



## INTEGRATED ANIMAL-FISH FARMING IN SOUTHERN BRAZIL: PRACTICES, CHALLENGES, OPPORTUNITIES AND DIFFICULTIES

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### ABSTRACT

In Santa Catarina state, the fish farming has characteristics that distinguish it from other states, as it is developed mostly in small farms. In these small farms the integration of production occurs by using corn as the main component for pig diet and pig manure is often used to fertilize corn, wheat and soybean. In this context, the integration with fish farming emerged as a complementary activity aiming to increase pig's income. The integrated pig-fish farming developed in Santa Catarina consist of a polyculture based on Chinese model coupled with pig manure utilization. The main species utilized is common carp (*Cyprinus carpio*) and Nile tilapia (*Oreochromis niloticus*), combined with herbivorous carp (*Ctenopharyngodon idella*) which feeds on aquatic plants, silver carp (*Hypophthalmichthys molitrix*) which feeds on phytoplankton. Other species like catfish Jundiá (*Rhamdia quelen*) are eventually used. The association of these species aims to rationally take advantage of the natural fertilization of the water by addition of pig manure and pig feed losses, which fall directly into the pond as pigs are reared in wooden structures over or beside of the water surface. Two main types of pig-fish integrated systems are developed in Santa, i.e. the traditional and the MAVIPI (Upper Itajaí Valley Model of Integrated Fish farming). Basically, the main differences between the MAVIPI and the traditional integrated pig-fish farming in Santa Catarina consist in the use of feed fish, mechanical aeration, control in the number of pigs and water management. One of the main goals of the integration pig-fish farming is the reduction of production costs of the fish activity and the realization of scope economies by sharing resources and manpower. The use of swine manure for the fertilization of the ponds can reduce the cost of production of fish farming by up to 70%. Despite offering an ecological and low cost way to produce fish, the integrated pig-fish systems in southern Brazil have presented a stagnation or even reduction in the volume in number of producers. Official statistics do not consider these types of data but personal opinion from several experts demonstrate a decline instead an increase of more intensive systems. The main reasons limiting the expansion of the integrated pig-fish farming systems in southern Brazil are: (a) *Low profitability*: the reduced cost or higher profit per kilo do not results always in higher profitability, as it is determined by the combination of productivity per area (production cycles x biomass per cycle) and profit margin per kilogram of fish sold (sales value less cost of production). At this point, the integrated systems can present a low profitability compared to the more intensive systems; (b) *Cultural restrictions in new markets*: despite being well accepted in the local market, the fish from integrated systems can face resistance of consumers in the other regions of Brazil. Although there is scientific evidence to support the quality of the product and the safety for consumption, it is hard to convince the Brazilian consumers to buy fish that have been produced in ponds fertilized with pig manure.

**Key-words:** Integrated systems, fish farming, pig, southern Brazil.