Improving the welfare of farmed pangasius at rearing

COMPASSION in world farming Food Business

Foreword

In order to address farm animal welfare and manage it efficiently throughout their business, food companies are encouraged to write and publicise a corporate policy on farm animal welfare. Pangasius are sentient beings that must be provided with a good quality of life in a farmed environment. The pangasius welfare policy should address the provision of good housing, good feeding, good health and opportunities to express appropriate behaviours to pangasius. High stocking densities, poor water quality, and procedures that require handling, lead to stress and poor welfare.
Any practices that compromise the welfare of pangasius must be addressed in the pangasius welfare policy. Rearing pangasius requires additional management steps which include:

- Careful consideration of farm location
- Health management and action plan developed and supervised by a vet
- Management of transfer and transport with the aim of minimising pain and suffering for the fish.

These requirements are further discussed below and in document 5: Improving the welfare of farmed pangasius.

We recommend

✔ Good Environment

- Maximum stocking density should be limited to 10 kg/m^3 in grow-out for ponds, nets and cages farms. Stocking density should be calculated by taking in consideration the volume of water available for the fish to move and not just the water surface area. The exact density (though always 10 kg/m^3 or lower) should be determined based on water quality, the behavioural and physiological needs of pangasius, health status, production system and feeding method so that welfare is optimised. Depth of pond/pen/cage must be taken into account at each site to ensure a maximum stocking density of 10 kg/m^3.

- Water quality parameters such as dissolved oxygen, unionised ammonia, turbidity and temperature should be monitored continuously. Measurements should be taken not only from surface waters but throughout the depth of the pond/pen/cage. This data is crucial to understanding how the fish behave and aggregate in the pond/pen/cage. When changes in the environment occur which lead to sub-optimal conditions within a pond/pen/cage or if rapid changes are detected, management steps should immediately be taken to address any welfare impacts upon the fish e.g. by oxygenating the water, reducing biomass within a pond/pen/cage. Pangasius should only be reared in regions native to this species to ensure they are reared at suitable temperatures. Distance between farms should be large enough to minimise the risk of pathogen transfer.

✔ Good Feeding

- Food must be of optimal quality for the nutritional needs of pangasius and the feeding method used must ensure all fish have access to food while minimising food wastage to prevent water deterioration and by avoiding any type of aggression or hunger. Fasting periods should only be used when absolutely necessary and when advised by a vet (e.g. prior to a disease treatment). Fasting periods should be no longer than is required for fish welfare benefits (e.g. emptying the gut to prevent water degradation during transport) and should not exceed 48 hours for each fish. Records of the dates and duration of fasting should be kept.

- Compassion also recommends that the amount of fishmeal and fish oil (FMFO) in feed or fish as feed be reduced or eliminated as much as possible, while still providing for the nutrition needs of farmed pangasius. Many FMFO fisheries face sustainability challenges and the welfare of fish caught in FMFO fisheries is poor due to the lack of humane capture, landing and killing. The amount of FMFO can be reduced by replacing it with other ingredients that can meet nutritional requirements, e.g. shrimp head meal, golden apple snail meal, groundnut cake, sweet potato leaf meal and cassava leaf meal.[1]

✔ Good Health

- All treatments and vaccines should be recorded and be included in a veterinarian health and welfare plan which should also include an assessment of the fish for suitability before any disease treatment or management procedure. The veterinarian health and welfare plan should outline planned husbandry procedures, risk assessments, disease monitoring and all treatments carried out. Antimicrobials should not be use prophylactically and the quantity, active ingredient and reason for use should be recorded. Quality of antimicrobials and any other drug must be assessed prior to the start of the treatments to avoid exposing pangasius to unnecessary chemicals. Banned antimicrobials and chemicals shall not be used.

✔ Opportunities to Express Appropriate Behaviour

- Crowding and handling should be performed only when absolutely necessary, be as gentle as possible, and pangasius must not be out of the water for more than 15 seconds. For both road and boat transport, sufficient water must be used to ensure the fish are able to maintain equilibrium, prevent water quality from deteriorating and oxygen levels must not drop below the recommended levels for the species (2.5-7.5 mg/l). Crowding must not last more than 2 h with 48 h between crowds to allow the fish time to recover. Crowding must be limited to a maximum of two crowding in a week and three in a month. Pangasius should not be repeatedly crowded during harvest. Compassion is against the prolonged starving and crowding of pangasius for acclimation to transport. See our resources for more information.

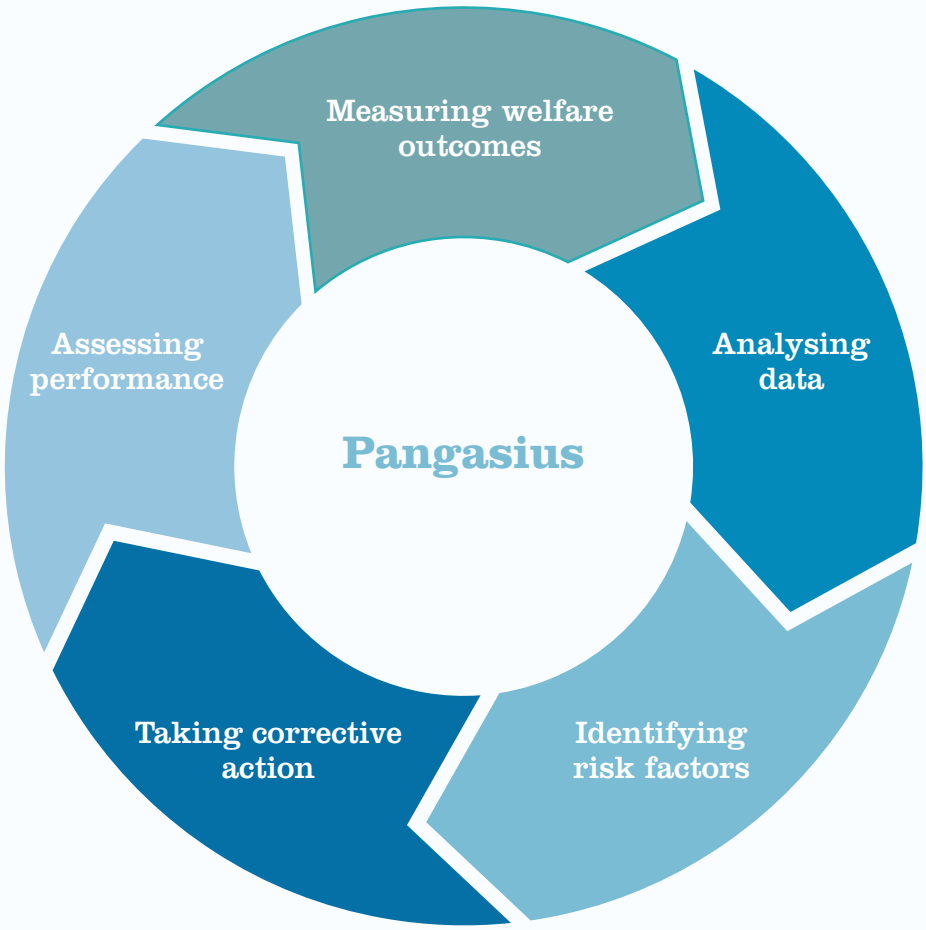
- Pangasius are slow swimmers and are rarely immobile. They become increasingly solitary as they grow however, they scare easily which causes erratic swimming. Pangasius are bottom feeders and naturally feed on a range of organisms including plant matter, plankton, insects and molluscs. Unfortunately, little is known about the full scope of natural behaviours for pangasius and research is needed in this area. Pangasius should be provided with an environment which promotes the expression of known natural behaviours and minimises behaviours such as erratic swimming and frequent air-breathing.

- Welfare outcomes should be measured and recorded for pangasius and include parameters such as swimming behaviour, feeding behaviour, breathing behaviour and physical damage. Further work to develop indicators of positive welfare for pangasius are required (e.g. colouration of the skin on the mouth and belly area).

[1] There is an urgent need to address the high numbers of fish used as feed or fish utilised to formulate pangasius feed with a focus on sustainability of those fisheries and welfare of the fish species. There is also a need for further research into improvements in reducing the proportion of animal protein in feed without negatively impacting the welfare of farmed pangasius.

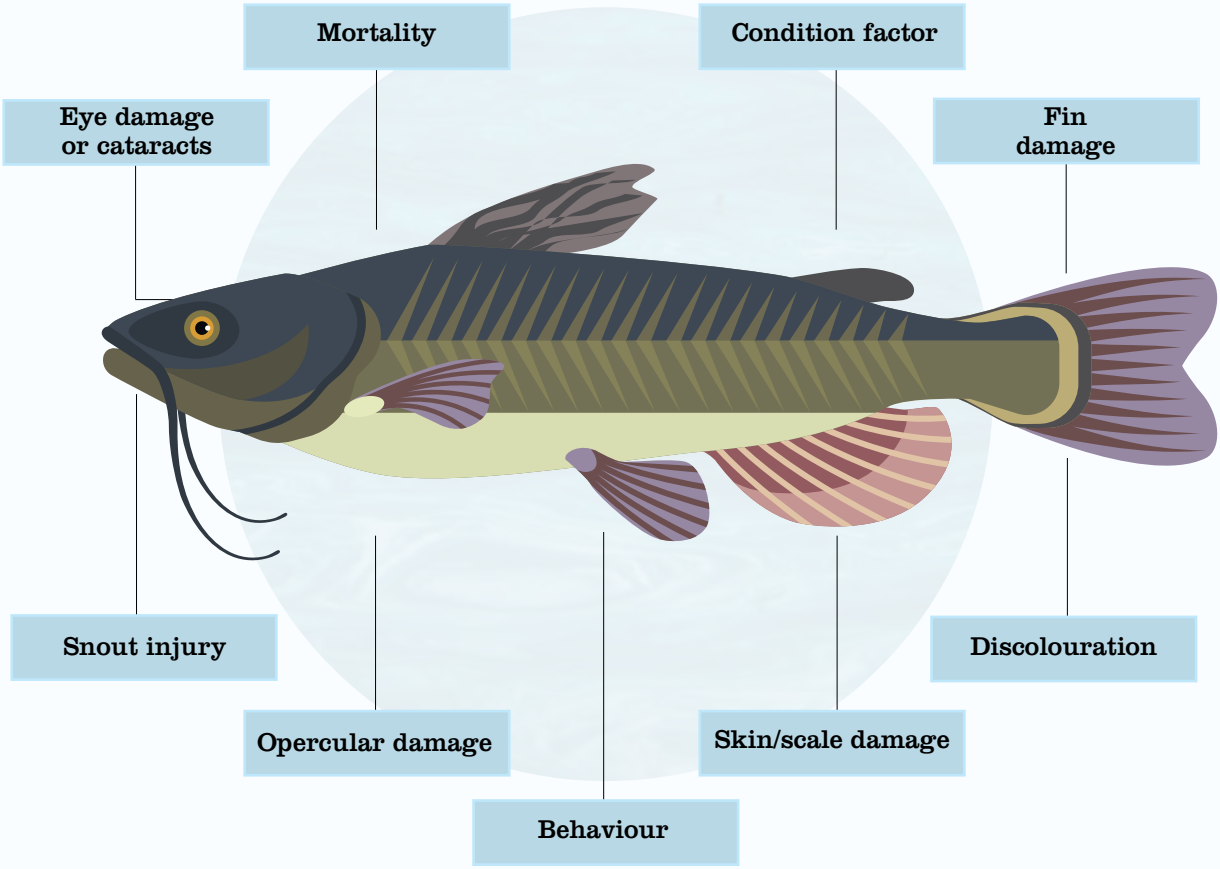
Welfare outcome measures

Welfare outcome measures should be used as part of a proactive programme of measurement and continuous improvement, including target setting. A programme should involve a continuous cycle:



Regular monitoring of welfare outcomes enables swift detection of problems, implementation of corrective action and continuous improvement to be achieved. Some measures should be continuously recorded. For the other measures, it is recommended that they are recorded on a representative sample of a minimum of 50 fish. Target setting should be used for all measures, to drive improvement.

Welfare outcomes in ponds, nets and cages



Mortality

WHAT: Record incidence of dead and moribund fish in each pond/pen/cage.

WHY: Widely collected data (often required daily) – it is a crude indicator of on-farm welfare issues as it is retrospective however increases in mortality rate can indicate welfare issues that have been overlooked.

HOW: Count the number of dead and culled fish in each pond/pen/cage, ideally on a daily basis, as they are removed and analysed for cause of death and for disposal. The total mortality should also be calculated at harvest (number of stocked fish – number of harvested fish)/(number of stocked fish) x100). Report % and cause of death if known.

Body condition factor and emaciation state

WHAT: Condition factor assesses and monitors the body fat reserves (condition) of individual fish. It will also identify any thin or emaciated fish. Common causes for loss of condition include adverse environmental conditions, poor feeding, disease and stress.

WHY: Good nutritional status, measured by condition factor, is required for successful production as well as for good welfare. A drop in condition factor generally indicates a welfare issue. Emaciated fish, being smaller, will quickly be outcompeted for food and can experience low welfare for long time before they die. These fish can also be a vector for transmitting diseases to other healthier fish.

HOW: Conditioning factor (K) is calculated as: 100 X weight (g) x length (cm). It can be measured automatically. If manually, it should be measured as frequently as possible, but as a minimum, during risk periods such as fasting, stressful periods and feeding deficits. 0 is normal; 1 is potentially emaciated; 2 is emaciated and 3 is extremely emaciated.abnormal behaviour (swimming slowly near the net or surface and away from the main school) and can be scored according to their physical appearance on a 0-3 scale. 0 is normal; 1 is potentially emaciated; 2 is emaciated and 3 is extremely emaciated.

Fin damage

WHAT: Fin damage can be scored by looking at fin erosion, splitting (a loss of fin tissue between fin rays), ray deformity or necrosis. It is measured as an individual welfare indicator where the severity and prevalence of fin damage and lesions are manually scored on a 0-3 scale (see below).

WHY: Fin damage can indicate welfare problems such as recent rough handling or disease.

HOW: Individual fish are scored by checking all fins. 0 is normal; 1: most of fin remaining; 2: only half of fin remaining; 3: very little fin remaining.

Snout damage

WHAT: Record incidents and severity of snout damage and lesions via manual scoring system.

WHY: Often occurs in relation to handling procedures such as crowding, brailling or pumping.

HOW: Damage is scored on a 0-3 scale with 0 being no damage noted; 1 being a minor wound on the snout (either jaw); 2 being a moderate wound and broken skin on snout and 3 showing a large, deep and extensive wound which can cover the whole head.

Pangasius with snout and eye injury

Skin lesions on pangasius

Eye damage or lesions

WHAT: Record the incident severity of eye damage and lesions (haemorrhage, cataracts) via manual scoring system.

WHY: Fish have no eyelids and their eyes protrude so are very vulnerable to damage. Trauma can indicate recent poor handling procedures. Causes of cataracts are multifactorial (nutritional deficiencies, osmotic imbalances, water temperature or salinity changes), and also linked to exposure to repetitive stress or secondary to other diseases. Whilst minor changes may not affect vision, development of cataracts eventually leads to blindness, inability to feed and thus poor welfare.

HOW: Eye images scored on a 0-3 scale with 0 being no damage noted; 1 being minor damage or haemorrhage; 2 being moderate damage or large haemorrhage/trauma; and 3 being a major haemorrhage/trauma (eye may be ruptured). Cataracts are scored on a 0-4 scale with 0: no cataracts; 1: cataracts cover <10% lens diameter; 2: cataract covered 10-50%; 3: cataracts covered 50-75%; 4: cataracts cover >75% lens diameter.

Behaviour

WHAT: Extremely feasible and useful group of welfare indicators as it is a non-invasive assessment and doesn't require handling of the fish or removing them from the water. Behavioural indicators have the advantage of being easy to observe and record during daily management routines. Whilst large scale fish observations can easily be integrated into some aquaculture management systems there is still further scope for improving technical equipment for behavioural observations in large fish groups and intensively reared pangasius.

WHY: Provides a snapshot of the experience of the fish. For example, exploratory behaviour and feed anticipatory behaviour can all be signs of good warfare. On the other hand, abnormal behaviour can indicate poor management of the pond/pen/cage, poor health status or suboptimal environmental conditions.

HOW: Use underwater/mobile feed cameras or surface observations to observe behaviours such as feeding, swimming speed, air-breathing frequency. Changes in feeding and swimming behaviour and air-breathing may indicate welfare issues. The challenge is that many behaviours are difficult to quantify and rely on skills and training of the of the observer and knowing what normal is for each life stage/ production system/ water environment (Table 1).

Red discolouration of the fins and belly area

Skin damage

WHAT: Loss of tissue or lesions anywhere on the fish's body. Can be accompanied by haemorrhaging, ulceration or changes in skin colour (Table 1).

WHY: Fish with damaged skin are more vulnerable to infections and secondary bacterial infection; damage is likely to cause pain and large ulcers/lesions may affect the fish ability to osmoregulate.

HOW: Fish are scored on a 0-3 scale with 0 being no evidence of skin damage; 1: small (<10 pence piece) lesion but no muscle exposure; 2: several small wounds; 3: large severe wounds (lesions ≥10 pence piece and exposed muscle).

Table 1: Pangasius visual welfare indicators (can be assessed during routine observations)

Behaviour	Positive/good welfare	Sign of stress and/or poor welfare
Feeding behaviour	Poor feeding response	Onset of disease, low feed quality or husbandry stressors.
Swimming speed	Altered with feeding times	May indicate increased competition for food and inability for all fish to access feed ("scramble competition").
Air-breathing	Breaking the water surface to breath, congregate at the top of the water column	Frequent air-breathing is an indicator of low dissolved oxygen and poor water quality.
Crowding at the surface	Aggregation at or near the surface of the water	Indicator of low dissolved oxygen and poor water quality.
Change in colour	Red discolouration of mouth, underside and caudal fin	Potential indicator of stress but requires further research.

Surface feeding of pangasius