



The aquaculture supply chain in the time of covid-19 pandemic: Vulnerability, resilience, solutions and priorities at the global scale



M.C. Mangano ^{a,*}, M. Berlino ^{b,c}, L. Corbari ^{b,d}, G. Milisenda ^a, M. Lucchese ^{b,c}, S. Terzo ^{b,aq,ar}, M. Bosch-Belmar ^b, M.S. Azaza ^e, J.M.F. Babarro ^f, R. Bakiu ^g, B.R. Broitman ^h, A.H. Buschmann ⁱ, R. Christofoletti ^j, Y. Dong ^k, B. Glamuzina ^l, O. Luthman ^m, P. Makridis ⁿ, A.J.A. Nogueira ^o, M. G. Palomo ^p, R. Dineshram ^q, P. Sanchez-Jerez ^r, H. Sevgili ^s, M. Troell ^t, K.Y. AbouelFadl ^u, M. N. Azra ^v, P. Britz ^w, E. Carrington ^x, I. Celić ^c, F. Choi ^y, C. Qin ^z, M.A. Dionísio ^{aa}, T. Dobroslavić ^l, P. Galli ^{ab}, D. Giannetto ^{ac}, J.H. Grabowski ^y, B. Helmuth ^y, M.J.H. Lebata-Ramos ^{ad}, P.T. Lim ^{ae}, Y. Liu ^{af}, S.M. Llorens ^{ag}, S. Mirto ^{ah}, M. Pećarević ^l, C. Pita ^{ai,aj}, N. Ragg ^{ak}, E. Ravagnan ^{al}, D. Saidi ^{am}, K. Schultz ^y, M. Shaltout ^{an}, S.H. Tan ^{ao}, V. Thiagarajan ^{ap}, G. Sarà ^b

^a Department of Integrated Marine Ecology, Stazione Zoologica Anton Dohrn, Sicily Marine Centre, Lungomare Cristoforo Colombo (complesso Roosevelt), 90142 Palermo, Italy

^b Laboratory of Ecology, Earth and Marine Sciences Department, University of Palermo Viale delle Scienze Ed. 16, 90128 Palermo, Italy

^c National Institute of Oceanography and Applied Geophysics - OGS, via A. Piccard 54, Trieste, 34151, Italy

^d Department of Engineering, University of Palermo, Viale delle Scienze, Ed. 8, 90128 Palermo, Italy

^e Aquaculture Laboratory, National Institute of Marine Science and Technology, 2025 Salammbô, Tunis, Tunisia

^f Instituto de Investigaciones Marinas IIM-CSIC, Eduardo Cabello 6, 36208 Vigo, Spain

^g Department of Aquaculture and Fisheries, Agricultural University of Tirana, Tirane, Albania

^h Departamento de Ciencias, Universidad Adolfo Ibáñez, Viña del Mar Chile & Millennium Institute for Coastal Socio-Ecology (SECOS), Chile

ⁱ Centro i-mar & CeBiB, Universidad de Los Lagos, Puerto Montt, Chile

^j Institute of Marine Sciences, Federal University of São Paulo (UNIFESP/IMar), Brazil

^k The Key Laboratory of Mariculture, Ministry of Education, Fisheries College, Ocean University of China, Qingdao 266003, China

^l Department of Applied Ecology, University of Dubrovnik, Čira Carića 4, 20000 Dubrovnik, Croatia

^m School of Natural Science, Technology and Environmental Studies, Södertörn University, Alfred Nobels allé 7, 141 89 Huddinge, Sweden

ⁿ Department of Biology, University of Patras, University Campus, Rio Achaias 26504, Greece

^o Departamento de Biología & CESAM, Universidade de Aveiro, Campus de Santiago, 3810-193 Aveiro, Portugal

^p Laboratory of Marine Ecology, Natural History Museum of Argentina, CONICET, Argentina

^q Biological Oceanography Division, CSIR-National Institute of Oceanography, Dona Paula, Goa 403004, India

^r Department of Marine Science and Applied Biology, University of Alicante. Ap.C. 99, Spain

^s Fisheries Application and Research Center & Department of Aquaculture, Egirdir Faculty of Fisheries, Isparta University of Applied Sciences, Çünür, Isparta, Turkey

^t Stockholm Resilience Centre, Stockholm University, Kräftriket 2B, 10691 Stockholm, Sweden and Beijer Institute of Ecological Economics, Royal Swedish Academy of Sciences, SE-104 05 Stockholm, Sweden

^u Aquatic ecology Department, Faculty of Fish and Fisheries Technology, Aswan University, Egypt

^v Institute of Marine Biotechnology, Universiti Malaysia Terengganu, 21030 Terengganu, Malaysia

^w Rhodes University, Department of Ichthyology and Fisheries Science, Grahamstown, South Africa

^x Department of Biology and Friday Harbor Laboratories, University of Washington, 620 University Road, Friday Harbor, WA 98250, USA

^y Northeastern University Marine Science Center, 430 Nahant Rd Nahant, MA 01908, USA

^z South China Sea Fisheries Research Institute, Chinese Academy of Fishery Sciences, China

^{aa} MARE—Marine and Environmental Sciences Centre, Faculty of Science, University of Lisbon, Campo Grande, 1749-016 Lisbon, Portugal

^{ab} Department of Earth and Environmental Sciences, University of Milano-Bicocca, Italy

^{ac} Department of Biology, Faculty of Science, Muğla Sıtkı Koçman University, 48000 Muğla, Turkey

^{ad} Aquaculture Department, Southeast Asian Fisheries Development Center, Tigbauan, Iloilo 5021, Philippines

^{ae} Bachok Marine Research Station, Institute of Ocean and Earth Sciences, University of Malaysia, 16310 Bachok Kelantan, Malaysia

^{af} Faculty of Biosciences, Fisheries and Economics, UiT The Arctic University of Norway, Norway

^{ag} Departamento de Ciencia Animal, Universitat Politècnica de València, Spain

^{ah} Institute of Anthropic Impact and Sustainability in Marine Environment, National Research Council (IAS-CNR), Lungomare Cristoforo Colombo 4521, 90142 Palermo, Italy

^{ai} International Institute for Environment and Development (IIED), London, United Kingdom

* Corresponding author.

E-mail address: mariacristina.mangano@szn.it (M.C. Mangano).