

KINGDOM OF CAMBODIA
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MINISTRY OF AGRICULTURE, FORESTRY AND FISHERIES
FISHERIES ADMINISTRATION



**ROADMAP FOR BETTER COORDINATION
IN CAMBODIAN FISHERIES RESEARCH**

**Cambodia Programme for Sustainable and Inclusive Growth in the Fisheries Sector:
Capture Component (CAPFISH-Capture)**

February 2021

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Technical report

prepared for the Food and Agriculture Organization of the United Nations
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of the Royal Government of Cambodia

by

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LIST OF ABBREVIATIONS

ACIAR	Australian Center for International Agricultural Research
ADB	Asian Development Bank
ASDP	Agricultural Sector Strategic Development Plan
CAD	Canadian Dollar
CAPFISH	Cambodia Programme for Sustainable and Inclusive Growth in the Fisheries Sector
CAPFISH-Capture	Cambodia Programme for Sustainable and Inclusive Growth in the Fisheries Sector: Capture Component
CARD	Council for Agriculture and Rural Development
CCC	Cooperation Committee for Cambodia
CCF	Cambodian Coalition of Fishers
CDRI	Cambodian Development Resource Institute
CEDAC	Cambodian Center for Study and Development in Agriculture
CEPA	Culture and Environment Preservation Association
CFis	Community Fisheries
CI	Conservation International
CNMC	Cambodian National Mekong Committee
CRDT	Cambodian Rural Development Team
CSUK	Chea Sim University of Kamchaymear (Prey Veng)
DoF	Department of Fisheries (Myanmar)
EU	European Union
EUR	Euro
FACT	Fisheries Action Coalition Team
FAO	Food and Agriculture Organization of the United Nations
FRDN	Fishery Research and Development Network (Myanmar)
FFI	Fauna and Flora International
FIA	Fisheries Administration
ICERD	International Conference on Environmental and Rural Development
IFReDI	Inland Fisheries Research and Development Institute
ITC	Institute of Technology of Cambodia
IUCN	International Union for Conservation of Nature
JICA	Japan International Development Agency
MAFF	Ministry of Agriculture, Forestry and Fisheries
MaFReDI	Marine Fisheries Research and Development Institute
MCC	Marine Conservation Cambodia
MFF	Myanmar Fisheries Federation
MFP	Myanmar Fisheries Partnership
MME	Ministry of Mines and Energy
MISTI	Ministry of Industry, Science, Technology and Innovation
MOE	Ministry of Environment
MOWRAM	Ministry of Water Resources and Meteorology
NCARD	National Conference on Agriculture and Rural Development

NGOs	Non-Governmental Organizations
NIA	National Institute of Agriculture
NSDP	National Strategic Development Plan
PDAF	Provincial Department of Agriculture and Fisheries
PNCA	Preak Leap National College of Agriculture
RUA	Royal University of Agriculture
RUPP	Royal University of Phnom Penh
SEAFDEC	Southeast Asian Fisheries Development Center
STI	Department of Science, Technology and Innovation
TSA	Tonle Sap Authority
UBB	University of Battambang
UNIDO	United Nations Industrial Development Organization
USAID	U.S. Agency for International Development
USD	United State Dollar
WB	World Bank
WCS	Wildlife Conservation Society
WWF	World Wildlife Fund

EXECUTIVE SUMMARY

The FAO Complementary Support to the CAPFISH-Capture project, in its component focusing on “Improved knowledge for fisheries management”, includes a support to priority research activities. This support requires improved knowledge for fisheries management and institutional capacity enhancement, which prompted a review of existing information and information gaps in the sector.

The present analysis is now looking at options for the development of “increased capacity for fisheries research coordination” in the country, and how to enhance FiA’s profile and visibility. The background analysis, initially focused on IFReDI and MaFReDI, was expanded to provide an overview of all research actors, of their contribution to the sector, of the activities to be coordinated - and of gaps in these activities.

We first identified all actors doing or driving research in inland fisheries. Each of these actors was proposed a questionnaire from which information was coded for analysis. Two main aspects were considered: *contribution to the sector* and *areas of focus*. These elements were then compared with those gathered in our previous analysis “Research and information produced in the Cambodian fisheries sector (2015-2020; capture fisheries)”.

The review identified 40 organizations, platforms or units involved in fisheries and contributing directly or indirectly to fisheries research (9 governmental entities, 7 development partners, 8 international / regional organizations, 3 national universities and 13 NGOs). Among those, the analysis identified 3 actors with a balanced portfolio covering three dimensions (exploitation, social and environment/conservation), 11 entities more focused on exploitation, 17 on conservation, and 9 on social aspects.

That review underlines a potential for improved coordination between major actors focusing on similar themes (e.g. FAO-IFReDI-MRC, IFReDI-FiA DPFIC; FAO-WOM) or between actors specialised in the same themes (e.g. SEAFDEC and MCC).

The analysis comparing areas of focus among actors of the fisheries sector and themes covered by publications identified five fisheries themes characterized by a discrepancy between information produced and interest claimed. *Conservation* is characterized by more visibility in recent publications than among organizations. As opposed to this particular case, five themes are characterized by more interest claimed by organizations than covered by research and publications: *policy recommendations and regulation analysis; gender, children and minorities; livelihood monitoring and effort monitoring*. These themes require special attention among researchers so that the information needs of managers and development actors are better met.

Questionnaires to organizations consulted included question on how fisheries research is decided. Answers show that the nature of the research proposed or undertaken is driven, by order of influence, by: *donors; individuals* (project managers, lead scientists, project staff), *national strategies; large organizations' mandate or agenda; scoping studies; communities; conservation priorities* and *publishing*. The factor superimposed to all drivers and conditioning the research is *local resources* already available (specialized equipment, qualified field staff, technical maintenance, etc.).

The section of the report dedicated to internet visibility of FiA, IFRaDI and MaFRaDI concludes, after a bleak review, that the current FiA web presence does not reflect the status and achievements of an organization that produced, in the past 6 years, 49 peer-reviewed articles in high-ranking international journals and 89 other research or extension documents. This leads to a recommendation for a revamping of institutional web sites, with the formal creation of a maintenance and content provision unit.

Importantly, an update of the institutional and policy context shows that the future of IFRaDI and MaFRaDI is being planned under two simultaneous and mutually exclusive institutional frameworks:

- a move of FiA (including IFRaDI) towards a new site near Takhmau City, while MaFRaDI will move to Sihanoukville;
- a transfer of IFRaDI and MaFRaDI under the authority of a Cambodian Academy of Agricultural Sciences to be created on RUA campus in Chamkar Daung.

Both initiatives are expected by 2023, and the latter has been mentioned, since 2018, in several high-level policy documents.

In such unstable context, defining a long-term roadmap towards increased capacity for fisheries research coordination by FiA research institutes is challenging. As a consequence, two initiatives are proposed in the short term:

- the creation at FiA of a Research Committee mainly composed of managers and defining priority research themes for communication to all research actors (in particular research mentors);
- the creation of a professionally organized line of publications for the whole institution, so that the current gap between unpublished reports and high-level articles in international journals is filled.

These three main initiatives (organizing and feeding web sites, streamlining research through a Research Committee, creation of a line of publications), complemented with some additional ones detailed in the report, can be developed during the next couple of years and can substantially improve, in a short time frame, the visibility and recognition of the FiA while paving the way for its longer-term role in national fisheries research coordination.

1. INTRODUCTION

In Cambodia fish represents about 70% of Cambodia's intake of animal protein and fisheries make a large contribution to livelihoods (around 30% of Cambodians are involved in work related to fisheries). The country's inland fishery production is one of the largest of any country in the world, but fisheries are faced with growing threats. In response to these threats in a sector of key importance to Cambodia, the European Union funded the Cambodia Programme for Sustainable and Inclusive Growth in the Fisheries Sector: Capture component ("CAPFISH Capture Fisheries"). The funding level reaches approximately EUR 93 million over five years (2019-2024), through direct budget support to the Fisheries Administration (FiA) and complementary funding via the FAO, UNIDO, and non-governmental organizations / civil society organizations.

The FAO Complementary Support to CAPFISH aims at strengthening management, conservation and control systems in Cambodia inland and marine fisheries. This support covers fisheries conservation, management and compliance, support to fishing communities, improved knowledge for fisheries management and institutional capacity enhancement.

In this setting, the present analysis is looking at options for the development of "increased capacity for fisheries research coordination" in the country. The focus is on the Inland Fisheries Research and Development Institute (IFReDI) and the Marine Fisheries Research and Development Institute (MaFReDI) as potential key coordinators representing the Fisheries Administration and national interests in the sector.

The secondary objective of the present analysis is to identify how to enhance IFReDI and MaFReDI's profile and visibility, in order to strengthen their role as potential coordinators.

In the following sections the methodology of the study is presented first. It is followed by a review of players in capture fisheries sector and of their area of intervention. That section is complemented with a rapid review of processes for the identification of research actions among the various actors.

This leads to a comparative analysis of areas of intervention vs. published research and subsequently of areas whose mismatch between intervention and underpinning research require better coordination.

A section about the evolving national policy framework for research in agriculture and fisheries provides key elements about the becoming of IFReDI and MaFReDI, which will have a major influence on their possible coordination role.

Last, a review of communication aspects in FiA research institutes leads to a conclusion about priorities for research coordination.

Identifying options for i) increased fisheries research coordination at FiA and ii) enhanced visibility of IFReDI and MaFReDI (and, more generally, FiA) will define the next steps for the CAPFISH-Capture project to support both fisheries research and institutional coordination in the sector.

2. METHODOLOGY

Preparing a roadmap for an increased capacity of fisheries research coordination requires clarity about actors contributing to research and whose activities are to be coordinated.

The companion report “Research and information produced in the Cambodian fisheries sector (2015-2020; capture fisheries)” underlines the multiplicity of organization contributing to research or knowledge generation (28 Cambodia-based organizations, plus several foreign universities). Furthermore, several major players in the fisheries sector influence how much and which research is done, but do not necessarily produce research themselves. Thus, in the past WWF and Oxfam funded IFRDI for research on dam impacts, USAID has been funding active research in biology, ecology and rice field fisheries management through WorldFish or the Wonders of the Mekong project, and the European Union programmed substantial funding for research at the FiA. However, none of these research actors is known as a research institution.

This observation led to a preliminary identification of actors doing or driving research in inland fisheries. Each actor identified was proposed a questionnaire about the main fields of activity/intervention of his/her organization, and about how research topics are identified and decided in the organization. The information gathered was then coded so that it could be summarized and plotted.

These processes are detailed below.

Scope of the review

“Research” is defined here as “generation of new information”, in particular “studies to be published in reports or publications” but also “monitoring”. “Fisheries research” covers biological studies, stock and habitat assessment studies, fisheries-related socio-economic studies (including gender and fish consumption), fisheries governance studies, and infrastructure development related studies. “Fisheries research” does *not* cover studies about ecosystems, rivers, hydrology, water quality or climate change, nor research in the aquaculture sector. Our review covers the period between 2015 and 2020; planned research was not integrated.

Identification of actors

The review, initially focused on the 28 producers of scientific information identified in the companion report “Research and information produced in the Cambodian fisheries sector”, was later on expanded by i) consulting senior FAO, WorldFish and IFRDI officers familiar with all stakeholders of the fisheries sector in Cambodia; and ii) asking each interviewee about other actors of the sector to be consulted too. As a result, the consultation expanded to 40 actors based in Cambodia, including many of them influential in fisheries research but not publishing in their own name.

Questionnaire to actors

The questionnaire sent to all interviewees is detailed in Annex 2. Each respondent filled in particular a table of 22 “themes covered in the past five years” using the following coding system:

0: no focus 1: some focus 2: strong focus

That list of 22 themes is the same as the one used for the analysis of research publications in report “Research and information produced in the Cambodian fisheries sector”.

Section “List of projects done in the past five years” generated limited response and overall the level of details varied a lot depending on the person interviewed. As a consequence, all interviews are not detailed by organization here, but all data on themes covered are.

Information coding

The information reported by interviewees was summarized according to two perspectives: a) *contribution to the sector*, and b) *areas of focus*. Each perspective itself was detailed (Figure 1):

a) *contribution to the sector*: i) degree of focus on fisheries (exclusive to occasional); ii) involvement in knowledge generation (high to limited), and iii) scale of activities (large to small)

b) *areas of focus*: i) environment (species biology, ecology) and conservation; ii) social (and/or economic) aspects, and iii) exploitation of the resource.

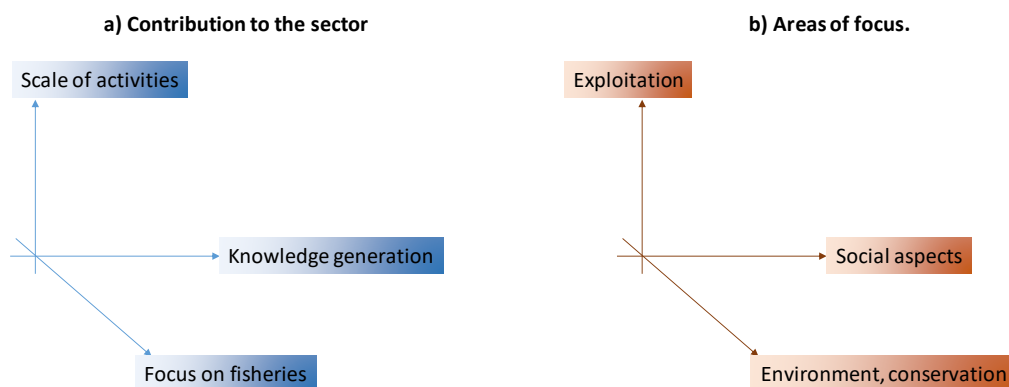


Figure 1: Axes summarizing the information on actors in the fisheries sector

The score of each organization on each axis was determined using the same coding system (0: no; 1: some; 2: strong/large). The coding was drafted on the basis of interviews then reviewed collectively by a group of seven FAO and FIA officers with more than 10 years of experience each in stakeholders and functioning of the Cambodian fisheries sector.

3. ACTORS, CONTRIBUTION TO THE SECTOR, AREAS OF FOCUS

An improved coordination of fisheries research requires a good knowledge of all research actors, in order i) to focus efforts, in a context of initially limited resources, on interactions with key players and ii) to streamline the main sources of research.

The analysis below started with an identification of research actors in the Cambodian fisheries sector, but expanded to all main players influencing the sector. The purpose was to also take advantage of the extensive consultation initiated about research to draw a larger picture of all players in the field.

3.1. Fisheries research actors

The review identified 40 organizations, platforms or units involved in fisheries and contributing directly or indirectly to fisheries research.

Line agencies:

Inland Fisheries Research and Development Institute (IFReDI); Marine Fisheries Research and Development Institute (MaFReDI); deputies of the FiA Director General (FIA DDG); FIA Community Fisheries Development Department (FIA CFDD); FIA Department of Fisheries Conservation (FIA DFC); FIA Department of Planning, Finance and International Cooperation (FIA DPFI); FIA Department of Post-Harvest and Quality Control (FIA DFPTQ); the Cambodia National Mekong Committee (CNMC) and the Tonle Sap Authority (TSA).

Development partners:

Asian Development Bank (ADB); Agence Française de Développement (AFD); Delegation of the European Union to Cambodia (EU); Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ); Japan International Cooperation Agency (JICA); U.S. Agency for International Development (USAID) and World Bank.

International / regional organizations:

Food and Agriculture Organization of the United Nations (FAO); FishBio; Institut de Recherche pour le Développement (IRD); Mekong River Commission (MRC); Southeast Asian Fisheries Development Center (SEAFDEC); United Nations Industrial Development Organization (UNIDO); World Food Programme (WFP) and WorldFish (WorldFish).

Non-governmental organizations (NGOs):

Conservation International (CI); Fisheries Action Coalition Team (FACT); Fauna and Flora International (FFI); ForumCiv; International Union for Conservation of Nature (IUCN); the Learning Institute (LI); Marine Conservation Cambodia (MCC); River Coalition of Cambodia /NGO Forum (RCC/NGOF); Oxfam; Wildlife Conservation Society (WCS); Wild Earth Allies (WEA); Wonders of the Mekong (WOM) and the World Wildlife Fund (WWF).

National universities:

Royal University of Phnom Penh (RUPP); University of Battambang (UBB); Royal University of Agriculture (RUA).

Many of these entities are well known in the sector (e.g. FAO, IFRaDI, WorldFish, etc.), but others have also been identified as active stakeholders contributing to the development of research in the sector, for the reasons detailed below.

Line agencies

Five deputies support the FiA Director General, each of them with a specific area of intervention: North Tonle Sap, South Tonle Sap, upper Mekong, lower Mekong, and coastal zone. Although they are not research actors themselves, they do drive research and knowledge generation in the area under their responsibility, be it in the coastal zone (in particular progress in monitoring the catch), in the upper Mekong (research activities and catch monitoring in Stung Treng and Kratie Provinces) or in the whole Cambodian Mekong, through co-steering of the MRC activities and its Joint Environmental Monitoring. We detail here initiatives for the coastal zone as they are specific and include developments in a new direction: marine fishing effort and fish catch monitoring, new regulations, and alignments with international frameworks and procedures.

At FiA, the Department of Planning, Finance and International Cooperation (DPFIC) also contributes, indirectly, to research through the official monitoring of catches countrywide. Monitoring consists in a compilation of monthly reports from provincial Cantonments and the production of annual statistics for the sector (plus a contribution to a census of marine boats, i.e. fishing effort, in 2018). Catches are recorded at the species level for marine species. Recipients of these statistics are Cantonments (compiled provincial statistics, annually), MAFF (sector statistics, annually), SEAFDEC¹ (annually), FAO² (Fisheries Global Information System FIGIS, annually), the Ministry of Economy and Finance (monthly and annually), the United Nations Economic and Social Council (ECOSOC) through the Ministry of Foreign Affairs and International Cooperation (monthly and annually). Thus, the number of recipients of catch statistics expanded in recent years and now includes high-level institutions receiving monthly records. As raw records from the field usually require some processing and standardization before being compiled³, the simultaneous provision of raw monthly records and polished annual statistics to various organizations may increasingly complicate the role and responsibilities of DPFIC in the future.

Development partners:

In recent years the Asian Development Bank (ADB) has not openly promoted in fisheries, but has been influential through the Tonle Sap Poverty Reduction and Smallholder Development Project (USD 55.3 million, 2010 to 2017) and its current extension. The project influences in particular economic diversification and effectiveness of fishing-dependent communities in the Tonle Sap Basin. The ADB also assists the Ministry of Planning and the Ministry of Commerce with fish price monitoring - two monitoring systems reported in our companion report on fisheries data. In the coming years,

¹ <http://map.seafdec.org/NewBulletin/statnote.php>

² <http://www.fao.org/fishery/statistics/global-capture-production/query/en>

³ FAO 2004. Handbook of fishery statistical standards. Food and Agriculture Organization of the United Nations, Rome, Italy. 260 pp.

the ADB will play an active role in coastal fisheries through the Cambodia Inclusive Coastal Marine Fisheries Value Chain and Sustainable Tourism Development project. These projects are underpinned by detailed scoping studies, whose open access would benefit fisheries research.

The Agence Française de Développement (AFD) is one of the development partners involved in capture fisheries, through funding of research activities on biodiversity and conservation of aquatic environments, in particular in relation to agriculture. The new program “Water Resources Management and Agro-ecological Transition for Cambodia” (WAT4CAM; EUR 55 million, with the Ministry of Water Resources and Meteorology) focused on medium-sized irrigation schemes also includes components about fish-friendly irrigation system.

International / regional organizations

FishBio⁴ is a US-based private company specialised in fisheries research, monitoring and conservation. It has developed a Mekong branch focused primarily on Laos. This branch produces research and management outputs relevant to Cambodia (e.g. a guide to assess Fish Conservation Zones⁵), collaborates with the Wonders of the Mekong platform for management and conservation of migratory fish species and maintains an active website on Mekong fisheries⁶

The French Institut de Recherche pour le Développement (IRD) worked in the past years on the integration of fish resources to agriculture-focused water management in floodplains, and has extensively published with scientists of the FiA Department of Post-Harvest and Quality Control on nutrition and fish-based products against malnutrition.

The World Food Programme (WFP) is not directly involved in fisheries but is connected to the above research on food supplements (in particular for children and pregnant women) and monitors food prices, in particular eight fish product categories.

NGOs

Wild Earth Allies (WEA) is an NGO recently established in Cambodia (2018) and focusing on conservation, protection of critical habitats and environmental education in Kep and Kampot Provinces. Target species are hawksbill and green marine turtles, and activities include development of community-based patrols and management plans, and habitat assessments for proposed Marine Fisheries Management Areas.

The Wonders of the Mekong (WOM) is a project/platform funded by USAID and focused on conducting applied research, building capacity and developing communications products to highlight the economic, ecological, and cultural values of Mekong biodiversity and ecosystem services. WOM is based at IFReDI and operates as a coordination platform between several universities in Cambodia, France and the US. It has in particular boosted fish ecology research in Cambodia, through the funding of multiple M. Sc. and Ph. D. students.

⁴ <https://fishbio.com/> and <https://fishbio.com/tag/cambodia>

⁵ Lory E., Ainsley S., Ounboundisane S. 2019. Guidelines for assessing fish conservation zones in Lao PDR. FISHBIO Laos, Vientiane, Lao PDR.

⁶ <https://www.mekongfishnetwork.org>

National universities

In addition to RUPP, RUA and UBB, several universities in Cambodia have recently integrated fisheries scientists as lecturers or are developing fisheries programs. These universities include the Chea Sim University of Kamchaymear⁷ (Prey Veng Province) and the Prek Leap National Institute of Agriculture near Phnom Penh⁸. Although it does not feature a fisheries curriculum, the Institute of Technology of Cambodia (ITC) is also one of the national education entities that can provide qualified scientists needed in the fisheries sector, for instance in IT (marine fishing fleet monitoring, underwater telemetry), in database management (national catch statistics) or in statistics (data analysis). At the moment, none of the Cambodian universities proposes a curriculum covering marine biology, which clearly remains to be developed.

3.2. Actors and their contribution to the sector

The contribution of the 40 actors to the fisheries sector was estimated as detailed in section 2. Figure 2 shows how the actors in fisheries are distributed along three axes: degree of focus on fisheries; involvement in knowledge generation, and scale of activities.

The analysis allows identifying three main groups of actors:

- the key players that score high in all three dimensions: IFReDI, the FIA Department of Fisheries Conservation (DFC), the FIA Department of Planning, Finance and International Cooperation (DPFIC), the Mekong River Commission (MRC), the FAO and the Wonders of the Mekong platform. This group happens to cover all main aspects of the sector, i.e. research (IFReDI, MRC), management (DFC), capacity building (WOM), monitoring (DPFIC) and institutional coordination (FAO, MRC);
- the large players with a maximal score on two axes:
 - SEAFDEC, FIA Department of post-harvest, Marine Conservation Cambodia and WorldFish for both exclusive involvement in fisheries and knowledge generation;
 - European Union, FIA Community Fisheries Development Department (CFDD) and Forum Civ for involvement in fisheries and scale of activities
 - FishBio for involvement in fisheries and knowledge generation;
- actors that play a major role in one dimension. These organizations are:
 - RUPP, UBB, FFI and IRD for knowledge generation;
 - MaFReDI, DDG marine, FACT and NGOF/RCC for involvement in fisheries.

Other actors are also involved or influential in fisheries research, but to a lesser extent. The position of some donors in that figure can be debated, as their major financial contributions can be in the form of grants or of loans (e.g. EU vs. ADB, World Bank), or can be indirect, for instance through research or capacity building projects (e.g. USAID and the Wonders of the Mekong project).

⁷ <http://www.csuk.edu.kh>

⁸ <https://pnsa.edu.kh/wp>

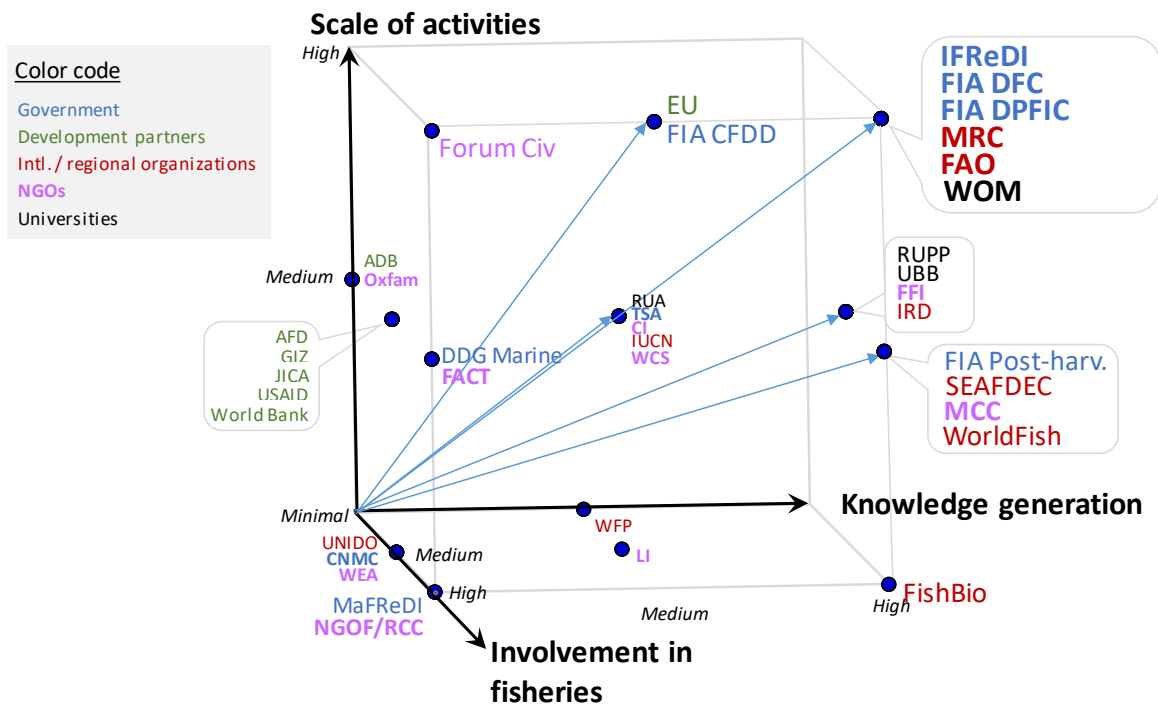


Figure 2: Main groups of actors in fisheries research, according to three perspectives

When the ordination process is further developed by combing the scores of each organization along each of the three axes, the analysis produces a figure in which actors are ranked in relation to their overall contribution to the fisheries sector and its research. That ranking is an indication of the degree of effort required for coordination, if limited resources impose a prioritization.

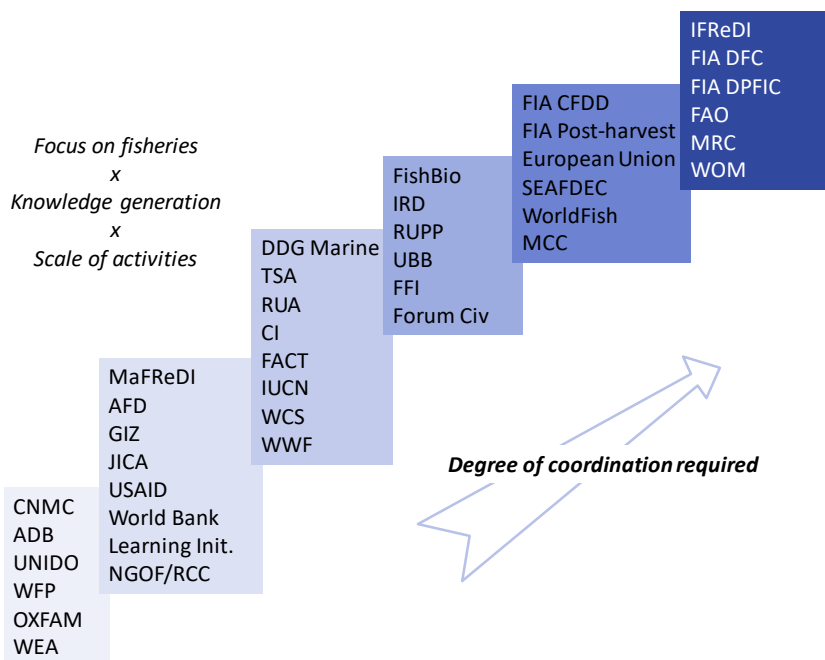


Figure 3: Main groups of actors in fisheries and fisheries research, from minor to major contributors

The above figure requires some comments:

- the presence of some actors in the top group is not new information, but flags the relevance of increased coordination between these major actors (e.g. FAO-IFReDI-MRC, IFReDI-FiA DPFIC; FAO-WOM);
- the same applies to the second top group, with a proximity that underlines possible or even desirable collaborations between some of these actors (e.g. SEAFDEC and MCC in the coastal zone, with for instance an analysis of SEAFDEC trawling data in collaboration with WOM to better underpin the selection of conservation zones);
- the other groups identify actors who do not usually collaborate (e.g. RUPP and Forum Civ) but who could mutually benefit from a closer relationship. In that case, improved research coordination could be through students working on social research question relevant to a better support of fishing communities, with possible funding from the CapFish fund for research.
- the ordering process also identifies actors expected at higher or lower levels, which is a chance to review their role in the sector.

3.3. Focus areas among actors

Data gathered during interviews also allow identifying the main areas of focus among main actors in the fisheries sector. Data are plotted below along three dimensions: exploitation, social and environment/conservation, following the same coding system (no focus; some focus; strong focus).

The analysis allows identifying four groups of actors (Figure 4):

- those with a balanced portfolio covering the three dimensions: the European Union (EU), Agence Française de Développement (AFD) and WorldFish;
- those more focused on exploitation; they include FAO, IFReDI, MRC, GIZ, SEAFDEC and the Royal University of Agriculture (RUA), FIA Department of Post-Harvest, USAID and FIA Director General deputies, FIA Department of Planning, Finance and International Cooperation (FiA DPFIC) and JICA (listed here by degree of specialization);
- organizations more focused on conservation (ordered by increasing focus): Tonle Sap Authority (TSA), Conservation International (CI), Fisheries Action Coalition Team (FACT), Fauna and Flora International (FFI), ForumCiv, River Coalition of Cambodia /NGO Forum (RCC/NGOF), WWF, Wonders of the Mekong (WOM), Marine Conservation Cambodia (MCC), FishBio, FIA Department of Fisheries Conservation (FIA DFC), the Royal University of Phnom Penh (RUPP) and the University of Battambang (UBB); MaFReDI, Wildlife Conservation Society (WCS); Wild Earth Allies (WEA) and IUCN;
- those more focused on social aspects (again, by degree of focus): Cambodia National Mekong Committee (CNMC), ADB, World Bank, FIA Community Fisheries Development Department (FIA CFDD), the Institut de Recherche pour le Développement (IRD), the Learning Institute (LI), Oxfam, UNIDO and the World Food Programme (WFP).

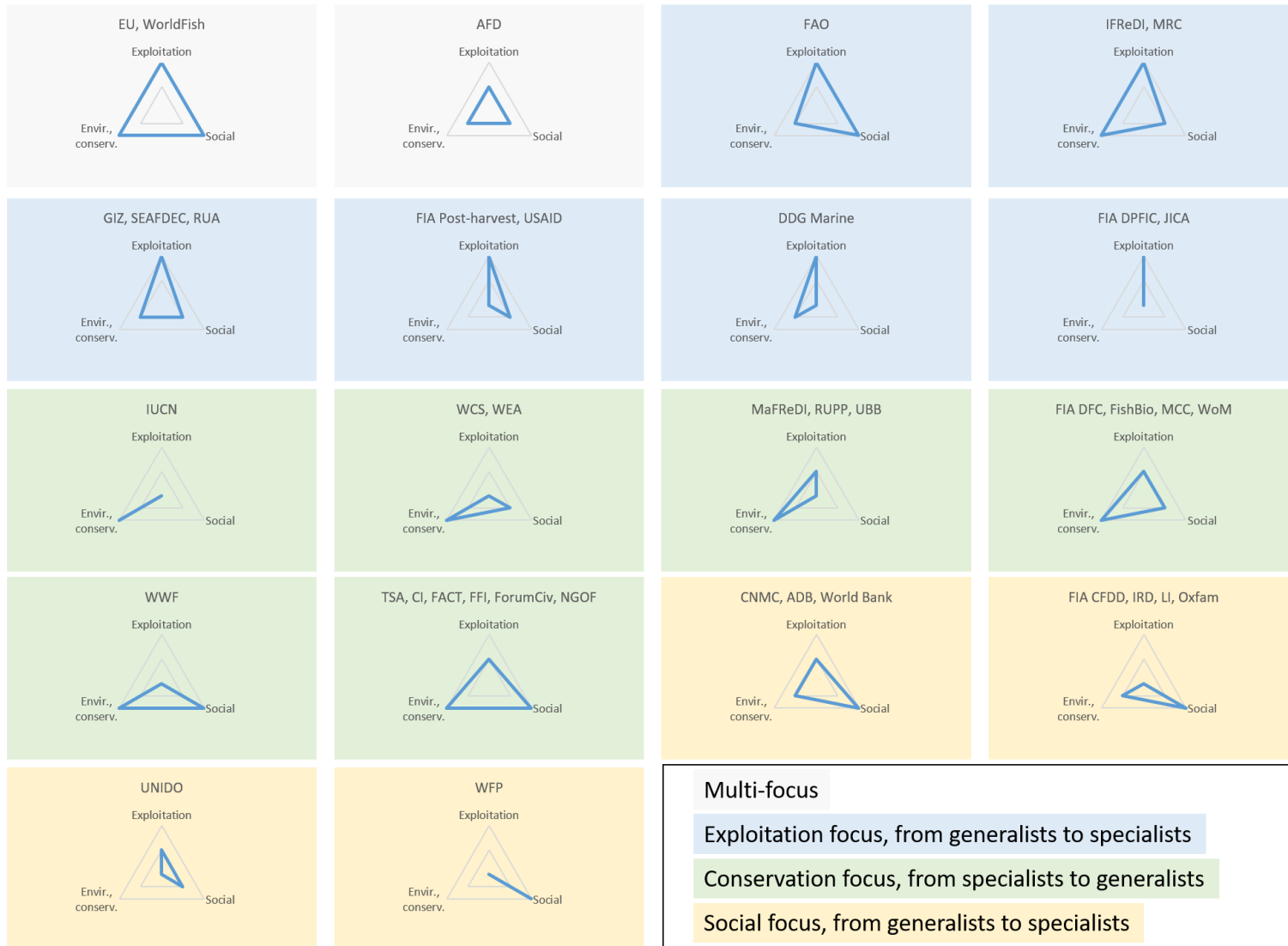


Figure 4: Main areas of focus among the institutions reviewed

3.4. Areas of focus vs. publications

In the above analyses, 40 organizations operating in the fisheries sector identified their area of focus among 22 themes proposed (5 in biology, 5 in socio-economics, 2 in post-harvest, 5 in monitoring, 3 in management and 2 in policy). These themes are the same as those used for the analysis of publication titles in the companion report “Research and information produced in the Cambodian fisheries sector”. We present here a juxtaposition of the two analyses⁹, in order to highlight possible discrepancies between information available and actors’ main areas of focus in the sector.

The first graph (Figure 5) shows, on standardized axes, the frequency of publications by theme and of focus declared in organizations for the same themes.



Figure 5: Publications (orange) and of focus declared in organizations (blue) by fisheries theme. Arrows point at discrepancies between the two perspectives

This preliminary analysis flags at least four themes or groups of themes for which there is a discrepancy between focus among actors and information available in publications.

That analysis is further detailed below (Figure 6).

⁹ See figure 7 in section 5 of report “Research and information produced in the Cambodian fisheries sector”

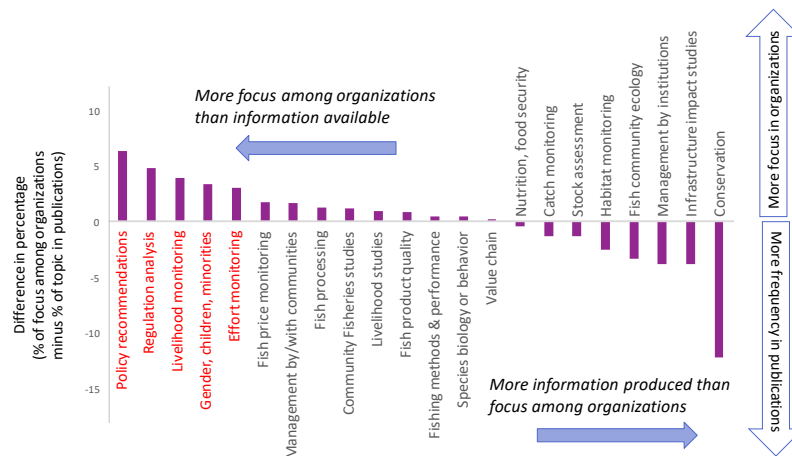


Figure 6: Difference, for each fisheries theme, between publications recently produced and degree of focus among fisheries actors

The analysis shows that five fisheries themes are characterized by discrepancy between information produced between 2015 and 2020 and areas of focus claimed among 40 actors of the fisheries sector.

Conservation is characterized by a dominance in recent publications; this is mainly because the intended creation of protected areas in the coastal zone (Koh Rong, Koh Sdach, Koh Seh, Koh Angkrong, etc.) has motivated active research reflected by multiple technical reports.

As opposed to this, five themes are characterized by more interest claimed by organizations than covered by research and publications:

- *Policy recommendations* and *regulation analysis*: as already flagged, these themes are important to many organizations and NGOs, but are not proportionally addressed through publications by researchers or lawyers. Even though policy recommendations are present in many publications -without necessarily being featured in the title of these papers- the lack of specific and specialized analyses is a weakness for the sector, as policy making also requires examination of consistency between legal instruments, identification of legal loopholes and 360° analysis of the consequences of new regulations.
- *Gender, children and minorities* is also a recurrent theme among NGOs and donors, but is characterized by a deficit in research and publications. This calls for more social research in that theme, in order to better underpin fisheries actors' project and support activities.
- *Livelihood monitoring*, whose weakness was already flagged in the analysis of publications, is a theme brought forward and claimed by many NGOs, but actually poorly documented in terms of hard data and follow-up after interventions.
- *Effort monitoring* is understood by many actors as a need to regulate the fishing effort -under the assumption that overfishing is the main cause of declining catches- hence a high interest for this theme. However, the latter is actually poorly documented, and requires much more evidence to support claims of overfishing or initiatives for effort reduction.

3.5. Decision making about fisheries research

Among all institutions consulted, 17 provided detailed answers about the way research is proposed or undertaken. Since all types of organizations (line agencies, donors, international/regional organizations, NGOs, academic organizations) were represented among these 17 respondents, broad brush patterns emerged.

Depending on the type of organization, the nature of research proposed or undertaken depends on several drivers:

- research in line agencies and proposed by donors reflects **national strategies** such as the Agricultural Sector Master Plan (ASMP) or the Agriculture Sector Strategic Development Plan (ASDP);
- **large organizations' mandate or agenda** also drive the Cambodian fisheries research;
- **donors** are identified by most research entities as the main drivers of their research activities;
- next research activities are often identified and recommended by **project managers, lead scientists, practitioners and field staff** who have first-hand experience of needs and unknowns in the sector.
- **scoping studies** (i.e. rapid assessments by independent experts) are popular among donors and to some extent among international organizations and large NGOs.
- conservation-focused entities identify **protection needs** as the main drivers of their research.
- **communities** are also consulted to identify research and intervention needs, but this is mainly done by NGOs, and sometimes by international or regional organizations.
- **publishing** is the new and specific driver of young scientists and of academic institutions.

Interactions between drivers of fisheries research and research implementers are detailed in Figure 7.

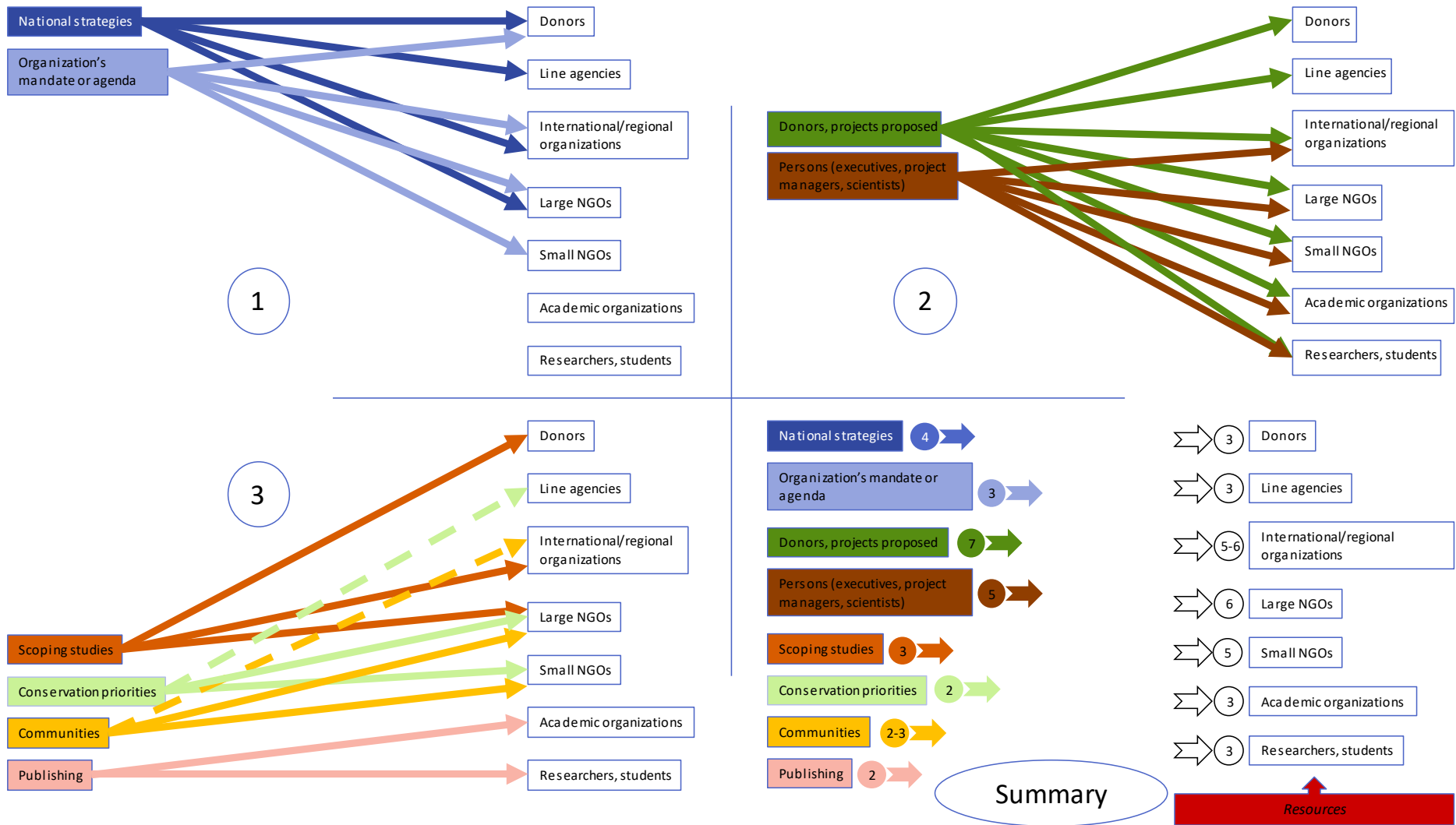


Figure 7: Interactions between drivers and implementers of research

This figure shows that, as mentioned above, **donors** remain the main driver of Cambodian fisheries research in term of size, selection of research themes and quality (quality checking process defined or not, internal or public reporting, regional or international publications required or not, etc.). Donors are also the actors having an influence on most fisheries research implementers. This situation justified in the past the development of internal planning and prioritization at FiA, and the streamlining of proposals and projects through improved donor coordination (with DFID/DANIDA then the EU Delegation playing a central role). These coordination requirements vis-à-vis donors remain fully relevant, and the beneficial role of the Technical Working Group on Fisheries can be further improved (case of large programs or loans being developed without being presented at the TWGF).

The second most influential driver is **individuals**, either at the decision-making level, in the academic arena or when designing projects. Thus, instructions from leaders at the central or ministerial level are also a significant driver of the research agenda in line agencies. Similarly, a few senior scientists or academes mentoring PhD candidates have a strong influence on the selection of new research topics by students and ultimately on the content of the highest quality fisheries research done in Cambodia. Last, future research activities are often defined by the focus of concept notes proposed by project managers, on the basis of their experience, field constraints, but also personal inclinations. This highlights the constant importance of public communication and awareness raising (e.g. about gender, conservation or social challenges) in shaping the Cambodian fisheries research agenda.

National strategies do influence the research agenda, but mainly among line agencies and high-level institutional actors. Since these agencies - and in particular their research units - are requested to draft sections of the national strategic plans there is a degree of circularity, but also an opportunity for scientists and management leaders to propose the research considered most relevant to the sector in the five to ten years to come.

Organizations' agendas are another driver of the Cambodian fisheries research. These agendas can be defined regardless of the country and sector (e.g. work on ethnic minorities, on aquatic mammals), and in that case the Cambodian fisheries sector is seen as a field of implementation, among others, of these external agendas. In reality these organizations' agendas are often blended with national strategies, scoping studies and consultations, but they definitely influence the development of large research themes (e.g. post-harvest, marine fisheries management).

At the same level of importance, **scoping studies** contribute to shaping the research landscape through an influence on donors, international organizations and large NGOs. They provide recommendations usually broader than those emerging from the field and complement or fine-tune strategic directions recommend by head offices. This underlines the importance of i) a solid and diverse consultation framework in proposed scoping studies, and ii) an active collaboration of national experts and scientists with external reviewers, a point sometimes neglected due to consultation fatigue.

The viewpoint and recommendations of **communities** are sought by NGOs (in particular small ones) and to some extent by international organizations (although their weight in the blend of drivers is less for the latter). If the combination of current local perspectives with large-scale, multisectoral and anticipatory ones is necessary among high-level actors, the local perspective remains overlooked by many research actors, at the expense of pragmatism, tangible deliverables and even sometimes research credibility. Thus, the difference -in particular in migratory patterns- between *Henicorhynchus siamensis* and *H. lobatus*¹⁰ -the two dominant species in the Cambodian freshwater harvest- is well known among fishers but remained ignored two decades long by institutional research.

Conservation priorities and even urgencies are flagged by the conservation actors as the main element that drives their research agenda and defines their next activities. The identification process of these priorities is sometimes unclear (appreciation for iconic species might be a strong underlying motivation) but i) the ongoing reduction and degradation of species-rich habitats is a clear argument, and ii) the focus on flagship species has proven an effective way to protect a larger range of species.

Publishing in reputable science journals is a new driver in the sector. It applies to young professionals, as PhD diploma, publication list and international exposure have become selection criteria to access positions in universities, line agencies or large organizations. The need to secure PhDs with A-level publications led to the recent analysis of catch and environmental datasets previously neglected, but can also result in the selection of research topics influenced by international appetite and publication opportunities (e.g. modelling, DNA studies).

Last, one factor obviously driving research but not always mentioned is **local resources**, in particular human and logistical resources. Research is complex and costly, and often requires laboratory equipment gathered over the long term, qualified field assistants, specialized technical maintenance (back office servers, GPS devices, underwater cameras, telemetry equipment, etc.), the contribution of statisticians and IT specialists, and access to professional software and scientific literature. These elements constitute the local enabling environment not necessarily funded by research projects, and are a constant constraint to research development.

¹⁰ Recently renamed *Gymnostomus siamensis* and *Gymnostomus lobatus* (So et al. 2019)

3.6. Internet visibility of FiA, IFReDI and MaFReDI

A search for information in English on the Fisheries Administration web sites yields very few results.

- A Google search for “Cambodia Fisheries Administration” yields one single page entitled “Welcome to Fisheries Administrator” (www.fia.gov.kh/english). Unfortunately, access to that unsecured page is blocked by antivirus software due to “threat of data loss”. When the safety measure is bypassed, access is given to a single semi-blank page¹¹, with no banner, no menu for sub-pages and broken photo links.
- The FiA main web site (fia.gov.kh) is only accessible in Khmer language, as access to the English version is blocked as above.
- On the FiA web page in Khmer, the link towards documents¹² gives access to 11 documents, all about aquaculture. This contrasts with the production of FiA scientists in capture fisheries, i.e. 136 documents in the past 6 years, including 80 publications on the freshwater domain and 35 on the marine one.
- The second FiA web sites under MAFF (fia.maaf.gov.kh), whose Khmer version is different from the previous one, includes an English version. However, that English site¹³ is the same as the Khmer one, in Khmer language. The Khmer version of the site features a link towards “technical books”; that link gives access to 43 documents on aquaculture and farming, but to no document on capture fisheries -except one unidentified PDF (no cover, no title, no reference) consisting of 66 pages of fishing gear illustrations. None of the 15 books, manuals and guidelines produced by FiA in the past 6 years is featured on this page.
- The IFReDI website (ifredi-cambodia.org) features a page of publications and reports. However, the most recent publication featured is dated 2012, and the most recent report is from 2015, which reflects no update in the past five years for these pages.
- MaFReDI, created in 2008, does not have a web site.

In short, the FiA web presence does not reflect the status and achievements of an organization that produced, in the past 6 years, 49 peer-reviewed articles in high ranking international journals and 87 other documents available elsewhere on the net. From an international perspective this neglect towards web sites is detrimental to the image of the administration, does not do justice to its significant achievements - in particular in terms of research and extension- and necessarily results in missed opportunities vis-à-vis new donors or foundations remotely exploring options for credible partnerships.

¹¹ <http://www.fia.gov.kh/english/index.php?page=home>

¹² http://www.fia.gov.kh/khmer/index.php?page=technical_docs

¹³ <https://fia.maaf.gov.kh/?lang=en>

4. THE NATIONAL POLICY CONTEXT

The CapFish - Capture project aims (Output 7) at assisting “MaFReDI and IFReDI in the preparation of a long-term Strategic Plan for Fisheries Research to Support Fisheries Management in marine and freshwater fisheries”, including “establishing a more robust institutional structure for fisheries research” and mechanisms to prioritize and implement research”.

This objective and the processes required to meet it need to be related to the national policy context that defines the administrative structure in which IFReDI and MaFReDI operate.

The Inland Fisheries Research and Development Institute (IFReDI) was established in October 2002 (MAFF Declaration n° 357) as a research and development institute under the Department of Fisheries (DoF). In 2006 the DoF became the Fisheries Administration (sub-decree n° 78, 11/098/2006) and the FiA’s new organizational chart including the Marine Fisheries Research and Development Institute (MaFReDI) was approved by the Prime Minister on 14 November 2008. The National Aquaculture Research and Development Institute (NARDI) was created later on, in 2014. In addition to these three *institutes*, two *centers* complement FiA’s research capacity: the Center for Inland Aquaculture Development (initially the Freshwater Aquaculture Research and Development Center or FARDeC) and the Center for Marine Aquaculture Development (initially the Marine Aquaculture Research and Development Center or MARDeC). See Figure 8.

Since their creation IFReDI and MaFReDI have been located within the FiA compound in Phnom Penh and have operated under FIA’s umbrella.

Nowadays, the future of IFReDI and MaFReDI is being planned under two simultaneous and mutually exclusive institutional frameworks.

1) Planned move of IFReDI and MaFReDI together with FIA

The government has planned to move the Fisheries Administration from its current location in Phnom Penh to Takhmau, south of Phnom Penh. Although the official decision for that move could not be traced, the new site is identified, new premises have been designed and earthwork has started. The new FiA site is located on Hun Sen Boulevard (usually called “60 meter road”), next to the future Aeon 3 Mall, 9 km from its current location. The 1.2 hectare site is on reclaimed land and will see the construction of four to five buildings (one main 9-floor high building for offices, one 3-floor high building for laboratories, plus a conference center, a building of apartments for staff and a restaurant).

According to these plans IFReDI will stay within FiA and will therefore move to the new site, where offices and labs have already been reserved for the institute (one floor in the main administrative building and one floor and a half in the lab building). Meanwhile MaFReDI, while remaining administratively under FiA, will move to its new premises in Sihanoukville, close to its operation base. The timeframe for these moves is not clearly set yet: probably 2022 or 2023.

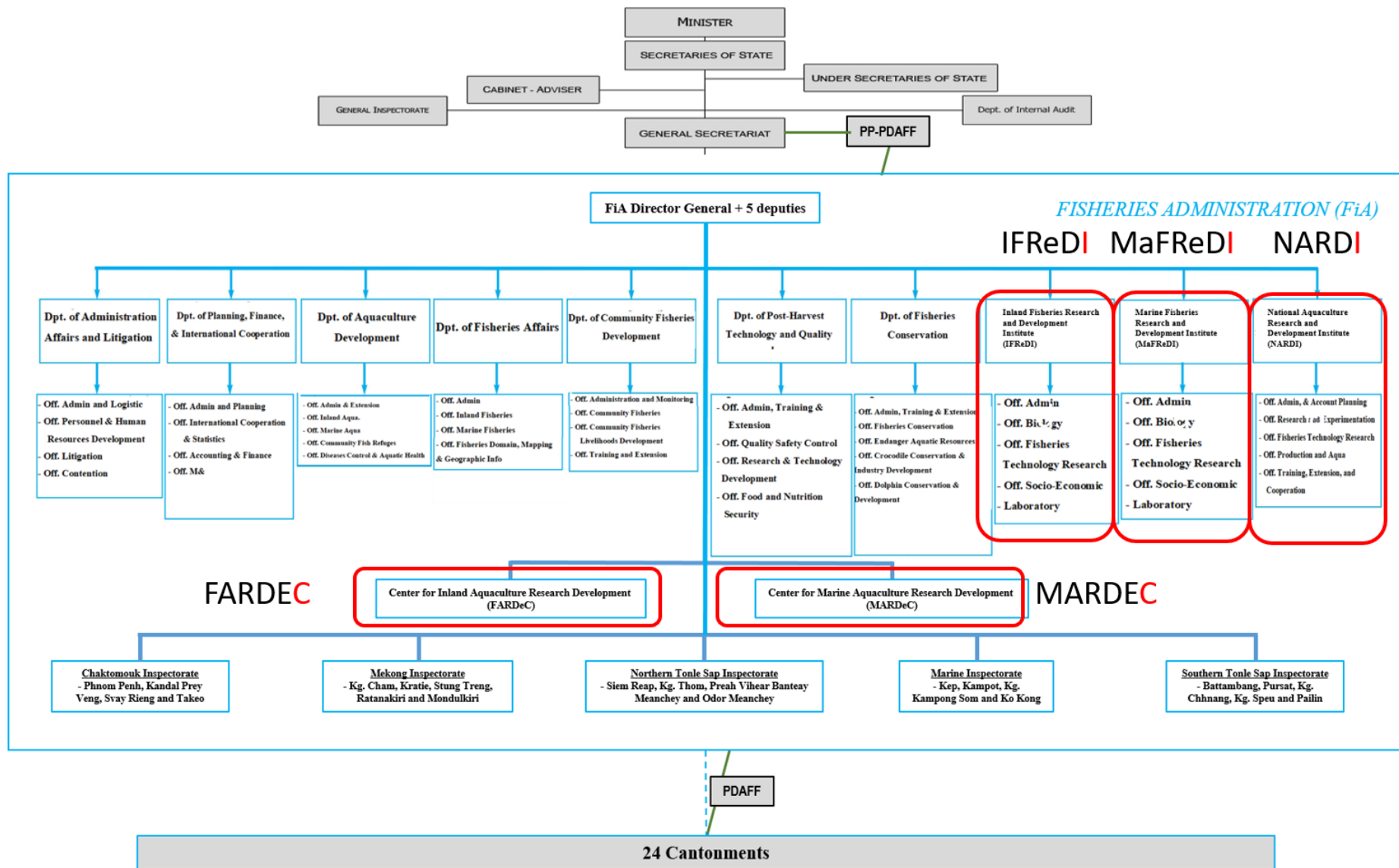


Figure 8: FiA's research institutes and centers

2) Planned transfer of FiA institutes towards a new Cambodian Academy of Agricultural Sciences

In the meantime, the government has initiated the development of a new Cambodian Academy of Agricultural Sciences. The creation of this Academy was decided before 2017, is mentioned in the political program of the Cambodian People's Party (p. 59), was announced at the 2017-2018 Agriculture, Forestry and Fisheries Congress and is reflected in the Agriculture Sector Strategic Development Plan 2019-2023 (p. 44).

Excerpt of the Agriculture Sector Strategic Development Plan 2019-2023

Chapter 3: Agriculture Development Strategy

3.3. Strategies and Agricultural Development Programs

3.3.5. Program 5: Increasing Supported Service Efficiency and Human Resource Development

Point #3. Human Resources Development in Agricultural Sector: develop technical knowledge and other related agricultural specialties, research more about new technologies and discoveries, aim at strengthening and expanding human resources in agriculture to meet the demands of labor market and socio-economic development. In these approaches MAFF has to successfully implement the following key strategic actions:

- examine, adjust and establish the organizational structure of ministry,
- launch an Academy of Agricultural Sciences for comprehensive and high efficiency in agricultural science researches, and
- coordinate development of the "Research Policy for Agricultural Development".

As presented to the leaders of all agricultural and fisheries research institutes in April 2018 and in subsequent information sharing sessions, the vision of the Cambodian Academy of Agricultural Sciences is to *"lead research, development and innovation in the agriculture sector"* and its mission is to *"develop inclusive scientific knowledge and technologies for sustainable growth of the agriculture sector"*.

The government's plan is to integrate to the CAAS all agricultural research and training institutes, including those in fisheries and aquaculture. Thus, the CAAS would bring together under its umbrella research institutes in crops¹⁴, forestry and rubber¹⁵, water management¹⁶, animal resources¹⁷, cross-cutting issues¹⁸ and education¹⁹, but also in fisheries and aquaculture, i.e. IFRaDI, MaFRaDI and NARDI. Latest developments indicate that the number of institutes federated would be reduced to thirteen, but IFRaDI, MaFRaDI and NARDI remain part of them. FARDEC and MARDEC, being research *centers*, would not join the CAAS and remain under FiA.

¹⁴ Rice and Cereal Research for Development Institute (RCRDI), Horticulture and Herbal Plant Research for Development Institute (HHRDI), Legume and Root Crops Research for Development Institute (LRRDI)

¹⁵ Forestry Research Institute (FRI), Rubber Research for Development Institute (RRDI)

¹⁶ Agricultural Land and Water Research Institute (ALWRI)

¹⁷ Animal Research for Development Institute (ARDI), Poultry Research for Development Institute (PRDI), Veterinary Research Institute (VRI), Livestock Biotechnology and Biodiversity Institute (LBBI); Wild Life Research Institute (WLRI)

¹⁸ Agricultural Biotechnology and Biodiversity Institute (ABBI), Food Safety and Nutrition Research for Development Institute (FSRDI), Agricultural Policy and Marketing Research Institute (APMRI), Agricultural Engineering Research for Development Institute (AERDI)

¹⁹ Royal University of Agriculture (RUA). Prek Leap National School of Agriculture (PLNSA) and Kampong Cham National School of Agriculture (KCNSA)

The funding of this academy would initially be through Chinese assistance, even though modalities have not been detailed yet. The CAAS would be located on the RUA campus in Chamkar Daung, south of Phnom Penh, but practical aspects about the housing of each institute have not been worked out yet.

Overall, the objective within the government has been a reorganization completed by 2023 -even though recent COVID-related constraints might delay or compromise these plans.

Thus, IFRaDI and MaFRaDI are currently concerned by two distinct institutional strategies to be implemented within the coming 2-3 years: either stay within FiA (while moving to new locations), or be detached from FiA and join a newly created institution. While the first option might disrupt or delay operations during the year of the move, the second might substantially impact the institutional framework of IFRaDI and MaFRaDI's operation with partners (e.g. all Memoranda of Understanding to be revisited, in particular high level ones shaping the institutional collaboration with regional partners such as MRC or SEAFDEC) and, more importantly, the funding environment already set or planned with development partners.

The ongoing restructuring makes the definition of a long-term roadmap for increased fisheries research coordination capacity at IFRaDI and MaFRaDI -including a new coordination with provincial versions of the Agriculture Sector Strategic Development Plan (PASDP)- a difficult exercise, for the following reasons:

- the institutional structure in which IFRaDI and MaFRaDI will soon operate might remain unclear until 2023, and a change in overarching structure might complicate the current plans regarding CapFish support to fisheries research through FiA;
- a deep restructuring of FiA's research institutes might expose the resources and funding level of these institutes, and their ability to deliver in relation to existing plans and commitments;
- similarly, in case of institutional restructuring the staffing of the institutes remains to be clarified, and current daily operations in collaboration with staff of other FiA departments might be compromised;
- in case of move under the umbrella of a new Cambodian Academy of Agricultural Sciences, existing partnerships and collaborations (e.g. with MRC, with WoM) might be temporarily altered, and institutional relationships with PDAFs and Cantonments might also require a redefinition.

For these reasons, and until the context clarifies, it is recommended to focus on short-term improvements to the existing research environment and networks, such as internal research streamlining, publication options and web visibility.

5. CONCLUSIONS

A short- to medium-term perspective on Cambodian fisheries research and coordination improvement lies in a focus on improved research coordination and research communication *within FIA*.

Two initial developments are possible:

- *the creation of a FIA Research Committee* in view of formally defining, once a year, research priorities from the FiA perspective. That committee should consist of a few scientists (e.g. one from IFRaDI and one from MaFRaDI, plus one lead publishing scientist) and, importantly, of national managers in charge of conservation, Community Fisheries, post-harvest, monitoring and enforcement. Key Cantonment heads representing the North Tonle Sap, South Tonle Sap, upper Mekong, lower Mekong, and coastal zone should also be included, for a total of 13 to 15 members. The objective is that the committee's constituency results in recommendations more driven by technical demand than by academic considerations. This would lead to the identification of the knowledge gaps considered most critical, and the definition of (only) 10 priority research themes. These priority themes can then be formally communicated to donors, NGOs and universities as the FiA's perspective on research needs in fisheries.
- The active *involvement of the FiA in the CapFish fund* for research managed by FAO and focused on fisheries and natural resources. That fund is sizeable - between USD 125,000 and USD 491,600²⁰ -, and allows the development, between 2021 and 2024, of priority research activities defined by the fund Steering Committee that will be created early 2021. A similar mechanism is also expected from the twin research fund managed by UNIDO (at least USD 420,000 to be allocated between 2021 and 2024), whose focus is food technology and food safety.

Improving research coordination will require awareness raising among the **individuals** who influence fisheries research and select or recommend research topics for MSc and PhD students - the latter being at the moment loosely related to fisheries management challenges²¹.

These individuals, include, as mentioned above, senior fisheries scientists and academes at IFRaDI, Wonders of the Mekong, Toulouse University, RUPP and UBB²² but also senior managers in the lead NGOs. The recommended process consist in formally *exposing, during an annual meeting, these mentors and project proposal writers to management needs and priorities in research topics identified by the FiA* (in particular by its Research Committee to be created). Such exposure is also a chance to flag and address the current gaps in fisheries research, in particular in terms of gender, post-harvest studies and livelihood monitoring²³.

It is assumed that leaders at the central or ministerial level will remain influential through the research issues they require, in relation to problems or public demand perceived at the local level.

²⁰ see companion report "Establishing a small-grant fund for fisheries research in Cambodia"

²¹ The latest Cambodian freshwater research focuses in particular on spatio-temporal variations in fish community structure and in feeding competition; on food web structure or on modelling of changes among macroinvertebrate communities. These academic and conceptual perspectives contrast with those, practical, of the latest theses in the marine environment: design and implementation of marine management strategies; socio-economic implications of proposed no-take zones or impact of community fisheries on sea turtles.

²² RUA does not have a PhD program

²³ See report "Research and information produced in the Cambodian fisheries sector"

Such increased awareness about research priorities will then be better reflected in **national strategies**, as the latter require the input of line agency scientists.

On the contrary, national research coordination has limited bearing on **organizations' agendas**, and this will remain as one of the uncontrolled factors. Yet it is healthy for the sector that some organizations, in particular NGOs, focus on themes not or insufficiently addressed by main organizations - in particular gender, children, ethnic minorities or processing.

What could be improved here is the *use of students by NGOs to answer questions relevant to the effectiveness of their assistance* (e.g. operation modalities that result in a better performance of Community Fisheries; identification of interventions that maximize fish refuge performance; techniques accessible to mothers to improve fish-based child nutrition; options to alleviate constraints on access of ethnic minorities to fish marketing; etc.). This use of students could be done through a better coordination between NGOs offering a mentoring role and, again, the research funds and grants of the CapFish project. This requires a proactive communication from fund managers towards NGOs.

A better consultation of **communities** is regularly requested by NGOs interacting with line agencies. Although FiA features recent examples of close interaction on a large scale (e.g. the Mekong Integrated Water Resource Management project, phase III), the process can be improved by *institutionalizing an annual consultation of community fisheries representatives to identify fisheries research themes locally relevant but also significant at the national level*.

Scoping studies, through their influence on donors and the agenda of large organizations, are activities that contribute in depth to shaping the sector, its management and its research. As such they require, like EiAs, inputs of FIA experts through a process based not only on aleatory good will but considered as an institutional obligation. Thus, consultation fatigue being acknowledged, improved coordination of fisheries research and management certainly requires that *contributing to scoping studies and collaborating with external reviewers be institutionally recognized and formally communicated to main FiA officers*.

Publishing is essential to research dissemination and is increasingly recognized as a professional necessity. At the moment, three main options exist for Cambodian fisheries scientists:

- *A-level publication in peer reviewed international journals*. Quality is maximal, but publishing at this level is very demanding and not accessible to all. It can also be objected that i) accepted papers tend to be on topics of global relevance only, or feeding the latest academic debates; ii) these articles are accessible only to fluent English speakers, and their style and language is not accessible to a non-scientific audience -such as decision-makers; iii) a lot of practical and valuable information (e.g. failed attempts, technical constraints) remains unpublished; and iv) international articles are costly²⁴.
- *Regional articles* in journals such as *Catch and Culture* (MRC) or *Fish for the people* (SEAFDEC). These journals have a large regional readership, and their non-peer reviewed articles are freely accessible. However they tend to present conclusions in a journalistic style rather than just results in a scientific way.

²⁴ i) USD 300-400 to publish a non-open access paper; about USD 3,000 for an open-access one
ii) about USD 25 per article for readers not registered in research networks

- *Technical reports.* These reports are non-peer reviewed, offer a large degree of freedom to authors, and can be formally published or not. Formal publication require an ISBN number²⁵ - an easy registration process that gives the status of internationally registered and copyrighted document. Alternatively, unregistered reports are considered grey literature. In practice, very few of the FiA reports are formally registered, and even valuable books locally published remain as grey literature hardly referenced and accessible on the web²⁶.

Thus, scientists producing technical information are confronted with a very small range of options when it comes to publishing. Exceptions consist in being co-authors in internationally driven publications or publishing with/for organizations that do register their reports (MRC, SEAFDEC, WorldFish, etc.) or at least put them online (MCC, CDRI, etc.). The Cambodian Journal of Natural History (rupp.edu.kh/cjnh) is the only peer-reviewed Cambodian science journal that offers a national option (it is also open-access, free of publication fees, and offers editing assistance to young scientists) but it is focused on conservation and fish only represent 5% of its content.

In that context, *it is proposed that the Fisheries Administration creates its own line(s) of publications.*

Two options can be considered:

- short articles about short analyses, findings or achievements, similar to SEAFDEC Fish for the People papers²⁷ or IWMI briefs²⁸
- technical reports, similar to MRC Technical Reports²⁹, WorldFish Program reports³⁰ or, in Cambodia, CDRI Working Papers³¹ or MCC Environmental reports³².

Both would be subject to an internal review process (e.g. two senior specialists in the field, one from FIA focusing on quality and the institutional perspective, one international reviewer focusing on quality and style). Both also require:

- a standard layout chart (which can be derived from those already existing such as the Mekong IWRM project series or the Wonders of the Mekong publications),
- a professional editor (possibly outsourced) for English, design, layout and ISSN or ISBN registration;
- and uploading on one of the FiA web sites, links being shared with partner organizations.

Publishing in those series can and should be open to external scientists (e.g. academes, students, partners). Ideally, all papers should be translated and available both in English and Khmer languages.

²⁵ An ISBN (International Standard Book Number) is a 13-digit code used to identify in the international network of publication databases all books published worldwide. It can be purchased at the National Library in Phnom Penh for USD 5-10 per publication. See <https://www.isbn-international.org>

²⁶ E.g.:

- Freshwater fishes of the Kingdom of Cambodia. 2016. Fisheries Administration and Ministry of Agriculture, Forestry and Fisheries. Phnom Penh, Cambodia. 404 pp.

- Fishes of Cambodian freshwater bodies. 2018. Inland Fisheries Research and Development Institute, Fisheries Administration, Phnom Penh, Cambodia. 197 pp.

²⁷ <http://www.seafdec.org/downloads/special-publication-fish-for-the-people/>

²⁸ E.g.: <https://www.iwmi.cgiar.org/publications/briefs/wle-towards-sustainable-intensification-briefs/re-conceptualizing-dam-design-and-management-for-enhanced-water-and-food-security/>

²⁹ <http://mrcmekong.org/publications/reports/technical-paper-series/>

³⁰ E.g.: <https://www.worldfishcenter.org/content/community-visioning-and-action-plans-tonle-sap-hub>

³¹ <https://cdri.org.kh/publication-page/working-paper/>

³² <https://marineconservationcambodia.org/marine-reef-research>

The cost of each publication - including translation into Khmer- could be integrated to project budgeting, and such option is definitely welcome by all donors. That cost would be minor (a few hundred dollars per publication) if the document is exclusively in digital format (PDF).

Formally developing one or two lines of science publications at FiA would therefore:

- offer a broader range of recognized publishing options and be an incentive for all fisheries scientists or technicians working in Cambodia;
- allow the development of fisheries publications in Khmer;
- value the substantial research work that remains partly unpublished (e.g. in conservation, in resource monitoring);
- increase the publication rate and number of outputs within FiA;
- be an innovation among fisheries administrations and fisheries departments in the region;
- substantially increase, at low cost, the local and international visibility of the Cambodian Fisheries Administration.

In terms of web presence, the current dire situation calls for the identification of a web unit or at least a person in charge. That unit would ideally consist of two persons, one IT specialist in charge of securing presence of and access to web pages, and one content manager in charge of collecting and putting new material online, while editing the presentation of this material. Seeking publications from the different institutes and departments is a challenging task in a context where communication and dissemination are not seen as a necessity by the producers of fisheries information. Thus, this information compiler should be strongly backed by the FiA executive management, so that provision of information to web sites does not solely depend on good will.

Actually a full strategic approach to web site maintenance should be considered, with the definition of a process by which documents but also news and written material are also regularly provided to the web unit. This process should become a systematic (e.g. monthly) and institutionally recognized contribution to information sharing, visibility and recognition of the FiA.

Thus, in a context of uncertainty regarding the institutional situation of IFReDI and MaFReDI, the first elements of a roadmap towards increased capacity for fisheries research coordination and improved visibility would consist in:

- the creation at FiA of a small Research Committee mainly composed of managers and defining priority research themes for communication to all research actors (in particular research mentors);
- the creation of a professionally organized line of publications for the whole institution, so that the current gap between currently unpublished reports and high-level articles in international journals is filled;
- the revamping of institutional web sites, with the creation of a maintenance and content provision unit.

These three initiatives and their sub-activities can be developed during the next couple of years, which remains independent from institutional decisions expected by 2023. These “low hanging fruits” will also substantially improve, in a short time frame, the visibility and recognition of the FiA currently characterized by underexploited research assets. Last, they should contribute to shaping a spirit of research-based management, and to a closer involvement of researchers in management challenges.

6. ANNEX 1: LIST OF INSTITUTIONS AND PERSONS CONSULTED

Institutions that contributed to the review:

Agence Française de Développement (AFD)
Asian Development Bank (ADB)
Cambodia National Mekong Committee (CNMC)
Conservation International (CI)
Delegation of the European Union to Cambodia (EU)
Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)
Fauna and Flora International (FFI)
FIA Community Fisheries Development Department (FIA CFDD)
FIA Department of Fisheries Conservation (FIA DFC)
FIA Department of Planning, Finance and International Cooperation (FIA DPFIC)
FIA Department of Post-Harvest and Quality Control (FIA DFPTQ)
FIA Deputy Director Generals (2)
FishBio
Fisheries Action Coalition Team (FACT)
Food and Agriculture Organization of the United Nations (FAO)
ForumCiv
Inland Fisheries Research and Development Institute (IFReDI)
Institut de Recherche pour le Développement (IRD)
International Union for Conservation of Nature (IUCN)
Japan International Cooperation Agency (JICA)
Marine Conservation Cambodia (MCC)
Marine Fisheries Research and Development Institute (MaFReDI)
Mekong River Commission (MRC)
Oxfam (OXFAM)
River Coalition of Cambodia / NGO Forum (RCC/NGOF)
Royal University of Agriculture (RUA)
Royal University of Phnom Penh (RUPP)
Southeast Asian Fisheries Development Center (SEAFDEC)
The Leaning Institute (LI)
Tonle Sap Authority (TSA)
U.S. Agency for International Development (USAID)
United Nations Industrial Development Organization (UNIDO)
University of Battambang (UBB)
Wild Earth Allies (WEA)
Wildlife Conservation Society (WCS)
Wonders of the Mekong (WOM)
World Bank
World Food Programme (WFP)
World Wildlife Fund (WWF)
WorldFish

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All these contributors are warmly thanked.

7. ANNEX 2: Questionnaire to fisheries actors

The questionnaire below was sent to all stakeholders consulted, or filled with them during Skype or Zoom talks.

● BRIEF DESCRIPTION OF THE ORGANIZATION

- Nature of the organization
- Size of the organization
- Donors
- How long in Cambodia?

● RESEARCH THEMES COVERED IN THE PAST FIVE YEARS

What are the research themes covered by your organization now and in the past 5 years?
Please indicate below the themes your organization has produced research about (0 = no focus; 1 = limited focus; 2 = strong focus)

DISCIPLINES	Themes	0 = no focus 1 = limited focus 2 = strong focus
BIOLOGY	Species biology or behavior	
	Community ecology	
	Stock assessment	
	Infrastructure impact studies	
	Fishing methods & performance	
SOCIOECONOMICS	Livelihoods	
	CFI studies	
	Gender, children, minorities	
	Nutrition, food security	
	Market chains	
POST-HARVEST	Fish processing	
	Fish product quality	
FIELD-BASED MONITORING	Catch monitoring	
	Effort monitoring	
	Habitat monitoring	
	Livelihood monitoring	
	Fish price monitoring	
MANAGEMENT APPROACHES	Conservation-focused management	
	Resource management by institutions	
	Resource management by/with communities	
POLICY	Responsibility and regulation analysis	
	Policy recommendations	

Any missing theme? Which one? Level of focus of your organization in this theme?

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- **IDENTIFYING RESEARCH**

How does your organization **identify** the research to be done?

Based on knowledge and opinion of key persons within the organization?

Through scoping studies?

Research topics indicated by donors?

- **RESEARCH PRIORITIZATION**

- **Prioritization process**

How does your organization **prioritize** the research to be done?

Among all possible or desirable topics, how are selected the priority ones?

- **Results of this prioritization**

What are the topics considered as a **priority for fisheries research** in Cambodia?

What are the results of this prioritization?

What research is currently flagged as necessary?

- **RECIPIENTS OF THE RESEARCH DONE**

Who are the **target recipients** of your research?

- **REPORTING RESEARCH**

How does your organization **report research** to its target recipients?

Through publications? Through reports? Through notes or talks to decision-makers?

- **DETAILED INFORMATION ON RESEARCH DONE**

- **List of projects done in the past five years**

Main projects implemented by your organization between 2015 and 2020

- **List of main research outputs in the past 5 years**

List of recent outputs produced by your organization (2015-2020)

International publications? (e.g. in science journals)

Regional publications? (e.g. MRC reports)

Reports by your organization

Communication to media

Notes or talks to decision-makers

Many thanks for your time and information sharing.

8. ANNEX 3: OVERVIEW OF PUBLICATION POLICIES AND PROCEDURES IN A RESEARCH INSTITUTION

Publication policies and procedures

The text below is an excerpt, modified to be concise and relevant to the Fisheries Administration, of the “Publication policies and procedures” at the CGIAR International Rice Research Institute (IRRI Publication guidelines, 53 pp.).

Principles

Reports of [FiA] activity outputs should be made available to collaborators, research administrators, policymakers, and others. This requires a publication framework, detailed below.

Publication framework

To improve dissemination of [FiA] research results and promote the exchange of [fisheries] research information among scientists, all research publications follow standard procedures designed to ensure institutional review.

Guidelines and procedures are recommended by the Publications Advisory Committee (PAC) and approved by Management. Implementation is the responsibility of the PAC and the science editor/publisher, in cooperation with [Department and Institute directors].

Publication products

Papers for external publication

All manuscripts and related materials reporting the outcome of [FiA] activities for submission to International journals are reviewed by the relevant [FiA] disciplines and approved by the [Department or Institute] head. A science editor/publisher provides editing services. The review process includes technical review (relevance, overall content and quality of the manuscript), biometrics review if needed (statistical aspects of the manuscript), and editorial review (style, English).

Books, technical reports

All books and technical reports —monographs, proceedings, manuals, field guides—based on work done at [FiA] must be approved for publication. A science editor/publisher provides editing services. This includes text editing, graphic design, standardized layout, and ISBN registration. The research program of origin is responsible for finding funds for printing and distribution.

Publication series

Two numbered publication series —Discussion Paper and Technical Bulletin— provide a flexible means for [FiA] scientists to share information with specialized institutions and individuals. The manuscripts are not normally subjected to extensive editing or peer review. Each series must have a [FiA] corporate identity, and appears in a standard format. The research program of origin is responsible for finding funds for printing and distribution.

Discussion paper. This series is a fast means of presenting plans for new research or preliminary results of research still in progress, but which could be of immediate use to others. The series also contains special project reports, consortia and network reports, reports of meetings or workshops

(short of the actual proceedings), workshop recommendations, and similar materials.

Technical Bulletin. This series is a rapid means of presenting results of research on a specialized technical subject such as the development of experimental methods, specialized software, or other solutions to complex research problems.

Internal review process

The goal of the internal manuscript review process is to improve the scientific content, quality, and presentation of manuscript sent for publication outside [FiA] to maintain its reputation as the premier research institution for [fisheries science].

An appropriate [FiA scientist] will always be asked to provide substantive criticism, to assist the author in developing the document.

Depending on the nature of the subject matter and of the document, more than one reviewer may be necessary. Thus, all technical reports must be reviewed by an external critic. Once an external reviewer has accepted the task, the science editor/ publisher manages the review process from that point on. An honorarium or fee is not routinely offered to external reviewers, but is to be considered when an extremely time-consuming review is required. In such rare cases, honoraria are funded by the research division producing the book. Final revision against the external reviewers' comments is discussed with the author by the science editor/publisher and a date set for final manuscript submission.

Publication procedure

Once the content has been reviewed, the Publications Advisory Committee will either assign a staff editor or hire a freelance editor, in consultation with the author. The author will work with the editor in preparing the manuscript for publication. When the final product has been approved, the science editor/publisher will convene a production meeting involving authors, heads of production and distribution and staff editor.



Three initiatives are proposed in the short term for better coordination in Cambodian fisheries research:

- creation at FiA of a Research Committee mainly composed of managers to define priority research themes for communication to all research actors (in particular research mentors);
- revamping of institutional web sites, with the formal creation of a maintenance and content provision unit;
- creation of a professionally organized line of publications for the whole institution.



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