

Estimating Employment in World Aquaculture

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Background

As part of its ongoing efforts to evaluate the socio-economic impacts of aquaculture development, the Aquaculture and Management Conservation Service (FIRA) has recently completed a series of estimates of world employment in aquaculture. Despite the important contribution to national economies made by aquaculture over the last three decades, a systematic estimation of employment in the sector at a global scale has yet to be completed. This article presents preliminary results of an *ad hoc* estimation as part of an ongoing project on socio-economic impacts of aquaculture, generated information of which will be fed into the forthcoming “Global Conference on Aquaculture 2010”. The figures presented include direct and indirect jobs.

Most of the data used in this estimation were obtained from FAO employment statistics database. Additional data were obtained from the 2005 FAO Regional Reviews on Aquaculture Development, the National Aquaculture Sector Overview (NASO) fact sheets, and employment databases maintained by national governments.

Although the FAO database covered the period 1970-2008, many of the data were very fragmented for a large number of countries; while most data obtained from other sources, referred only to the period 2000-2005, with 2005 bearing the most complete information. Thus, a global estimate for employment in world aquaculture was attempted only for the year 2005.

Methodology

The FAO database contains information on direct (on-farm) full-time, part-time and occasional employment in aquaculture. Based on the definition of each type of direct employment¹, part-time and occasional employments were converted to

direct full-time-equivalent jobs. Data from other sources were treated in the same way. Countries were grouped in eight major geographical regions (Table 1). They included 88 countries that accounted for 97 percent of world aquaculture production in 2005.

The next step was to estimate labor productivity in each country, which represents tonnes of aquaculture output produced by one full-time equivalent worker. Weighted averages of the labor productivity estimates were then computed within each geographical region. They were used to estimate employment in countries for which this information was lacking. In doing so, the regional weighted average labor productivities were used as proxies for labor productivities in these countries.

Data on employment multipliers (number of indirect jobs² generated by each direct job) were available for a reduced number of countries within each of the eight regions, except Oceania. Following the procedure previously outlined to come up with countries' labor productivity where this indicator was lacking, a weighted average multiplier was produced for each region and was used as a proxy for the multipliers in those countries for which data were not available. The employment multipliers were then used to estimate indirect employment in each country.³

Results

Results of this exercise, presented in Table 1, indicate that aquaculture employs about 23.4 million full-time-equivalent workers worldwide, which includes 16.7 million direct and 6.8 million indirect jobs.

Most employment is generated in Far East (plus India). The region accounts for 92 percent (21 518 099) of total employment (23 411 178),

which matches approximately its world aquaculture production share (91 percent). As expected, labor productivity is highest in North America and Europe (55 and 21 tonnes/man-year, respectively), an indication that the aquaculture sector in these countries is highly industrialized, relying on machinery for production and, as such, has a lower demand for manual labor.

Sub-Saharan Africa, Latin America, and Far East (plus India) exhibited the lowest labour productivities (0.46, 2.54 and 3.36 tonnes/man-year, respectively), an indication of comparatively greater supply of low-cost agricultural labor in these regions. For the

same reason, although Sub-Saharan Africa and Latin America represent only 0.2 and 2.6 percent of world production, respectively, they accounted for 1.5 and 3.6 percent of direct jobs in world aquaculture.

The direct employment in aquaculture represents 1.2 percent of the population employed in agriculture worldwide (about 1.35 billion in 2005). Moreover, assuming an average family size of five members, it can be inferred that in 2005 aquaculture contributed, through employment, to the livelihoods of approximately 117 million people, or 1.8 percent of the world population. ■

Table 1. Estimated total employment (direct and indirect) in world aquaculture, 2005. Numbers may not add up due to rounding.

World region (No. of Countries)	Aquaculture production (tonnes)	Labor productivity (tonnes/man-year)	Direct employment (number of direct, full-time on-farm jobs)	Average employment multiplier ^a	Indirect employment (number of indirect jobs)	Total employment (direct + indirect)
Far East plus India (17)	52 326 782	3.36	15 592 825	0.38	5 925 274	21 518 099
Rest of Asia (8)	305 590	9.49	32 193	1.07	34 325	66 518
North Africa (4)	546 964	8.84	61 873	0.59	36 505	98 377
Sub-Saharan Africa (9)	111 340	0.46	244 435	1.40	342 209	586 643
Latin America (20)	1 519 180	2.54	597 968	0.47	296 500	894 469
North America (2)	667 694	55.41	12 050	1.61	21 117	33 168
Europe (26)	2 131 086	20.70	102 955	0.85	88 724	191 679
Oceania (2)	159 222	11.63	13 694	0.62	8 531	22 225
TOTAL	57 767 858		16 657 993		6 753 185	23 411 178

^a Number of indirect jobs generated by each direct job

¹The definitions used in the FAO employment database are as follows: i) Full-time: individuals receiving at least 90 percent of their livelihood from farming or spending at least 90 percent of their working time in that occupation; ii) Part-time: individuals receiving at least 30 percent but less than 90 percent of their livelihood from farming or spending at least 30 percent but less than 90 percent of their working time in that occupation; and (iii) Occasional: individuals receiving

under 30 percent of their livelihood from farming or spending under 30 percent of their working time in that occupation.

²Indirect jobs are those associated with ancillary activities such as building of infrastructure (ponds, cages, tanks, etc.), feed and seed production, manufacturing of fish processing equipment, packaging, marketing and distribution.

³Indirect employment = direct employment (full-time-equivalent number of jobs) * employment multiplier.