AQUATIC LIFE INSTITUTE

March 14, 2023

Dr. Enrique Luis Graue Wiechers,
Rector
Universidad Autónoma de México

Aquatic Life Institute is an international non-profit organization dedicated to improving the welfare conditions of aquatic animals exploited in the food system. Supported by a coalition of nearly 120 organizations around the world, we are writing to your institution to express our concern and objection to research being carried out by the Universidad Autonoma de Mexico Sisal campus, and its partner Moluscos del Mayab, regarding the farming of octopuses. We published a report highlighting the concerning aspects of the farm operation in the UNAM Sisal center.

Establishing a global industry of intensive octopus and/or cephalopod production is highly problematic. Several farms of this type are in operation or planned in Mexico (UNAM), Spain, Japan, and until its recent closure, in Hawaii, United States.

Sustainable octopus farms are not feasible. Sustainable development by definition refers to meeting the demands of current generations without jeopardizing the needs of future generations, taking into account economic growth, environmental care, and social well-being. Under these principles, octopus farms cannot be sustainable.

Numerous animal and environmental protection organizations, scientists, and politicians have expressed serious concerns about these projects, since they present risks to animal welfare, biodiversity and biosafety, environmental degradation, antibiotic resistance, public health, food safety, and the livelihoods of coastal communities. In the attached document you will find an in-depth analysis of these risks.

Policy makers are taking a stance against these unsustainable farming practices and proposals as recently witnessed in Hawaii where an octopus farm was shut down, and Washington State, where a bill is making its way through the state legislature that will ban all future octopus farming endeavors.

Due to the arguments set forth in the attached document, the undersigned organizations are strongly opposed to the operation of this farm and the current focus of the research facility. UNAM is committed to sustainability and is a proud

supporter of changing systems to improve environmental conservation. As such, a project of this nature is contrary to the values of the university.

Institutions such as UNAM must focus on more sustainable food systems than current overfishing and overexploitation practices, such as shifting from farmed carnivorous species to herbivorous or omnivorous species, extractive species, and systems where animals and their food are co-produced and fed a more herbivorous diet. We advocate switching to plant-based alternatives (both for animal feed and human consumption), especially in the global north where substitutes are widely available. In addition, recovery programs for declining wild cephalopod species should be supported by the implementation of temporary or complete fishing bans and marine protected areas. The UN high seas treaty was approved recently on March 6th, which aims to protect 30% of the world's oceans by 2030, and UNAM should look to support alignment to these global objectives for conservation.

Given all the potential long-term risks of this project, we the undersigned, urge UNAM University to end the program and instead focus on projects that truly promote the conservation of the Mayan octopus and other species of the local ecosystem, and that benefit the food security and livelihoods of the coastal community. Thus, the Sisal community and UNAM can be recognized worldwide for being allies and defenders of the octopus. Aquatic Life Institute would be very interested in collaborating with the institution in this regard.

We look forward to hearing from you.

Signatories

Action for Protection of Animals Africa
Action For Dolphins
AEL Advocacy
Africa Network for Animal Welfare USA
African Marine Mammal Conservation Organization
Alexandria Turtle And Wildlife Rescue
Alianima
Anima International
Anima Naturalis
ANIMAL
Animal Advocacy Africa
Animal Advocates International
Animal Aid
Animal Empathy Philipines

Animal Equality
Animal Friends Croatia
Animal Justice Canada
Animal Interfaith Alliance
Animal Kingdom Foundation
Animal Law Italia
Animal Nepal
Animal Rights Center Japan
Animal Rights Initiative
Animal Society e.V.
Animals Aotearoa
Animals Don't Speak Human
Animal Welfare Advocates Association the Gambia
Animal Welfare Concern
Animals Australia
Animals Now
Apon Welfare
Aquatic Life Institute
ARAF-PLATEAU DOGON
ARBA
Arusha Society for the Protection of Animals
Aware
BC SPCA
Catholic Concern for Animals
CDMX Animal Save
CDMX Climate Save
Coalition of African Animal Welfare Organisations
Compassion in World Farming
Conservative Animal Welfare Foundation
Crustacean Compassion
The Dark Hobby
Deutscher Tierschutzbund
Dharma Voices for Animals
Dieren Bescherming
Djurens Rätt
Dyrenes Alliance
Education for African Animals Welfare
Essere Animali
Estonian Union for the Protection of Animals
Ethical Farming Ireland
FAADA
Factory Farming Awareness Coalition

Feedback Global
Fish Welfare Initiative
F.R.E.E
Fórum Animal
Friends of Phillip
Ghana Animal Welfare Society
Green REV Institute
Humane Africa Trust
The Humane Global Network
The Humane League
Humánny pokrok
In Defense of Animals
Institute of Animal Law Asia
Invisible Animals (Nevidimi Zhivotni)
Kafessiz Türkiye
Kitwe Animal Welfare Society
Kurdistan Organization for Animal Rights Protection
Kyma
L214
Lady Freethinker
Lilongwe Society for Protection and Care of Animals
National Council of SPCAs
Nepal Animal Welfare and Research Center (NAWRC)
Nurture Imvelo Trust
Ocean Born Foundation
Oikeutta eläimille
OIPA - International Organization for Animal Protection
ONG Sante Animale Afrique (SAA)
Plataforma ALTO
Planet For All
Protección Animal Ecuador (PAE)
Proyecto ALA
PAZ
RENCTAS
Rwanda Animal Welfare Organization (RAWO)
SAFCEI
SAFE
Samayu
Sea First
Sentient Media
Shellfish Network
Shrimp Welfare Project

Sibanye Animal Welfare and Conservancy Trust
Sinergia Animal
Sống Thuần Chay
SPCA Montreal
SPCA New Zealand
SPCA Selangor
Tanzania Animals Protection Organization
Tanzania Animal Welfare Society (TAWESO)
Tikobane Trust
Tourists Against Trophy Hunting
University of Guilan
Utunzi Animal Welfare Organization
Vegetarianos Hoy
Vissenbescherming
Voices for Animals
Voters for animals rights
We Animals
Welfare Footprint Project (Center for Welfare Metrics)
Welfarm
West Africa Centre for the Protection of Animal Welfare (WACPAW)
WTS

AQUATIC LIFE INSTITUTE

animal EQUALITY

ANIMAL FRIENDS CROATIA

ANIMAL JUSTICE

Animal Interfaith Alliance

AKF ANIMAL PROTECTION

ALI

animalNEPAL.org

ANIMAL RIGHTS CENTER

ANIMAL RIGHTS INITIATIVE

ANIMALS AOTEAROA

Animals Don't Speak Human

ANIMAL WELFARE ADVOCATES ASSOCIATION THE GAMBIA

Animals Australia for a *kinder* world

APON

ASSOCIATION ARAF-PLATEAU DOGON Tél: 76 22 55 60 Bandiagara-Mali

arba

ARUSHA SOCIETY FOR THE PROTECTION OF ANIMALS ASPA

AWARE (사)동물복지문제연구소 어웨어

BCSPCA

CATHOLIC CONCERN FOR ANIMALS

CDMX ANIMAL SAVE · ANIMAL SAVE MOVEMENT ·

CDMX CLIMATE SAVE · CLIMATE SAVE MOVEMENT ·

CAAWO Coalition of African Animal Welfare Organisations

DEUTSCHER TIERSCHUTZBUND

Dharma Voices For Animals®

DIEREN BESCHERMING

Djurens Rätt.

DYRENES ALLIANCE

AQUATIC LIFE INSTITUTE

EAAW

ESSEREANIMALI

Eestimaa Loomakaitse Liit

EFI Ethical Farming Ireland

FADA

FFAC FACTORY FARMING AWARENESS COALITION

FEED BACK

FREE Freedom and Respect for Every Earthling

Friends of Philip

Animal Welfare League AWL

REV .institute

HUMANE HOA AFRICA

THE HUMANE GLOBAL NETWORK

THE HUMANE LEAGUE

IN DEFENSE OF ANIMALS

IALA Institute of Animal Law of Asia

НЕВИДИМИ ЖИВОТНИ

Kafessiz Türkiye

Kurdistan Organization of Animal Right Protection

КУМА sea conservation & research

éthique & animaux L214

LSPCA Lilongwe Society for the Protection and Care of Animals

DBV SPCA National Council of SPCAs

NEPAL ANIMAL WELFARE AND RESEARCH CENTER (NAWRC)

NURTURE IMVELO TRUST

Ocean Born

oikeutta eläimille

OIPA International Organization for Animal Protection

SANTE ANIMALE ONG SAA Afrique

¡ALTO! Animales Libres de Tortura

AQUATIC LIFE INSTITUTE

Planet for All

Pae Protección animal ecuador

Proyecto ALA
ANIMALES LATINO AMÉRICA

Paris Animaux Zoopolis

Renctas

RWANDA ANIMAL WELFARE ORGANIZATION (RAWO)

safcei
SOUTHERN AFRICAN FAITH COMMUNITIES' ENVIRONMENT INSTITUTE

SAFE For Animals
Ngā Kararehe Haumaru

SAMAYU

SEA FIRST

SHELLFISH NETWORK
Fighting neglected cruelty

SHRIMP WELFARE PROJECT

SIBANYE ANIMAL WELFARE & CONSERVANCY
SAWC TRUST

sinergia ANIMAL

sống thuần chay

SPCA MONTRÉAL

SPCA

spca

TAPO
Tanzania Animals Protection Organization
Improves the Lives of Animals

TAWESO
TANZANIA ANIMAL WELFARE SOCIETY

Community Development through Conservation and Animal Welfare
TIKOBANE TRUST

Tourism & Guide Trophy Hunting (T&TH)
University of Guilan

UTUNZI
ANIMAL WELFARE

VEGETARIANOSHOY

VISSEN BESCHERMING

ГОЛОСА ЗА ЖИВОТНЫХ

VOTERS FOR ANIMAL RIGHTS

WE ANIMALS MEDIA

WELFAREFOOTPRINT PROJECT

welfarm
Protection mondiale des animaux de ferme

WEST AFRICA CENTRE FOR THE PROTECTION OF ANIMAL WELFARE (WACPAW)
Putting the welfare of animals first

WTS
Welttierschutz-stiftung

AQUATIC LIFE INSTITUTE

ANNEX 1

RISKS RELATED TO THE INTENSIVE EXPLOITATION OF OCTOPUS IN AQUACULTURE

Risks related to animal welfare

In November 2021, the UK extended the scope of the animal welfare bill (Sentience bill) to recognize octopuses and cephalopod molluscs (squid, cuttlefish, etc.) as sentient beings (that can reason, learn and experience sensations) after the findings of an independent review by the London School of Economics and Political Science (LSE) commissioned by the UK government. The five-year project drew on more than 300 existing scientific studies to reach a conclusion of sentience, and the authors recommended that the government expand its definition of animal welfare to include these animals. This report eventually led to the inclusion of cephalopods in the UK Animal Welfare Act.

Paradoxically, at the UNAM research center in Sisal, they have also carried out studies that highlight the intelligence of the octopus. A preprint study shows that *O. Maya* can differentiate between a new object and a known one, with great precision. To achieve object recognition, octopuses use both visual and tactile exploration for new objects, while familiar objects are only explored by touch. This experiment shows that octopuses have an extraordinary memory[1].

Scientists have highlighted the many problems with octopus farming, all of which are related to the fact that these animals, like many others, are in no way, shape or form suitable for large-scale factory farming. Aquatic Life Institute (ALI) draws on 5 pillars of well-being in our recommendations for key decision makers, in addition to other wellness concerns listed below:

1. Environmental enrichment:
   They are intelligent and curious. They would require a high level of enrichment that would not be possible in a farm setting, resulting in extreme boredom and chronic mental and physical stress. The farm in Sisal claims to be experimenting with different types of enrichment, however it is not feasible to replicate the true diversity of its natural ecosystem.
2. Feed composition:
   Recent studies have shown that octopuses are voracious and active carnivores; have complex feeding behavior ranging from detection to consumption of

[1] "Novel Object Recognition in Octopus maya. - Research Square". March 11, 2022,https://www.researchsquare.com/article/rs-1439375/v1.pdf.

prey[2] . Their nutritional requirements put further pressure on existing wild populations commonly used for fishmeal/fish oil for the aquaculture industry, including many species that could also be used for human consumption. Species utilized for this farm's feed, such as crab and squid, could instead be redirected to local human consumption.

3. Population density and space requirements:
   These animals are solitary by nature. High stocking densities, which is standard industry practice to increase production on farms, results in high levels of aggression, cannibalism, and social stress. The Sisal farm has reported a mortality rate of 52%, of which 30% is directly related to cannibalism.
4. Water quality:
   They are very fragile due to the lack of an internal or external skeleton, and can be very susceptible to sudden changes in their environment and human manipulation.
5. Stun and Kill:
   Currently, there is no humane method of killing octopus. Slaughter methods have been studied, however none have been scientifically approved as humane.
6. Transportation and Handling:
   a. Transport of any live octopus could pose a significant threat to its well-being and survival due to stringent environmental requirements. High mortality rates and transportation costs could be expected.
   b. Captive conditions, handling and transport can cause injury. For example, *O. vulgaris* may fight if transported together and eventually bite or cannibalize each other.[3].
7. Health and Medical Treatment:
   a. The main threats to octopus disease are water quality problems, physical injury, and infection (due to parasites or other pathogens), all of which can be interrelated. The risk of disease is exacerbated by crowded conditions.
   b. The octopus's immune system is poorly understood to date. The lack of genomic information makes it difficult to understand vital processes such as immune defense mechanisms and their interaction with pathogens at the molecular level. To date, no treatment plans, prevention strategies, or risk assessments have been developed at the farm level.
   c. In terms of breeding, broodstock welfare considerations are non-existent.

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[2] "Octopus insularis (Octopodidae), evidence from a specialist..." August 8, 2009,https://link.springer.com/article/10.1007/s00227-009-1264-4.

[3]Borrelli, L, Gherardi, F, Fiorito, G. A catalog of body patterns in the Cephalopoda, Naples, Italy: A. Dohrn Zoological Station; Florence University Press, 2006, pp. 626–626.

d. Large-scale aquatic farms are a breeding ground for pathogenic bacteria and thus contribute to the overuse of antibiotics and the dangerous creation of multi-resistant bacteria.
e. Pathogens associated with skin lesions (Photobacterium swingsii, Lactococcus garvieae, and betanodavirus) have been found in dead octopuses in previous studies.[4].

Environmental concerns

1. Octopus farming raises significant environmental concerns due to the production of new effluents and their subsequent discharge into surrounding ecosystems.
2. Extensive evidence gathered from around the world[5][6], has shown that the intensive farming of other carnivorous species, such as salmon, has caused the progressive and severe destruction of related wild species due to the spread of pathogens, competition, genetic abnormalities and many other factors. There is profound concern that this farm would cause similar impacts on the already vulnerable and declining wild *O. maya* population in the Yucatan peninsula.
3. Octopus farm escapes could also threaten local habitats and animal populations with a high potential of transferring any on-farm diseases, antibiotics, etc. Octopus are notorious for escaping their enclosures.
4. One of the objectives proposed by the research center is to support the conservation of *O. maya*. However, since the final product of the farm are octopuses of around 250 grams, it is a product with a different market than the octopus obtained by fishing methods in the region, which can only be extracted after 450 grams, according to guidelines established by the federal government[7]. Therefore, this farm does not contribute to conservation efforts to reduce overfishing in this region.

Public health concerns

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[4]Fichi, G, et al. "Pathogens Associated with Octopus vulgaris Skin Lesions: First Detection of Photobacterium Swingsii, Lactococcus Garvieae, and Betanodavirus". Diseases of Aquatic Organisms, Vol. 115, no. 2, July 23, 2015, pp. 147–156, 10.3354/dao02877.
[5]Fichi, G, et al. "Pathogens Associated with Octopus vulgaris Skin Lesions: First Detection of Photobacterium Swingsii, Lactococcus Garvieae, and Betanodavirus". Diseases of Aquatic Organisms, Vol. 115, no. 2, July 23, 2015, pp. 147–156, 10.3354/dao02877.
[6] "A global assessment of the impacts of salmon aquaculture on wildlife..." February 12, 2008,https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.0060033.
[7] "Definen peso y talla mínima para captura de Pulpo en el Golfo de ...." 8 Mar. 2019, https://www.gob.mx/inapesca/es/articulos/definen-peso-y-talla-minima-para-captura-de-pulpo-en-el-golfo-de-mexico-y-mar-caribe?idiom=es.

1. *Todarodes pacificus* (Japanese flying squid) have been reported as positive for Betanodavirus,[8] an agent of a serious viral disease known as VER (viral encephalopathy and retinopathy) has been detected in a wide range of vertebrate and invertebrate hosts worldwide and has caused severe mass mortalities in both farmed and wild marine organisms[9]. Betanodavirus was also identified in skin lesions, in the eye, and in the branchial heart of *O. vulgaris*.[10,11]
2. A wide variety of pathogens have been isolated from infection sites of octopuses and squids in a laboratory[12]:*Acinetobacter lwoffi, A. hydrophila, Cytaphaga sp, P. putrifaciens, P. stutzeri, Vibrio alginolyticus, V. carchariae, V. costicola, V. cholerae, V. damsela, V. fluvialis, V. natriegenes, V. parahaemolyticus, V. pelagius (biovar 2)*.
    - *Vibrio spp*. It is considered a significant problem for the development of the aquaculture sector and generates severe economic losses worldwide.
    - Vibrios are gram-negative, ubiquitous in marine and estuarine ecosystems, as well as in aquaculture farms, and are one of the main microbiota of these ecosystems. Many vibrios are serious pathogens for animals raised in aquaculture.
    - Cholera is a potentially zoonotic epidemic (transmitted from animals to humans) and life-threatening secretory diarrhea characterized by numerous bulky watery stools, often accompanied by vomiting, resulting in hypovolemic shock and acidosis. It is caused by certain members of the species *Vibrio cholerae*.
    - Cholera is endemic or epidemic in areas with poor sanitation; it occurs sporadically or as limited outbreaks in developed countries. In coastal regions it can persist in plankton.[13]

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[8]Gomez, DK, Mori, K, Okinaka, Y, Nakai, T, Park, SC. Whitebait can be a source of betanodavirus for farmed marine fish. Aquaculture 2010; 302: 158–163.

[9]Vendramin N, Patarnello P, Toffan A, Panzarin V, Cappellozza E, Tedesco P, Terlizzi A, Terregino C and Cattoli G. Viral encephalopathy and retinopathy in groupers (Epinephelusspp.) in southern Italy: a threat to wild species in danger of extinction? BMC VetRes 2013; 9: doi:10.1186/1746-6148-9-20.

[10]Vanni A, Fichi G, Cardeti G, Cersini A, Perrucci S, Lenzi F, DeWolf T, Fronte B, Ricci E, Campeis F and Susini F. Potential pathogens in natural populations and in established subjects of Octopus vulgaris. Proceedings of the Italian Society of Fish Pathology, 19th National Congress 2013; 80.

[11]Fiorito, Graziano, et al. "Guidelines for the care and welfare of research cephalopods: a consensus based on an initiative by CephRes, FELASA and the Boyd Group". Laboratory Animals, Vol. 49, no. 2_suppl, September 9, 2015, pp. 1–90, 10.1177/0023677215580006.

[12]Ruth Francis-Floyd, D. V. M. "IAAAM 1987." VIN.com, 10 May 1987, www.vin.com/apputil/content/defaultadv1.aspx?pId=11104&id=3981710&print=1.

[13]Finkelstein, Richard A. "Cholera, Vibrio Cholerae O1 and O139, and other pathogenic vibrios." Nih.gov, University of Texas Medical Branch at Galveston, 2015,www.ncbi.nlm.nih.gov/books/NBK8407/.

- Octopus farming could become a serious public health risk, as captive cephalopods could be vectors of multiple unknown pathogens and zoonotic diseases such as cholera.

3. These treatments (antibiotics and protozoacides) used against diseases were applied to octopuses in various doses, durations and frequencies: Acetic acid, antimony, acriflavine, amikacin sulfate, atabrine, calcium hypochlorite, cefotaxime, chloramphenicol, formalin, furazolidone, gentamicin sulfate, kanamycin, malachite Green, metronidazole, minocycline hydrochloride, neomycin sulfate, neosporin, nifurpirinol, nitrofurazone, oxytetracycline hydrochloride, panos and piperacillin.

Some of these compounds, such as malachite green, have been banned in several EU member states. Denmark banned the compound in the 1990s. Many of these antibiotics are used to treat diseases in humans, so their use in octopuses significantly increases the risk of antibiotic resistance, posing a serious threat to public health of humans, animals and the environment, as established in the report of the United Nations Environment Program, UNEP, in 2021.[14]

Additional concerns

1. Proper Employee Training:
   There are no octopus-specific training programs for farm employees. Octopuses are fragile and require high levels of care when any type of handling occurs. Care would be compromised during production due to population densities, lack of knowledge, and "fast" procedures.
   There are no safety protocols for employees on the farm, as can be seen in the photographs of this article published by UNAM. Octopuses can pose serious health risks to humans when mishandled. Evidence shows that all octopus species are poisonous[15] and can cause possible adverse health conditions in humans.[16]
2. Data-driven approach, record keeping and reporting:
   Adequate, regular, and detailed monitoring procedures or emergency preparedness plans related to imminent environmental damage or threats do not exist as an industry standard at this time.
3. Legislative Considerations:

[14]Summary of the environmental dimensions of antimicrobial resistance for policy makers.https://wedocs.unep.org/bitstream/handle/20.500.11822/38373/antimicrobial_R.pdf
[15] "Poison Tentacles: Convergence of Toxic Proteins in the Kingdom..."https://pubmed.ncbi.nlm.nih.gov/19294452/.
[16] "Infiltrated plaques resulting from an injury caused by the common..."https://www.researchgate.net/publication/268447002_Infiltrated_plaques_resulting_from_an_injury_caused_by_the_common_octopus_Octopus_vulgaris_A_case_report..

There is currently no legislation that protects the welfare of farmed cephalopods in Mexico, and the species is not currently included in the Mexican National Aquaculture Charter.[17]

4. Livelihoods

   Despite the fact that this farm consistently claims that it is trying to improve the lives of local people, these projects could have detrimental effects on the livelihoods of surrounding communities. The United Nations General Assembly declared 2022 the International Year of Artisanal Fisheries and Aquaculture (IYAFA 2022). This vision statement seeks to develop "A world in which artisanal fishers, fish farmers and small-scale fish workers are fully recognized and empowered to continue their contributions to human well-being, healthy food systems and poverty eradication through the responsible and sustainable use of fishing and aquaculture resources". In Chile and Argentina, for example, large-scale salmon aquaculture has caused severe impacts on local communities, and only produced profits for the big salmon companies. The effects were so detrimental that salmon farms in Tierra del Fuego, Argentina were banned through pressure from local communities, in an effort to recover the ecosystem.

   Industrial cephalopod farming operations could negatively affect traditional artisanal fisheries in the Yucatan, as well as the communities that depend on these activities for their livelihoods. If disease spreads beyond the farm, it could greatly reduce the local population of *O. Maya* on which local communities depend for their livelihoods. In terms of food safety, this product is not intended to provide nutritious and affordable food for local communities, instead it is premium product intended for tourists and higher income populations.

[17] "Agreement by which the update of the Charter is approved...." 15 Apr. 2021, https://www.dof.gob.mx/nota_detalle.php?codigo=5615929&fecha=15/04/2021.