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Characteristics of fish farming practices and agrochemicals usage therein in four regions of Cameroon ☆

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ABSTRACT

Cameroon plans to reduce massive fish imports by developing aquaculture which appears to be a great solution to the massive demand for animal protein. Therefore there is a need to assess fish farming practices and agrochemicals usage. A cross-sectional survey employing questionnaires was used to collect information from 107 farmers in the centre, south, littoral, west regions of Cameroon between April and September 2016. The results of the study showed that fish farmers were mainly men (93%) with 49.5% as small scale farmers, 83.3% practiced earthen fish pond, and about 30% practice integrated fish farming with poultry (18.6%) piggery (16.7%) and crop farming (10.7%). Feeding practices are characterized by the use of locally formulated powdered feeds (31.7%), animal manure, chicken droppings (20.5%) and pig dung (18.7%). Concerning fish health management, few farmers (24.3%) refer to a veterinarian for prescription and 51% used agrochemical products like liming materials, fertilizers and veterinary drugs. Tetracyclines are the most used for curative purposes. Good fish farm management practices, successful fish health management, and periodical monitoring will contribute to produce safer fish products. Results from this study should encourage an effective monitoring of chemicals contaminants in fish farming in Cameroon.

Introduction

Aquaculture according to FAO (1997) is defined as "the farming of aquatic organisms including fish, molluscs, crustaceans and aquatic plants in selected or controlled environments". Today, aquaculture is growing more rapidly than all other animal food-production sectors. Its contribution to global supplies of several species of fish, crustaceans and mollusks increased from 3.9% of total production by weight in 1970 to 33% in 2005 (FAO, 2010). Throughout the centuries, fish has been an important component of the population's diet in many parts of the world. Fish constitutes an important source of proteins, minerals, vitamins and unsaturated essential fatty acids for the most underprivileged layers of society. Aquaculture in the form of fish farming was introduced in Cameroon in late 1940s and has seen significant progress in the last ten years (Pouomogne and Pemsl, 2008). Nowadays, the production, estimated at 400.000 tons in 2015 (MINEPIA and FAO, 2009), is still insufficient to meet the market demand. Due to growing population (2.8% annually) and rapid urbanization which has consequently led to a significant increase in fish prices in Cameroon. At the same time, natural fisheries stocks are maximally deteriorated and stocks of many fish species are in decline attributed to illegal and over-fishing. Therefore aquaculture appears to be a great solution to the massive demand for animal protein. Whereas, conditions for fish farming in Cameroon are good, there is a good climate suitable for the rearing of many species, appropriate soil for pond construction and natural inland waters covering over 40.000 km^2 (Brummett, 2007). Over the last 20 years many surveys have been conducted in West (Nji and Daouda, 1990; Pouomogne et al., 2010), North-West (Ndah et al., 2011) and Centre (Hirigoyen et al.,1997; Oswald et al., 2015; Fomena, 2013) regions of Cameroon, to better understand evolution of fish farming practices and local constraints inherent to its development. Today, increased fish production by farming is therefore an urgent matter for many african countries (Yao et al., 2016). A current focus taken by the government is to promote intensive

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fish farming for local food supply and to increase the income of fish farmers. Intensifying fish farming requires the use of chemicals during fish production, these include disinfectants, antibiotics and anthelmintic agents (Rawn, 2009). Previous studies conducted in Europe (Alderman and Hastings, 1998) in some parts of Africa as in Ghana (Fianko et al., 2011; Darko et al., 2016) and Nigeria (Ogunleye et al., 2008; Adetunji et al., 2012; Ibemere and Ezeano, 2014) and in Asia (Pham et al., 2015; Sheheli et al., 2013) have revealed chemical contamination of fish farming products. No studies in Cameroon have investigated the occurrence of sanitary risks related to fish farming practices. Therefore introducing control measures in the monitoring of chemical contaminants is a relevant issue. For the improvement of control system and future planning on the quality and safety of fish, the information regarding present fish farming practices and potential associated risk is absolutely necessary (Sapkota et al., 2008; Subasinghe et al., 2003) now that many developing countries have also taken steps to put in place control systems that encourage the responsible use of veterinary drugs and other agrochemicals to combat drug resistance and comply with international standards. Thus, this study stands as a preliminary enquiry on the practices in fish farming in Cameroon with the identification of chemicals use in aquaculture activities in order to postulate on potential associated sanitary risk.

Materials and methods

Study area

The study was conducted in four regions of Cameroon: the center, the south, the littoral and the west regions as shown in Fig. 1. The west region covers 13.872 km^2 and is mountainous, marked by highlands with a mean altitude of 1600 m and narrow valleys with catchments separating them. The climate has a unimodal wet season. The population density is relatively high, with about 143 inhabitants/km^2 (BUCREP, 2010). The central region covers 68.926 km^2 and is composed of rolling hills on a vast plain with a mean altitude of 700–800 m, with lowered mounds. The climate has two wet seasons. The population density is low, with about 36 inhabitants/km^2 (BUCREP, 2010; NIS, 2006). The south region covers an area of 47.110 km^2, with a population of about 534.900 inhabitants and a density of 13.4 inhabitants per km^2

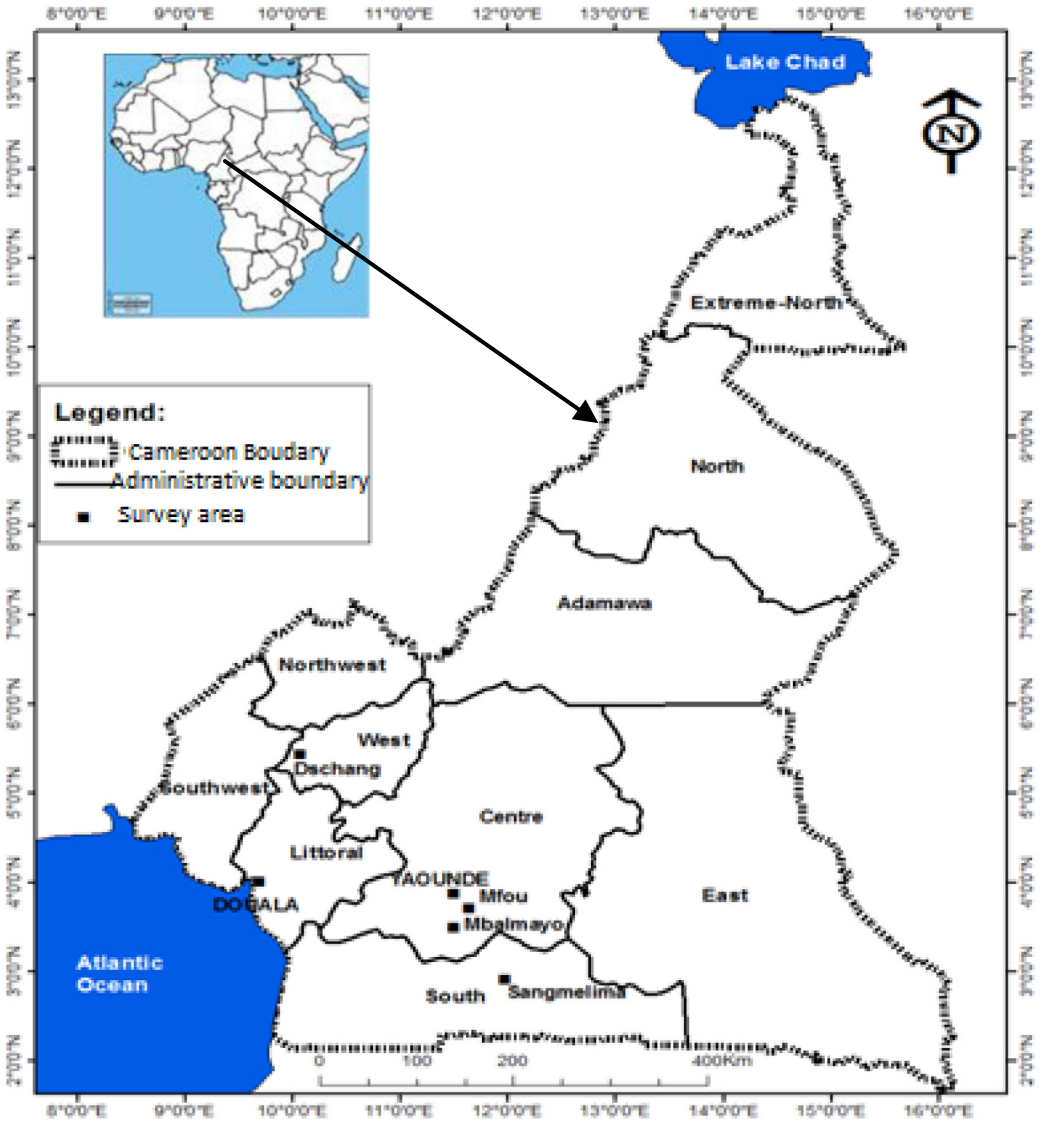

Fig. 1. Map of survey area.