

# Typology of interventions aiming to reduce antimicrobial use (AMU) in aquaculture systems in low and middle-income countries

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**Aim** To conduct a typology analysis of interventions to reduce AMU in aquaculture systems of low and middle income countries and provide an overview of the policy landscape affecting AMU.



Source: WorldFish

- Aquaculture systems are inherently **complex** with diverse ecological characteristics and environmental linkages.
- The global expansion of commercial systems through intensification has involved **increasing AMU** and other veterinary products to prevent and treat diseases, maximise production and compensate for poor management practices.
- **Regulation and enforcement in LMICs** of responsible use of AMs is often **inefficient and effective surveillance and monitoring systems** of AMU are lacking.
- A comprehensive typology to understand existing interventions to reduce AMU in the sector is lacking.



Source: SlowFood

## Methods

- Review of literature and documentation + Data collection through interviews.
- Countries included: Vietnam, Bangladesh, India, Egypt, Sub-Saharan Africa.
- Elements for typology analysis: **activity, scope, aim, direct or indirect, stakeholder to influence, designer, implementer, timeline, compulsory vs voluntary, degree of obligation, effect, M&E, enforcement, compliance.**

Description	Country	Strategies	AIM	Sector/ system	Specific policy or as component	Activity	direct or indirect	Target stakeholder (s)	Designer	Implementer	C/V	Degree of obligation
NAP development	LMICs	Plan	Advise, advocate, engage CA	AQ	Specific + health management	All	D	Gov; CA	FAO	FAO	V	Info provision
NFHM development	LMICs	Plan	Advise, engage CA	AQ	Component	All	I	Gov; CA	WF	WF	V	Info provision
FAO self-assessment	LMICs	Tool	Advisory	AQ	Component	All	I	Gov; CA	FAO	Gov	V	Info provision
Progressive Management Pathway	LMICs	Program	improve biosecurity	AQ	Component	All	I	Producers	FAO	CA	V	Enable choice
PVS	LMICs	Tool	3 <sup>rd</sup> party evaluation	AQ	Component	All	I	Vets, aahs	OIE	OIE	V	Info provision
AM list, dose, withdrawal periods	E, BG, Vt	legislation	Adequate use	AQ	Specific	All	D	Producers	Gov	CA	C	Restrict choice
Control veterinarians prescribing	Rw	legislation	Control who sells	TE	Specific	All	D	Vets	RCVd/RAB	RCVd	C	Restrict choice
Creation of processing plants	GB	Project	Enable export activities	AQ	NA	E	I	Producers	EU	EU	V	Enable choice
ban on export due to residues	Vt, India, BG	legislation	PH - protect consumers	AQ	Specific	E	I	Producers; industry	EU	Gov	C	Eliminate choice
Provision of Specific Pathogen Free (SPF) or resistant, GIFT tilapia	BG	Alternative to AM	Reduce risk of disease	AQ	NA	E	I	Producers	Academia, WF	WF, industry, others	V	Enable choice
Global Sustainable Seafood Initiative (GSSI)	Global	Tool	benchmark	AQ	Component	C	I	Industry; producers	various	industry	V	market incentives
Global Food Safety Initiative (GFSI)	Global	Tool	benchmark	AQ	Component	C	D	Industry; policy makers; consumers	various	industry	V	market incentives
GAPI: global aquaculture performance index	Global	Tool	benchmark	Marine aquaculture	Component	C	I	Producers; industry; policy makers; consumers	Academia	users	V	market incentives
Best Aquaculture Practices (BAP) -	Global	3 <sup>rd</sup> Party cert. program	Promote good practices	Shrimp, pangasius, salmon	Component	C	I	Producers; industry; policy makers; consumers	GAA	CABs	V	market incentives
Aquaculture Stewardship Council, ASC - VETgap	Global, Vt	3 <sup>rd</sup> Party cert. program	Promote good practices	Shrimp, pangasius, salmon	Component	C	I	Producers; industry; policy makers; consumers	ASC	CABs	V	market incentives
Global Good Aquaculture Practices	Global	3 <sup>rd</sup> Party cert. program	Promote good practices	Shrimp, pangasius, salmon	Component	C	I	Producers; industry	GlobalGAP	CABs	V	market incentives
Training of trainers or champions	local	Training	Training + social	AQ; TE	NA	All	I, D	Producers	FAO, WF	FAO, WF	V	Info provision
AMR campaign	BG	awareness campaign	educate producers	AQ	Specific	Dom	D	Producers	WF; Academia	WF	V	Info provision
Media	Chile	media	influence public perception	AQ	Specific	C	I	Consumers	media	media	V	Info provision
Media in Germany - "the Pangasius lie"	Vt	media	influence consumer	AQ	Component	E	I	Consumers	media	media	V	Info provision

NAP= National Action Plan; NFHM=National Fish Health Management Strategies; E= Export; C=Commercial; Dom= domestic; I= Indirect; D:Direct; Gov= Government; CA= competent authority; C/V= compulsory/voluntary; CABs= conformity assessment bodies

**NAPs and National Fish Health Management Strategies – aim to address health management deficiencies and in most cases through education of implementers. –**  
**Challenge:** no tangible plan for implementation of the plans, similar barriers as legislation. It is an advisory role and not further involvement in implementation of the plans to the users of AM. **Opportunities: behavioural change approaches or incentives in the design.**  
*Vietnam: concrete plan based on soft policies + control and inspection at different points of the AM value chain + pilot data gathering. Bangladesh: NFHM as guidelines, but no specific plan for implementation is formulated. Government seems to be targeted audience but lack of resources for implementation. Egypt: work in progress for NAP. Government will be in charge to implement the plan involving stakeholders as needed. Poor state resources are described and producers appear to perceive lack of communication and relationship with the government services.*

**LEGISLATION** to control AMU and veterinary products exists in LMICs.  
**Challenge: poor compliance + resources and capacity for enforcement:** e.g. to monitor use, withdrawal periods, prescription or sales of products.

**ALTERNATIVES TO AM: improved seed (SPF, SPR shrimp, GIFT tilapia), therapies and products (probiotics, immunostimulants, phage therapy, etc.), improved management ( water, fertilisers, pond construction, feed, etc.)**

**MARKET DRIVEN CERTIFICATION PROGRAMS - report of AMU:** programs aimed at better performance, in which report of AMU is a component. Some provide a label and are directed to the consumer. In LMIC, this is followed predominantly by commercial large companies for export.

**AWARENESS CAMPAIGN for public engagement in Bangladesh** based on preliminary study on population, using an animation disseminated through social media and digital networks. Outreach and reactions are monitored, used to understand the effect on population and best ways to spread the information.

## Key findings to date

- Successful reduction of AMU is observed in **combined interventions** such as the salmon production scenario in Norway: **vaccines, industry support, legislation;** or in LMICs that export commodities (shrimp and catfish in Asian countries): EU monitoring residues plan + enabling markets, creation of processing plans.
- Few policies aim to reduce AMU specifically or directly, but rather form part of management practices and biosecurity - AMU is addressed as one component in plans, guidelines, programs and other strategies.
- Other indirect strategies claimed to have driven reduction: alternatives to AMU like probiotics or market-based strategies such as certification standards.

**What is your experience with interventions to reduce AMU?  
 Can you give insights on strategies that could be applied and tested in aquaculture systems?**

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