# Characterization of freshwater fish quality in the Tanjona surrounding Antananarivo: Utilization of trace metals and stables isotopes ($\delta^{13}C$ & $\delta^{15}N$)

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***Cape Town, 26-30 June 2017***

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## Introduction:

- **AMPIANA project:** feed Antananarivo population, capital of Madagascar, with fish.
- **Tanjona:** innovative semi-extensive fish farming model identified in the project, located in floodplains of Fenoarivo city and the surrounding of Antananarivo.
- Urbanization and population growth may affect water quality in these floodplains and health quality of fish reared in this system (Fig.1).

  What is the health quality of water and fish from this system?
- The aims of this study was therefore to characterize the level of water contamination in the Tanjona *via* trace metals concentrations and stables isotopes ($\delta^{13}C$ & $\delta^{15}N$) in white muscle of tilapia, as well as stables isotopes in particulate organic matter and sediments.

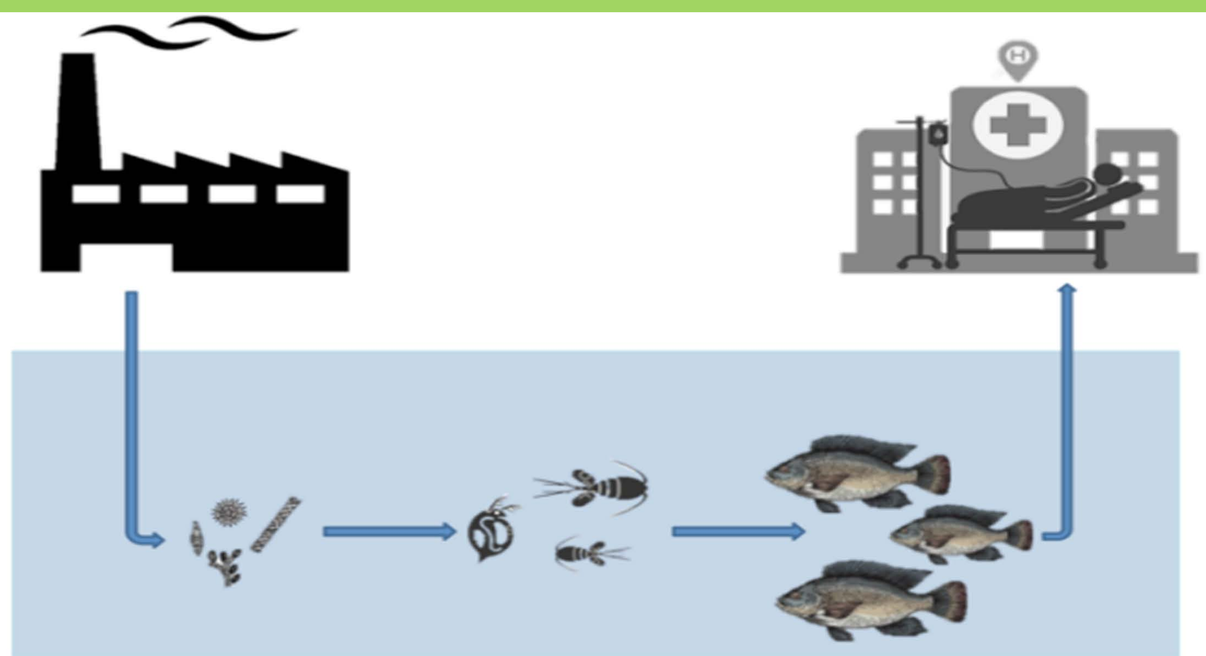

**Fig. 1: Schematic pathway of trace metals contamination**

Contaminants discharged through sewage water are incorporated in organisms at the base of food web and may then be transferred and accumulated by differents links on food chain including fish. Opportunistic fish such as tilapia, tolerates a wide range of water quality and may then constitute a source of contaminants for human health.

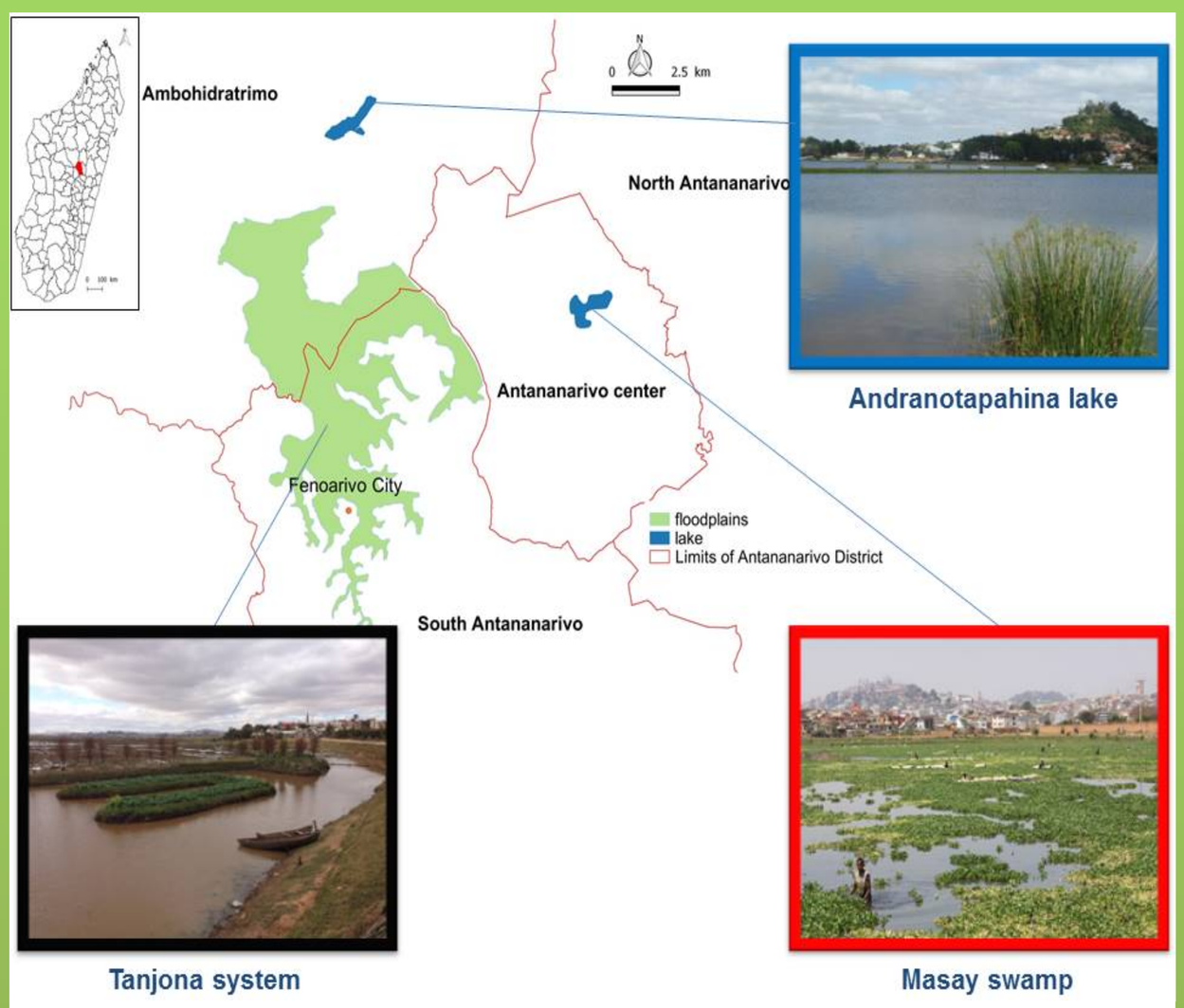


**Fig. 2: Study area**

## Methods:

- Tilapia, water and sediment samples were collected from three sites (Fig. 2):
  - Tanjona Fenoarivo (to be characterized)
  - Andranotapahina lake (considered as clean water area)
  - Masay swamp (considered as contaminated water area)
- Tilapia's white muscle were analyzed in order to measure trace metals concentrations: As, Pb, Cr,Ti, Zn,Co, Cu, Fe, Mn, Ni, Hg and Se (Fig. 3).
- Water, tilapia white muscle and sediment were prepared for stables isotopes analysis ($\delta^{13}C$ & $\delta^{15}N$) (Fig. 4).

**Fig. 3: tilapia samples for trace metals analysis**

**Fig. 4: Samples collected for stables isotopes analysis**

## Prospects:

- All samples are currently being analyzed for both parameters.
- Trace metals results from three sites will be compared in order to characterize fish quality.
- Stable isotopes results from three sites will be compared in order to characterize anthropogenic contamination and trace wastewaters effluents ($\delta^{15}N$ : nitrogen in wastewater).
- Provide basis for fish and environmental quality in Antananarivo.
- Characterize health and environmental risks in Antananarivo.

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