercial aquaculture undertaking there has been an expressed move and planning toward cage culture-based aquaculture.

## Human resources

The aquaculture subsector had by year 2004 an estimated 12 000 farmers with about 150 service providers or extension workers employed by local governments. Fifty districts out of 56 have an officer employed by the local government who is in-charge of technical guidance and management of the aquaculture sector. Another estimated 100 technical persons with basic training on fisheries and aquaculture are working as private service providers under the privatized, demand-driven and farmer-managed extension and advisory system. At the Department of Fisheries Resources, there is an Aquaculture Unit headed by a Principal Fisheries Officer under which are five Senior Fisheries Officers and four support staff. The Aquaculture Unit reports to the Assistant Commissioner for Fisheries in charge of the Production Division of the Department of Fisheries Resources. There are additional 100 persons working as managers for the upcoming commercial fish farms, some of whom have attained formal training in fisheries and aquaculture. Under each of these farm managers, an average of three persons are employed as labourers that support the manager in the farm. In addition, there are an estimated 20 000 people who provide specialized manual labour during construction of ponds, water and diversion channels, site clearing, stocking and seining during harvest, largely on a part-time basis. However, some youth have organized themselves into specialized groups for pond construction, which they do for their livelihood/occupation on a contract basis.

## Farming systems distribution and characteristics

Of the 56 districts as of 2003, the Ministry of Agriculture, Animal Industry and Fisheries has identified 31 as suitable for fisheries and aquaculture development based on both natural and socio-economic factors. The districts zoned are found around the country's major water systems including Lake Victoria Crescent, Lake Kyoga Basin, River Nile catchment, Edward-George complex and Koki Lakes. These districts are: Mayuge, Jinja, Bugiri, Busia, Mukono, Mpigi, Wakiso, Masaka, Rakai, Mbarara, Bushenyi,Ntungamo, Kasese, Hoima, Masindi, Nebbi, Gulu, Adjumani, Arua, , Kamuli, Soroti, Lira, Iganga, Tororo, Pallisa, Mbale, Apac, Kabiramaido, Kabarole, Kamwenge and Kyenjojo. Table 1 provides production data and other information for each of the districts listed. Annex 7.19.1 gives information on production, systems of production, area under production and the value of production for each of the listed districts.

## CULTURE PRACTICES

In Uganda, there are currently eight species that are cultured, composed of six finfish [*Oreochromis niloticus* (Nile tilapia), *Clarias gariepinus* (African catfish), *Tilapia zilli* (Zilli's tilapia), *Oreochromis leucostictus* (Mbiru), *Cyprinus carpio* (Carp), *Labeo victorianus* (Ningu)], one freshwater prawn (*Macrobrachium rosenbergii*) and one reptile - crocodiles. Nile tilapia is the most commonly farmed species. It was previously naturally restricted to the Nile system for which Lake Albert, the Uganda-Democratic Republic of Congo shared lake, is part of, and from where it was transplanted and introduced in most of the Ugandan water bodies including the major lakes (i.e. Victoria, Kyoga, George and Nabugabo). With good quality growth characteristics, easy production of seed and good taste across the country, Nile tilapia has become the number one cultured species. The only reservation is the prolific reproduction and seemingly resultant stuntedness.

African catfish (*Clarias gariepinus*) has recently emerged as the most favoured species for aquaculture in the country. Rural farmers have grown fond of it and the regional market has started to grow for this species. The main characteristics of this species are fast growth, ability to literally feed on any household organic waste. The technology for its reproduction and seed propagation has been perfected even at the very small-scale level of hatcheries. This species has wide distribution in all waters of

TABLE 7.19.1
**Potential fish production from stocking/re-stocking of minor lakes**

| Lake Name | District | Area in sq. km. | Number of seed required | Cost of seed (in million UGX) | Expected production (tonnes) | Expected value (in million UGX) |
|---|---|---|---|---|---|---|
| Nyamusinigire | Bushenyi | 4 | 880 000 | 44 | 440 | 440 |
| Kyamiga | Bushenyi | 3 | 640 000 | 32 | 320 | 320 |
| Mishora | Mbarara | 2 | 420 000 | 21 | 210 | 210 |
| Nakivale | Mbarara | 38 | 7 600 000 | 380 | 3 800 | 3 800 |
| Karunga | Rakai | 2 | 480 000 | 24 | 240 | 240 |
| Kijanebalola | Rakai | 40 | 8 000 000 | 400 | 4 000 | 4 000 |
| Kachera | Rakai | 44 | 8 800 000 | 440 | 4 400 | 4 400 |
| Mutanda | Kisoro | 26 | 5 220 000 | 261 | 2 610 | 2 610 |
| Mulehe | Kisoro | 4 | 860 000 | 43 | 430 | 430 |
| Bunyonyi | Kabale | 49 | 9 800 000 | 490 | 4 900 | 4 900 |
| Karenge | Bushenyi | 4 | 720 000 | 36 | 360 | 360 |
| Kojweri | Soroti | 95 | 19 000 000 | 950 | 9 500 | 9 500 |
| Kowidi | Soroti | 30 | 6 000 000 | 300 | 3 000 | 3 000 |
| Kihodo | Soroti | 12 | 2 400 000 | 120 | 1 200 | 1 200 |
| Maragaga | Soroti | 5 | 1 020 000 | 51 | 510 | 510 |
| Pacolo | Soroti | 3 | 680 000 | 34 | 340 | 340 |
| Ajama | Kumi | 9 | 1 800 000 | 90 | 900 | 900 |
| Gigati | Pallisa | 12 | 2 400 000 | 120 | 1 200 | 1 200 |
| Kawi | Pallisa | 10 | 2 000 000 | 100 | 1 000 | 1 000 |
| 20 Game | Pallisa | 2 | 480 000 | 24 | 240 | 240 |
| Komumwi | Pallisa | 3 | 520 000 | 26 | 260 | 260 |
| Kaditi | Pallisa | 19 | 3 800 000 | 190 | 1 900 | 1 900 |
| Nyasali | Pallisa/Kumi | 23 | 4 600 000 | 230 | 2 300 | 2 300 |
| Adois | Kumi/Soroti | 43 | 8 600 000 | 430 | 4 300 | 4 300 |
| Nyagoa | Kumi/Pallisa | 25 | 5 000 000 | 250 | 2 500 | 2 500 |
| Gawa | Kumi | 3 | 600 000 | 30 | 300 | 300 |
| Kwania | Apach/Lira | 497 | 99 400 000 | 4 970 | 49 700 | 49 700 |
| Lemwa | Pallisa | 10 | 2 000 000 | 100 | 1 000 | 1 000 |
| Kochobo | Kumi | 4 | 800 000 | 40 | 400 | 400 |
| 30 Opare | Soroti | 5 | 1 000 000 | 50 | 500 | 500 |
| Kasago | Kumi | 2 | 460 000 | 23 | 230 | 230 |
| Semere | Soroti/Kumi | 5 | 1 000 000 | 50 | 500 | 500 |
| Bisina | Soroti/Kumi | 179 | 35 800 000 | 790 | 17 900 | 17 900 |
| Aibapet | Soroti | 6 | 1 240 000 | 62 | 620 | 620 |
| Opeta | Soroti | 61 | 12 200 000 | 610 | 6 100 | 6 100 |
| Abokat | Soroti | 3 | 680 000 | 34 | 340 | 340 |
| Nawampasa | Kamuli | 5 | 1 060 000 | 53 | 530 | 530 |
| Nakiwa | Kamuli/Iganga | 112 | 22 400 000 | 1 120 | 11 200 | 11 200 |
| Muilu | Kamuli/Pallisa | 2 | 400 000 | 20 | 200 | 200 |
| 40 Namasajeri | Kamuli/Pallisa | 18 | 3 600 000 | 180 | 1 800 | 1 800 |
| Nabigaga | Kamuli | 12 | 2 400 000 | 120 | 1 200 | 1 200 |
| Owapet | Soroti | 5 | 1 080 000 | 54 | 540 | 540 |
| Rubi | Gulu | 40 | 7 900 000 | 395 | 3 950 | 3 950 |
| **Total** | | | **295 740 000** | **14 787** | **147 870** | **147 870** |

Uganda especially those linked to swamps and has been traditionally a primary target for a large segment of the fishing community traditionally.

Other species such as the introduced carp, *Tilapia zilli*, *T. rendalli*, black bass and trout, have remained insignificant as cultured species largely because of the lack of appeal to consumers, lack of quality fish seed and/or inadequate knowledge of appropriate technologies and conditions to propagate those species and their seed. However, when ranked, common carp is the favoured by farmers especially in the relatively cold regions of the country.

New on-farm species is the *Labeo victorianus* which is now being cultured in an effort to save the species from extinction. The hatchery technology of this species,

however, is still only available to government research institutes (Kajjansi Aquaculture Research and Development Centre) and seed production from the centre is still very limited. Of increasing interest as an quaculture species is the Nile perch (*Lates niloticus*) which is good for processing for export to premium markets. Trials are underway at the Kajjansi Aquaculture Research and Development Centre to propagate this species. A few farmers are already growing Nile perch in the ponds with success. However, there has been no breakthrough yet with artificial seed propagation. Both the research centre and farmers growing Nile perch are still getting their seed from the wild.

The most common system of culture in the country is pond culture. Other forms of fish culture such as cage culture are only starting to be discussed especially by the emerging commercial fish farmers. Previously, 99 percent of subsistence fish farmers had ponds ranging from 50 $m^2$ to 200 $m^2$. With the drive to commercialize aquaculture production, efforts are being made to increase the pond surface and pond numbers. The average pond size currently stands at 400 $m^2$/pond, with an estimated total of 20 000 ponds countrywide.

## PRODUCTION

Current estimates are based on fish seed production capacity, stocking record, size of stocked water bodies, number and size of farmer ponds. The Department of Fisheries Resources had projected an annual production of 15 000 tonnes for 2005. This includes production expected out of stocked community dams and reservoirs projected at 9 500 tonnes. Out of subsistence farmers, 2 500 tonnes are expected from 17 000 ponds owned by 11 000 farmers and another 3 000 tonnes produced by 200 emerging commercial farmers whose production is targeted for the regional market. The total pond surface area is estimated at about 6.5 $km^2$ (650 ha) with over 80 percent of the farmed fish production as African catfish in 2004. Details of the production for the 31 districts zoned for fisheries and aquaculture production are given in Annex 7.19.1.

### Aquaculture production, species, values

With the growing demand for fish locally, regionally and internationally, Uganda has increased her efforts to develop the aquaculture sector as an alternative to increasingly stressed natural stocks. According to the Department of Fisheries, Uganda will have to produce up to 320 000 tonnes annually out of aquaculture by 2015 if it is to avoid becoming a net importer of fish products. There is already a visible trend of intensification of fish farming systems including adoption of larger pond sizes and numbers, use of higher stocking rates, search for better quality fish species both in growth performance and marketability, use of formulated feeds and turning to more intensive fish culture systems such as cages and tanks. Over the last five years fish production has grown from under 500 tonnes to 15 000 tonnes and is fast transforming from subsistence-base to a profit-orientated and export-driven farming. In addition, aquaculture is attracting partnerships with external firms and individuals who wanted to take advantage of existing markets.

Fish remains the only animal protein Uganda has been able to supply to the external markets (both regional and international) and is by far the most available and adequately distributed animal protein throughout the country. It remains comparatively affordable to the majority of Ugandans. Fish production is nearly three times that of beef production and many times higher than chicken production.

Uganda's non-food aquatic species production through aquaculture is limited to the upcoming ornamental fish farming industry and the baitfish farming targeting the Nile perch fishery. Uganda currently produces 3 million catfish fingerlings annually for the bait annually. The most significant contribution to the national economy is indirect through the Nile perch fishery. Over 20 private hatcheries have been set-up

and currently supplying bait for the Nile perch fishery. There is one crocodile farm found in Masaka District in Central Uganda. The crocodiles are reared mainly for the skin. A few courtyard undertakings have sprung up for the production of ornamental fish. All these undertakings are however still very insignificant when compared to the table fish species cultured both in value and quantity.

Aquaculture in Uganda is currently predominantly land-based with an estimated 650 ha of pond surface utilized for aquatic production. Much of this land surface has been brought for aquaculture purposes with the coming on board of the emerging commercial fish farmers. Of increasing importance also are the community water reservoirs and minor lakes, which are regularly stocked for the surrounding communities. The stocked water bodies are estimated to produce up to 9 500 tonnes of fish annually while pond-based production generates over 5 500 tonnes of farmed fish/year.

The key species used in aquaculture are Nile tilapia and African catfish. Other species include *Tilapia zilli*, *T. rendalli*, *O. leucostictus*, *C. carpio*, *M. rosenbergi*, koi carp and other native species used in ornamental fish farming. Freshwater prawns, *M. rosenbergi,* for food fish production, koi carp for ornamental purposes and red tilapia for aquaculture research and development have been introduced into the country for aquaculture during the last ten years.

## SEED RESOURCES/SUPPLY

Until five years, over 95 percent of the fish seed supply for aquaculture came from government-operated hatcheries while the other 5 percent came from "farmer to farmer" supply system. Seed in most cases were of poor quality and were basically tilapia seed. Currently over 90 percent of the seed are supplied from private sector-owned and operated hatcheries with a growing choice of species and strains propagated for seed supply to farmers. Annex 7.19.2 gives the details of the seed resources in the country.

## SEED PRODUCTION FACILITIES AND SEED TECHNOLOGY

Annex 7.19.2 gives the details on existing hatcheries for freshwater fish seed production including location, production figures, the number of species, available technologies (e.g. breeding, hatching, rearing) and gene banks. Currently most of the hatcheries are pond-based with some sort of wet room that contains incubation troughs supplied with running water or some sort of improvisation.

## SEED QUALITY

Trained hatchery operators are conversant with issues of seed quality especially the need to sort fish seed by sizes and age. Most hatcheries reported having separate ponds or containments areas *hapas* for separation of the different batches of tilapia fish seed both by sizes and age – a factor that is strongly demanded by grow-out farmers. Catfish farmers reported that cannibalism is the result of non-sorting of fish seed according to sizes.

## SEED MARKETING

Grow-out farmers buying small quantities have to pick up the fish seed. However, for large orders or supply to a good number of farmers in the same area, hatchery operators are willing to delivery fish seed. Some medium-scale hatcheries reportedly have their own farm trucks and oxygen cylinders for transporting fish seed in large quantities and over long distances (see Annex 3). Prices for nearly all the hatcheries were negotiable and varied greatly even for hatcheries within the same locality. A number of small hatchery operators and grow-out farmers have been organized, as groups or associations, with the help of the local governments as a means to guarantee

market and in order to work together among themselves to ensure that seed are available in good quality whenever needed and hatchery operator has ready market for any seed produced. Some of the large- and medium-scale hatcheries have put up sign posts and advertised their companies in the media.

## SEED INDUSTRY

Uganda's current seed production industry can be categorized into three groups: small-scale, medium-scale and large-scale. Small-scale hatcheries produce largely for rural communities and are usually limited in their capacity to supply seed to the district in which they occur. Small-scale hatcheries are those considered to produce less than 200 000 fingerlings of any one species a year or those producing not more than 300 000 fingerlings in total in a year. The medium-scale hatcheries target emerging commercial grow-out farmers, and produce seed that can be sold beyond the district of production. Many medium-scale producers came up during the government's programme of stocking and restocking of water bodies and have since transformed into commercial hatcheries. Medium-scale hatcheries produce between 300 000 to 1 million fingerlings a year. The large-scale hatcheries are only starting to come up and they are categorized as those that produce over 1 million fingerlings a year.

Small-scale hatcheries are limited in technical capacity and resources. Normally these category of hatcheries which are rural-based are credited for bringing quality fish seed for rural fish farmers. However, this category has the risk of not providing rural farmers with a quality product given the limited resources and remoteness of hatcheries for effective monitoring by the regulatory agencies. Medium-scale hatcheries are always careful to keep up the quality of their products as they largely dependent on commercial fish farmers coming back to buy more seed from them. There is a tendency with this category of hatcheries to over-produce seed to meet either the market demand and to meet deadlines. In so doing, this category of hatcheries is likely to lead to increased fish escapees, over-fertilization and failure to adhere to guidelines to ensure quality fish seed production. Large-scale hatcheries are normally well-planned and well-designed. Previously there was only one public aquaculture research centre (KARDC) and these now are growing to meet and ensure provision of quality fish all the time. Many of the large-scale hatcheries are clearly around the central administrative districts and supply fish seed only to large-scale farms. One such hatchery (SUNGENOR) is specialized

PLATE 7.19
**Facilities at Tukundane fish farm in Ugandas**

**Tukundane fish farm hapas holding Nile tilapia fingerlings ready for dispatch to grow-out farmers**

**Farm visits at Tukundane Fish Farm by aquaculture students of Makerere University**

**Tukundane fish farm proprietor with catfish brood**

in improved tilapia seed from the GIFT strain of Nile tilapia and supplies seed under a contract growing scheme where farmers sell back the fish to the company's fish processing and export partner (NGEGE Ltd).

On the whole, fish farming remains an alien practice a situation that was not helped by the manner in which aquaculture was first considered and introduced into the country. The practice was considered to be non-income generating and only for fish protein provision for the rural communities who did it at subsistence level with little or no input other than the fish seed. However, with time the practice has began to attract profits and generated income for fish farmers who have started to invest commercially and expand production targeting local, regional and international markets. This level of farmers have better-constructed production units, have designed measures against predators (small reptiles and birds) and are using formulated fish feeds either bought from feed firms or manufactured on farm. These fish farms are also better located and are employing technically trained persons or seeking advice from competent aquaculture service providers.

## SUPPORT SERVICES

Delivery of agriculture advisory services had been legally changed since 2002 from public delivery to private delivery with gradual shift from public-funded to private-funded delivery of advisory services (extension). As a result, many public agencies and institutions responsible for aquaculture extension have been either dismantled or realigned to fit the new government service delivery system. The services, unlike in the past, have to be popularly demanded by farmers. This is a point of contention for aquaculture as it is still minor in popularity compared to other sectors under agriculture which means that there are only a few places which stand to benefit from this new arrangement of service delivery. However, the government has started generating information such as aquaculture practice manuals, guidelines for the seed propagation for the respective farmed species provided through the Department of Fisheries Resources by both the central and local governments, the National Agricultural Advisory Services and the KARDC.

## SEED CERTIFICATION

All fish seed producing, supplying and fingerling raising farms and companies have to be certified by law. This is in accordance with the provisions of the statutory instrument regulating aquaculture activities under the FISH ACT (1964) known as the Fish (Aquaculture) Rules 2003 instrument number 31. The operator has to apply using a required application form, submit it to the Chief Fisheries Officer or to a person designated by the Chief Fisheries Officer to work ON his or her behalf. Inspectors are then dispatched to the aquaculture establishment to inspect and ensure that all requirements and plans are in place to ensure responsible production of quality fish seed. Based on the report of the inspectors, the Chief Fisheries Officer then issues a Fish Seed Production Certificate. This process is aimed at ensuring that farmers get quality fish seed and to prevent ecosystem alteration and ecological and genetic disruption from either escapees of farmed fish or entry of unwanted fish into the production system. In essence, no one is not allowed to produce or pass on fish seed without certification. This provides the legal and policy framework for fish seed production in the country.

## ECONOMIC ASPECTS OF HATCHERY OPERATIONS

Below are some of the conclusions regarding tilapia seed production that were arrived at by an expert under the Technical Cooperation among Developing Countries (TCDC) programme provided by the FAO Technical Cooperation Project (TCP) to guide hatchery operators.

The main technical standards developed in terms of documented simple and sustainable technologies that fit the current level of production in Uganda and which have been applied in the project zones include the following:

- Nursing tilapia from the size of 0.15-0.2 g per fish can reach 4.1 g with the survival rate of 87.1 percent for 40 days of nursing and productivity of 23-27 fish /m$^2$
- Nursing catfish from the size of six to eight days old (0.5g-30g per fish) to reach 4.4 g per fish with a survival rate of 43.0 percent for 40 days of nursing and productivity of 26-29 fish/m$^2$
- Preliminary calculation of producing 545 fish per 1 kg of broodstock 50 fry/ month/m$^2$ pond area for 30 days with the cost of fry at UGX5.2-8.1/fish seed with 3 day fry brought from a commercial fish farm.
- Transportation of larvae, fry and fingerling of both tilapia and catfish using oxygenated plastic bags with a survival rate ranging from 92-100 percent traveling a distance of 60-280 km for 4-8 hrs. Transportation of tilapia broodstock in a crest tank supplied with oxygen can get a survival rate of 99-100 percent with the similar distance and time. The simple transportation method of transporting in a container with oxygen air can be used for the short distance of approximately 15 km with same results.

## INFORMATION OR KNOWLEDGE GAPS

Gaps exist in the information needed for planning and operation of commercial or medium- to large-scale hatcheries in the country. There has been some work done at the technical level by local institutions and international agencies including FAO and DFID to generate information especially for the small-scale hatcheries. However, attempts to get the actual economics involved in running rural hatcheries by local institutions and by these international agencies were not conclusive, there has not been any attempt in the country to review the economics of hatchery operations at any other level of hatchery production and operation. Serious consideration of economics is needed to provide information to the operators required for appropriate investment and planning.

## STAKEHOLDERS INVOLVED WITH FISH SEED PRODUCTION

There are many stakeholders involved in seed production with the seed producers and the fish farmers as the primary stakeholders. There are nearly 60 fish seed producing agencies and/or individuals in the country and about 12 000 grow-out fish farmers. This is followed by the government which is interested in promoting aquaculture for both for food and bridging the gap between the current fish supply and fast increasing demand for fish for trade at local, regional, and international levels. The government is also interested in fish seed as management tool for existing fisheries through routine stocking and restocking of fishery exploited water bodies. Other key stakeholders include the aquaculture research centres and fish fry centres as part of government institutions in place to promote the adoption of aquaculture and development and provision of needed technologies for aquaculture practice. Aquaculture currently provides employment to an estimated 35 000 people in the country.

**Producers/farmers:** Of the 35 000 people, 12 000 are engaged in aquaculture as owners of the production units producing an estimated 5 500 metric tonnes of fish annually and employing another 23 000 upfront from farm labourers to extension workers, technicians and managers.

**Local institutions and farmers associations:** Key non-government organizations and institutions involved in the promotion of the use of quality fish are mainly fish farmers' organizations and processing and exporting factories and firms. There are

about 20 district-based fish farmers' organizations and five other organizations that have a national coverage. About four factories are currently interested in buying fish from aquaculture for processing for export – and this require that the seed used are of good quality and produces fish that meets the market requirement.

**Small hatcheries:** Many of the hatcheries in the country remain small- to medium-scale seed production hatcheries that have come up during the last three to five years with increasing importance of fish in the country and which are supported by a number of government and other non-government agencies to ensure availability of quality fish seed to farmers especially in the rural areas. There are currently more than over 50 small- to medium-sized hatcheries in the country.

**Larger hatcheries:** Until two to three years back, there were only two large hatcheries, one managed and operated by the government at KARDC and a private one known as Sunfish Farm. Another three private ones were until recently only at the planning stage. All the three are now in full operation and an additional five have come up as a result of expansion of the originally small hatcheries with the expanded market and improved quality of their seed.

**Government institutions:** The key institutions of government in seed production are the Department of Fisheries Resources that provides the legal and policy framework for all activities related to seed production, including support and promotion. The Department of Fisheries Resources is central and works with local governments departments responsible for fisheries in carrying out its mandate. However, local government fisheries officers handling aquaculture may also be engaged in extension. The other government institution involved in seed production is the KARDC which is mandated to generate information through research for improved aquaculture production. Specifically, KARDC is involved in the development of better performing seed and strains of fish species that are demanded by the market. Along with this are three government regional fry centers(Aquaculture Development Centres – Nkoma, Bushenyi and Laliya), which although dilapidated, are scheduled for rehabilitation under the current fisheries development project funded by African Development Bank Loan facility. In addition, there are three districts with hatcheries that are owned and operated by the local government mandated to propagate seed to supply rural fish farmers.

Delivery of advisory services to farmers (extension) under the country's Plan for Modernization of Agriculture (PMA) has been transformed to private and farmer-demanded extension service system. This new approach is mandated by law. This includes and applies to aquaculture practice as well. This is a move towards empowering farmers to demand and pay for extension services from private service providers and getting the government out of directly providing extension services to farmers. The national agency responsible for this arrangement is known as the National Agriculture Advisory Services (NAADS) that is currently a semi-autonomous body.

**Researchers**: Research on fish seed issues that had public funding was a remit of KARDC – and the institute was responsible for generation of information, knowledge and technologies on fish seed production and propagation, as well as improving the quality and performance of the fish seed. Other institutions such national university known as Makerere University and the Fisheries Training Institute at Entebbe conducted some limited research concerning seed issues for academic purposes. However, with the new National Agriculture Research System Bill, research has been made open and competitive with funding from the World Bank. It is therefore anticipated that other key players may come in to do research on fish seed issues.

**Donors:** A number of projects have been funded by donor agencies over the last five years: These include the following:

i. Small Scale Fish Farming Project – largely for rural livelihood supported by DFID – started 1999 and ended 2004;
ii. Support to Fisheries Management aimed at bolstering production of quality fish seed and setting of large commercial fish farms supported by the government – started 2003 ended 2004;
iii. Support to Aquaculture – Fish Fry meant for provision of seed to the rural poor farmers supported by the government, started 2001 ended 2004;
iv. Support to Fisheries Development Project – in which support for aquaculture has been earmarked for rehabilitation of infrastructure for Research and Regional Fry Centres. It also will have a minor component for support directly to fish farmers at all levels including provision of credit. This has been supported with a loan from ADB – started 2003 and to end 2008;
v. Assistance to fish farmers in eastern Uganda – which has supported the creation of model commercial small-scale private hatcheries in three zones in eastern Uganda. This has been through an FAO TCP project – started 2002 and ended 2004;
vi. Lake Victoria Environment Management Project that supports aquaculture activities – largely involved in training, sensitization and awareness campaigns on good aquaculture production practices in 13 districts of Uganda Lake Victoria Basin. This project is also supporting the setting up of commercial private small-scale hatcheries in six of the thirteen districts, supported through a loan and grant from the World Bank, started 1999 until 2005;
vii. Fisheries Development Project in which there is limited support to fish farmers to improve their facilities and commercialize their production, funded by a Government Loan Facility from African Development Bank starting from 2003 to 2008. The project will also support the renovation and rehabilitation of the government regional fry centres and KARDC.

## FUTURE PROSPECTS AND RECOMMENDATIONS

Freshwater fish seed resources demand in the country is going to significantly increase in the coming five years as Uganda strives to transform her production from rural subsistence to commercial or profit-oriented aquaculture production. The national plan is to produce 50 000 tonnes of fish by end of 2007 and 120 000 tonnes by year 2011. This, according to the government plans, will mainly from both the medium-scale and the few large commercial fish farmers. By projection, including the government's intention to continue with the restocking exercise, and the bait demand by the long line fishery of Nile perch the National demand for seed is estimated at over 450 million fingerlings of quality fish seed per annum. Given the quite ambitious plan for aquaculture, Uganda needs to continue emphasizing the promotion of private sector intervention and leadership to achieve her aim. There is a need for continued and renewed research to improve local strains so as to reduce on challenges such as over proliferation of Nile tilapia and subsequent stunting of grow-out fish, cannibalism and marked size differences in grow-out facilities of African catfish, low performance of the limited genetic base of carp and limited choice of species and their strains for aquaculture. Table 1 is the Department of Fisheries Resources estimate for fish seed needed to stock minor lakes in the country. This estimate does not take into consideration the requirements for augmenting depleted larger lakes such as Lakes Edward and George. Also shown in Tables 7.19.2 to 7.19.4 are the estimated production and requirements as Uganda strives to develop her aquaculture potential. These figures are projection and can only be realized if the right situations prevail and required resources are made available to support development of the sector.

TABLE 7.19.2
**Potential fish production from cage culture systems in major crater lakes. All crater lakes over 20 m deep are targeted for cages. The cage systems in crater lakes will produce 4 500 tonnes/km². The cage system in major lakes will produce 4 500 tonnes in a 500 km²**

| Crater lakes | Number of districts | Target species | Area in sq. km. | Number of systems | Production (tonnes) | Value (in millions of Ugandan Shilling UGX) US$1 = UGX 1 170 |
|---|---|---|---|---|---|---|
| Lake Victoria | Lake basin (11) | Nile tilapia | 30 720 | 61 | 276 480 | 414 720 |
| Lake Edward | Lake basin (3) | Edward tilapia | 663 | 1 | 5 967 | 8 951 |
| Lake Albert | Lake basin (5) | Nile tilapia | 2 114 | 4 | 19 026 | 28 539 |
| Kanyegeya | Kabarole | Nile tilapia | 0.01 | 1 | 11 | 17 |
| Katanda | Kabarole | Nile tilapia | 0.35 | 1 | 788 | 1 181 |
| Mwegenyi | Kabarole | Nile tilapia | 0.30 | 1 | 675 | 1 013 |
| Kifuruka | Kabarole | Nile tilapia | 0.15 | 1 | 338 | 506 |
| Mwamba | Kabarole | Nile tilapia | 0.48 | 1 | 1 080 | 1 620 |
| Lugembe | Kabarole | Nile tilapia | 0.08 | 1 | 169 | 253 |
| Nyungu | Bushenyi | Nile tilapia | 0.20 | 1 | 450 | 675 |
| Kamweru | Bushenyi | Nile tilapia | 0.34 | 1 | 754 | 1 131 |
| Nkugute | Bushenyi | Nile tilapia | 0.58 | 1 | 1 305 | 1 958 |
| Opeta | Soroti | Nile tilapia, Catfish | 42.00 | 21 | 94 500 | 141 750 |
| Mutanda | Kisoro | Black bass | 23.00 | 12 | 51 750 | 77 625 |
| Bunyonyi | Kabale | Catfish, Black bass | 57.00 | 29 | 128 250 | 192 375 |
| Kabarole Lakes | Kabarole | Nile tilapia | 11.00 | 6 | 24 750 | 37 125 |
| Kasese Lakes | Kasese | Nile tilapia | 10.42 | 5 | 23 445 | 35 168 |
| **Total** | | | **146** | **81** | **328 264** | **944 605** |

TABLE 7.19.3
**Potential fish production from river cage culture systems**

| River Name | Target species | River lengths | Number of systems | Production (tonnes) | Value (in millions of UGX) |
|---|---|---|---|---|---|
| Victoria Nile | Nile tilapia | 390 | 98 | 97 500 | 146 250 |
| Albert Nile | Nile tilapia | 215 | 54 | 53 750 | 80 625 |
| Turkwel | Mirror carp trout | 40 | 10 | 10 000 | 15 000 |
| Aswa | Nile tilapia and Catfish | 200 | 50 | 50 000 | 75 000 |
| Semliki River | Trout mirror carp | 8 | 2 | 2 000 | 3 000 |
| Kagera | Catfish | 20 | 10 | 10 000 | 15 000 |
| Kazinga Channel | Nile tilapia | 25 | 6 | 6 250 | 9 375 |
| Mayanja | Nile tilapia and Catfish | 30 | 8 | 7 500 | 11 250 |
| Sezibwa | Nile tilapia and Catfish | 28 | 7 | 7 000 | 10 500 |
| **Total** | | | | **244 000** | **366 000** |

(Note: One cage system per 4 km is expected to produce 1 000 tonnes with an average price of UGX1 500/kg)

TABLE 7.19.4
**Potential fish production from stocking of dams and valley tanks**

| Region | Number of Dams Valley Tank | Capacity in million liters | Estimated area in millions of sq. m. | No, of seed required in millions | Cost of seed (in million UGX) | Expected production (tonnes) | Expected value (in millions UGX) |
|---|---|---|---|---|---|---|---|
| Acholi | 85 | 847 | 169 | 34 | 339 | 16 940 | 16 940 |
| Ankole | 93 | 6 780 | 1 356 | 271 | 2 712 | 135 610 | 135 610 |
| Mengo | 65 | 2 166 | 433 | 87 | 867 | 43 329 | 43 329 |
| Masaka | 67 | 7 979 | 1 596 | 319 | 3 192 | 159 581 | 159 581 |
| Toro | 11 | 252 | 50 | 10 | 101 | 5 036 | 5 036 |
| Kalamoja | 123 | 4 453 | 891 | 178 | 1 781 | 89 062 | 89 062 |
| Busoga | 43 | 738 | 148 | 30 | 295 | 14 753 | 14 753 |
| Bukedi | 42 | 137 | 27 | 5 | 55 | 2 743 | 2 743 |
| **Total** | **529** | **23 353** | **4 671** | **934** | **9 341** | **467 054** | **467 054** |

(Note: The dam list used is from old statistics and estimate assumes the following: stocking rate of 1 fish/5 m²; the dams are assumed to have an average depth of 5 m).

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## ANNEX 7.19.1
## Aquaculture Production Information for the 31 Districts of Uganda zoned for Fisheries and Aquaculture Production for 2004

| | Districts | System of culture | Number of production units | Farms surface in hectares | Species cultured | Fish production metric tonnes |
|---|---|---|---|---|---|---|
| 01 | Bugiri | Pond culture | 352 | 15.84 | Catfish | 79.2 |
| | | | | | Nile tilapia | 61.8 |
| 02 | Busia | Pond culture | 160 | 6.4 | Catfish | 32.0 |
| | | | | | Nile tilapia | 16.0 |
| 03 | Iganga | Pond culture | 408 | 28.56 | Catfish | 171.4 |
| | | | | | Nile tilapia | 71.4 |
| 04 | Jinja | Pond culture | 246 | 12.3 | Catfish | 61.5 |
| | | | | | Nile tilapia | 40.0 |
| | | | | | Freshwater Prawns | 1.5 |
| 05 | Kaberamaido | Pond culture | 260 | 5.2 | Catfish | 28.1 |
| | | | | | Nile tilapia | 14.0 |
| | | | | | Carp | 1.2 |
| 06 | Kamuli | Pond culture | 366 | 23.79 | Catfish | 119.0 |
| | | | | | Nile tilapia | 59.5 |
| 07 | Mayuge | Pond culture | 166 | 4.98 | Catfish | 22.4 |
| | | | | | Nile tilapia | 9.0 |
| 09 | Mbale | Pond culture | 248 | 7.44 | Catfish | 37.2 |
| | | | | | Nile tilapia | 11.2 |
| | | | | | Carp | 15.0 |
| 10 | Pallisa | Pond culture | 280 | 11.2 | Catfish | 67.2 |
| | | | | | Nile tilapia | 22.4 |
| | | | | | Carp | 5.4 |
| 11 | Soroti | Pond culture | 352 | 10.56 | Catfish | 52.8 |
| | | | | | Nile tilapia | 35.6 |
| 12 | Tororo | Pond culture | 600 | 36 | Catfish | 180.0 |
| | | | | | Nile tilapia | 108.0 |
| 13 | Masaka | Pond culture | 1024 | 51.2 | Catfish | 460.8 |
| | | | | | Nile tilapia | 102.4 |
| 14 | Mpigi | Pond culture | 288 | 10.08 | Catfish | 50.4 |
| | | | | | Nile tilapia | 25.2 |
| 15 | Mukono | Pond culture | 516 | 25.8 | Catfish | 193.5 |
| | | | | | Nile tilapia | 77.4 |
| 16 | Wakiso | Pond culture | 916 | 45.8 | Catfish | 961.8 |
| | | | | | Nile tilapia | 274.8 |
| | | Cage culture | 20 | 0.004 | Nile tilapia | 15.3 |
| 17 | Bushenyi | Pond culture | 1 048 | 20.96 | Catfish | 104.8 |
| | | | | | Nile tilapia | 37.7 |
| | | | | | Carp | 0.5 |
| 18 | Hoima | Pond culture | 130 | 2.6 | Catfish | 13.0 |
| | | | | | Nile tilapia | 5.2 |
| 19 | Kabarole | Pond culture | 252 | 5.04 | Catfish | 25.2 |
| | | | | | Nile tilapia | 7.6 |
| 20 | Kamwenge | Pond culture | 352 | 8.8 | Catfish | 44.0 |
| | | | | | Nile tilapia | 13.2 |
| 21 | Kasese | Pond culture | 714 | 17.14 | Catfish | 85.7 |
| | | | | | Nile tilapia | 42.8 |
| 22 | Kyenjojo | Pond culture | 646 | 6.46 | Catfish | 32.3 |
| | | | | | Nile tilapia | 16.2 |
| 23 | Ntungamo | Pond culture | 352 | 5.28 | Catfish | 26.4 |
| | | | | | Nile tilapia | 13.2 |
| 24 | Masindi | Pond culture | 152 | 2.28 | Catfish | 11.4 |
| | | | | | Nile tilapia | 5.7 |
| 25 | Mbarara | Pond culture | 524 | 13.1 | Catfish | 65.5 |
| | | | | | Nile tilapia | 32.8 |
| 26 | Adjumani | Pond culture | 159 | 3.18 | Catfish | 15.9 |
| | | | | | Nile tilapia | 8.0 |
| 27 | Apac | Pond culture | 178 | 3.56 | Catfish | 17.8 |
| | | | | | Nile tilapia | 10.7 |
| 28 | Arua | Pond culture | 726 | 14.52 | Catfish | 72.6 |
| | | | | | Nile tilapia | 43.6 |
| 29 | Gulu | Pond culture | 972 | 43.74 | Catfish | 218.7 |
| | | | | | Nile tilapia | 109.4 |
| 30 | Lira | Pond culture | 1068 | 42.72 | Catfish | 213.6 |
| | | | | | Nile tilapia | 149.5 |
| 31 | Nebbi | Pond culture | 352 | 8.8 | catfish | 21.1 |

## ANNEX 7.19.2
## Details on existing hatcheries for freshwater fish seed

| No. | Source of seed | Operators name | Location of establishment | Species propagated | Purpose for seed production | Gene bank | Annual seed production capacity |
|---|---|---|---|---|---|---|---|
| A | Wild capture | Department of Fisheries Resources | Natural water bodies | Tilapiines<br>Bagrus species<br>African Catfish<br>Nile perch | Growout, Breeding, Research<br>Growout, Research<br>Growout, Broodstock, Bait<br>Growout, Research | Natural Species repository | 400 000<br>20 000<br>4 500 000<br>150 000 |
| B1 | Artificial propagation | Sun fish Farm | Wakiso District | African Catfish<br>Nile tilapia | Growout, Bait<br>Growout | N/A | 15 000 000<br>3 000 000 |
| B2 | Artificial propagation | Bushenyi Aquaculture Development Center | Bushenyi District | Nile tilapia | Growout, Research, Training | N/A | 480 000 |
| B3 | Artificial propagation | Sisa Fish Farm | Wakiso District | African catfish | Growout, Bait | N/A | 6 000 000 |
| B8 | Artificial propagation | MOSO4 Enterprise | Iganga District | African catfish<br>Nile tilapia | Growout<br>Growout | N/A | 2 400 000<br>1 200 000 |
| B5 | Artificial propagation | Kikkati Fish Farm | Mukono District | African catfish | Growout, Bait | N/A | 3 600 000 |
| B6 | Artificial propagation | Bamukwasi Rock Valley Fish Farm | Tororo District | African Catfish<br>Common Carp<br>Nile tilapia | Growout<br>Growout<br>Growout | N/A | 1 200 000<br>240 000<br>600 000 |
| B7 | Artificial propagation | Butande Integrated Fish Farm | Busia District | African catfish<br>Nile tilapia | Growout<br>Growout | N/A | 300 000<br>1 200 000 |
| B8 | Artificial propagation | Salama Integrated Fish Farm | Busia District | African catfish<br>Nile tilapia | Growout, Bait<br>Growout | N/A | 600 000<br>840 000 |
| B9 | Artificial propagation | Banga Fish Farm | Mayuge District | Nile tilapia | Growout | N/A | 240 000 |
| B10 | Artificial propagation | Namasere Fish Farmers Association | Bugiri District | African Catfish<br>Nile tilapia | Growout, Bait<br>Growout | N/A | 600 000<br>480 000 |
| B11 | Artificial propagation | Mpigi Fish Farm | Mpigi District | African catfish<br>Nile tilapia | Growout, Bait<br>Growout | N/A | 1 200 000<br>600 000 |
| B12 | Artificial propagation | Interglobe Aquaculture Fish Farm | Kampala | African catfish | Growout | N/A | 600 000 |
| B13 | Artificial propagation | Sisa Integrated Fish Farming Ltd | Wakiso District | African catfish<br>Nile tilapia | Growout, Bait<br>Growout | N/A | 1 200 000<br>600 000 |
| B15 | Artificial propagation | Ruta Fish Farm | Wakiso District | African Catfish | Growout, Training of extension workers | N/A | 360 000 |
| B16 | Artificial propagation | Mutungo Kitiko Fish Farm | Wakiso District | Nile tilapia | Growout | N/A | 240 000 |
| B17 | Artificial propagation | JAMS aquaculture and Fish Farm | Wakiso District | African catfish<br>Nile tilapia | Growout, Bait<br>Growout | N/A | 1 500 000<br>960 000 |
| B18 | Artificial propagation | SIBCO Ltd | Nakaseke District | African catfish<br>Nile tilapia | Growout<br>Growout | N/A | 480 000<br>360 000 |
| B19 | Artificial propagation | Lean on Systems (U) ltd. | Wakiso District | African catfish<br>Nile tilapia | Growout, Bait<br>Growout | N/A | 1 500 000<br>1 800 000 |
| B20 | Artificial propagation | The Pearl Group | Wakiso District | Nile tilapia | Growout | N/A | 960 000 |
| B21 | Artificial propagation | Kampala Fish Farmers Ltd. | Wakiso District | African Catfish<br>Nile tilapia | Growout, Bait<br>Growout | N/A | 1 800 000<br>960 000 |
| B22 | Artificial propagation | Umoja Fish Farm | Wakiso District | African catfish | Growout, Bait | N/A | 12 000 000 |
| B24 | Artificial propagation | Kakunyu Agricultural Farm | Luwero District | Nile tilapia | Growout | N/A | 600 000 |
| B25 | Artificial propagation | Kabali Farm | Mukono District | African catfish<br>Nile tilapia | Growout, Bait<br>Growout | N/A | 360 000<br>480 000 |

| No. | Source of seed | Operators Name | Location of establishment | Species propagated | Purpose for seed production | Gene bank | Annual seed production capacity |
|---|---|---|---|---|---|---|---|
| B26 | Artificial propagation | Nalubowa Lusembo & Co. Estates | Masaka District | African catfish | Growout, Breeding | N/A | 15 000 000 |
| | | | | Nile tilapia | Growout, Breeding | | 2 400 000 |
| B27 | Artificial propagation | Kyankuzi Fish Farm | Iganga District | African catfish | Growout | N/A | 600 000 |
| B28 | Artificial propagation | Kabeihura Farm | Bushenyi District | African catfish | Growout | N/A | 1 200 000 |
| | | | | Nile tilapia | Growout | | 2 400 000 |
| B29 | Artificial propagation | Kigezi Fish Industry Project | Kabale District | African catfish | Growout | N/A | 480 000 |
| | | | | Nile tilapia | Growout | | 360 000 |
| B30 | Artificial propagation | Kabumba Fish Farmers | Isingiro District | Nile tilapia | Growout | N/A | 1 500 000 |
| B31 | Artificial propagation | Gisoro Community Developers Farm | Kisoro District | Nile tilapia | Growout | N/A | 600 000 |
| | | | | Common Carp | Growout | | 240 000 |
| B32 | Artificial propagation | Aquafarm Consult Ltd. | Wakiso District | African catfish | Growout, Bait | N/A | 2 400 000 |
| B33 | Artificial propagation | Tukundane Fish Farm | Isingiro District | Nile tilapia | Growout | N/A | 2 400 000 |
| | | | | Tilapia zilli | Growout | | 600 000 |
| B34 | Artificial propagation | Tochi Heights & Aqua Ltd | Gulu District | African catfish | Growout | N/A | 600 000 |
| | | | | Nile tilapia | Growout | | 12 000 000 |
| B35 | Artificial propagation | 306A Mixed Farm | Apac District | Nile tilapia | Growout | N/A | 8 400 000 |
| B36 | Artificial propagation | Pukure Orphan Care Integrated Farm | Gulu District | African catfish | Growout | N/A | 240 000 |
| | | | | Nile tilapia | Growout | | 360 000 |
| B37 | 74 | Ogur Fish Farms Ltd. | Lira District | African catfish | Growout | N/A | 240 000 |
| | | | | Nile tilapia | Growout | | 360 000 |
| B38 | 80 | Braj Fry Centre | Hioma District | African catfish | Growout, Bait | N/A | 480 000 |
| | | | | Nile tilapia | Growout | | 720 000 |
| B39 | 84 | Erisotto Aquafarm | Wakiso District | African catfish | Growout, Bait | N/A | 480 000 |
| | | | | Nile tilapia | Growout | | 720 000 |
| B40 | 86 | Katfereza Fish Farming | Wakiso District | African catfish | Growout | N/A | 240 000 |
| | | | | Nile tilapia | Growout | | 360 000 |
| B41 | 89 | Namuyenje Mixed Farmers Ltd | Mukono District | African catfish | Growout, Bait | N/A | 1 200 000 |
| B42 | 90 | Naluvule Farm | Wakiso District | African catfish | Growout, Bait | N/A | 480 000 |
| | | | | Nile tilapia | Growout | | 720 000 |
| B43 | | Nkoma Aquaculture Development Centre | Mbale District | Nile tilapia | Growout, Research, Training | Strain repository | 600 000 |
| | | | | Common Carp | Growout, Research, Training | | 240 000 |
| B44 | | SCAPA Limited | Kamuli District | African Catfish | Growout | N/A | 1 200 000 |
| | | | | Common carp | Growout | | 120 000 |
| | | | | Nile tilapia | Growout | | 720 000 |
| B45 | | Magogo Integrated Farm Dealers in Fish | Kamuli District | African catfish | Growout | N/A | 600 000 |
| | | | | Nile tilapia | Growout | | 720 000 |
| B46 | | Kajjansi Aquaculture Research and Development Centre | Wakiso District | African catfish | Growout, Research, Breeding | Strain repository | 960 000 |
| | | | | Common carp | Growout | | 360 000 |
| | | | | Labeo victorianus | Growout, Research | | 840 000 |
| | | | | Bagrus sp | Research | | 120 000 |
| | | | | Nile perch | Research | | 60 000 |
| B47 | | Son of the Nile Fish Farm | Mukono District | Nile tilapia | Growout, Breeding | N/A | 18 000 000 |