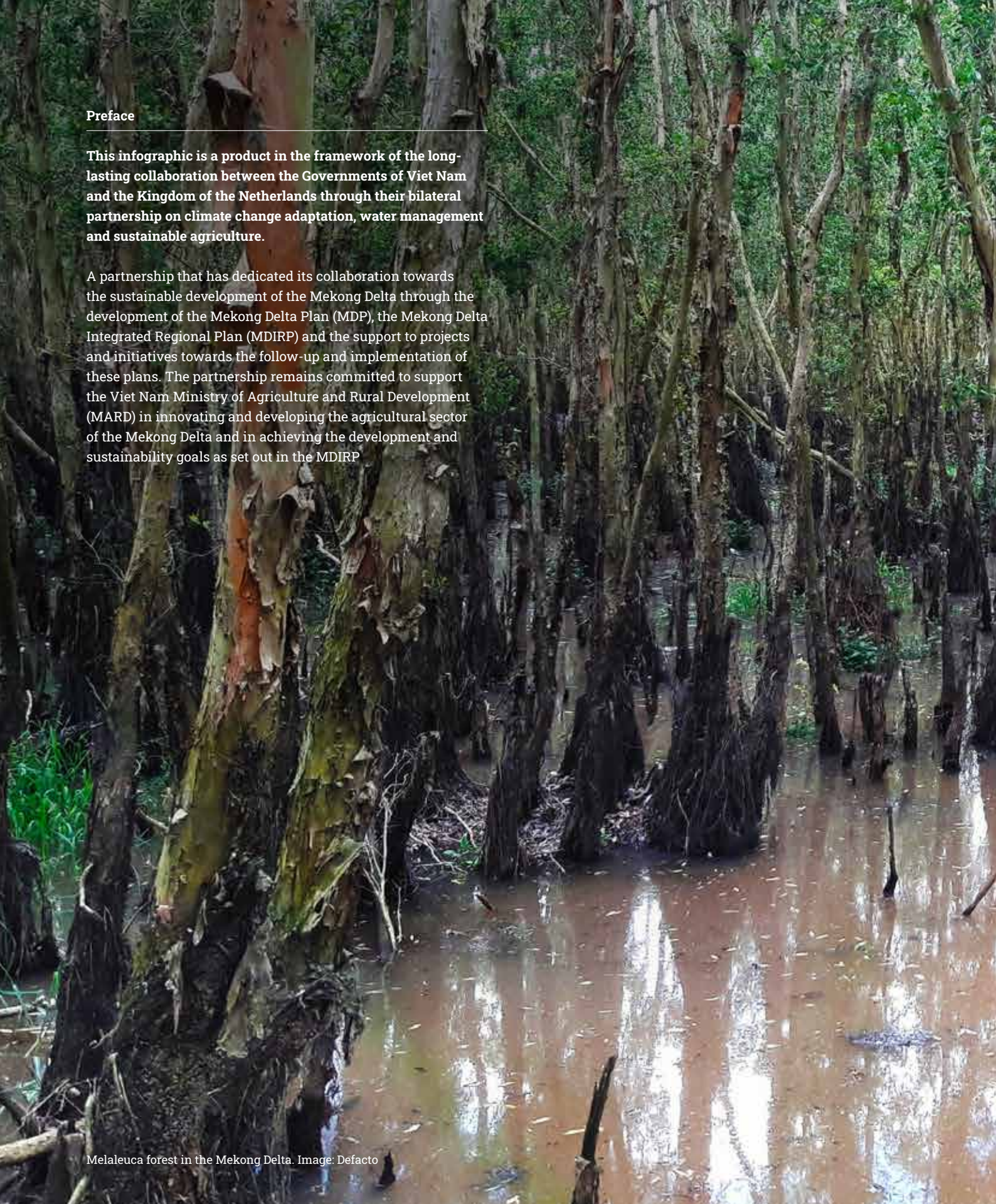
Mekong delta at a glance for sustainable agricultural transformation

Government of the Netherlands

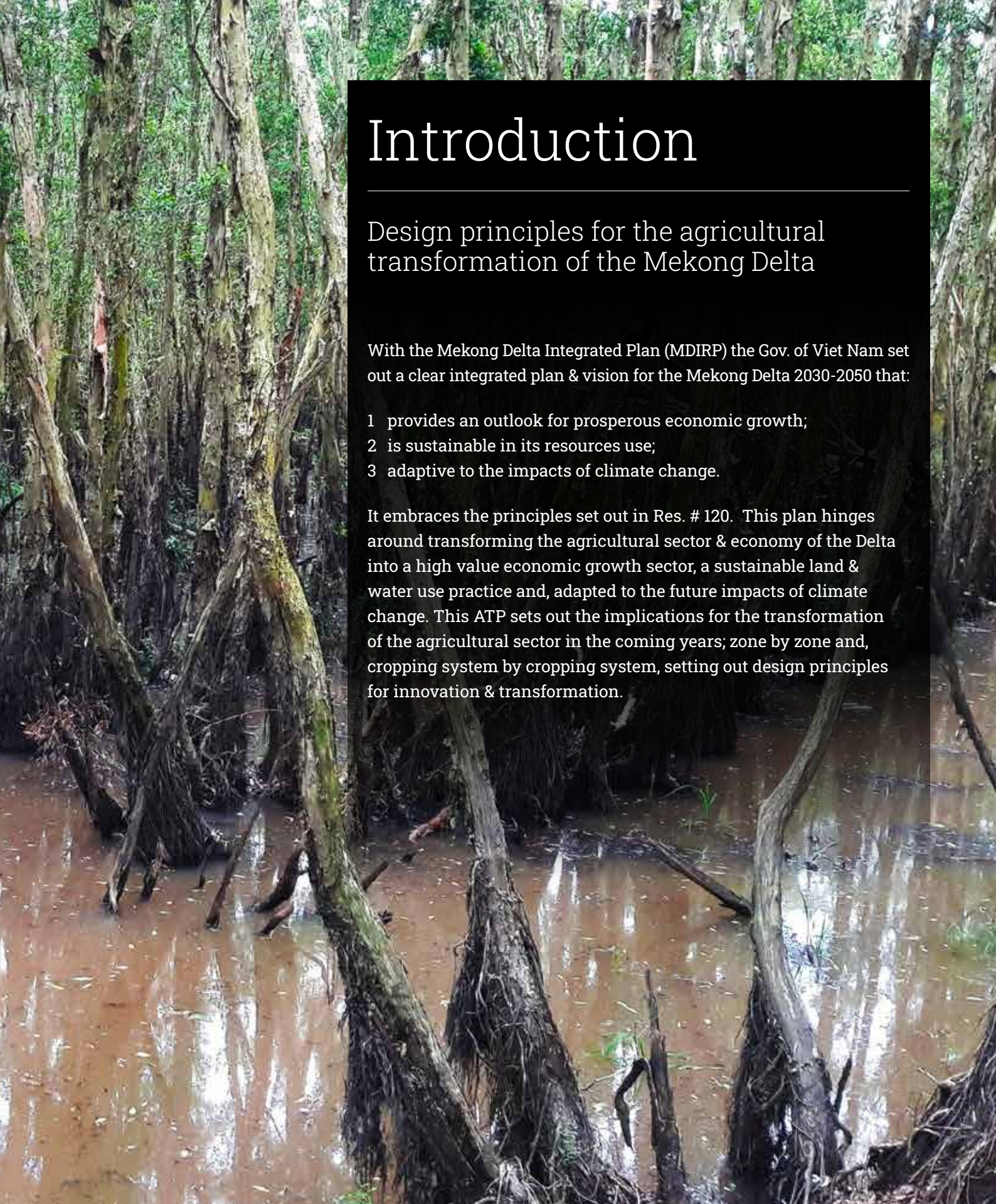
Preface

This infographic is a product in the framework of the long-lasting collaboration between the Governments of Viet Nam and the Kingdom of the Netherlands through their bilateral partnership on climate change adaptation, water management and sustainable agriculture.

A partnership that has dedicated its collaboration towards the sustainable development of the Mekong Delta through the development of the Mekong Delta Plan (MDP), the Mekong Delta Integrated Regional Plan (MDIRP) and the support to projects and initiatives towards the follow-up and implementation of these plans. The partnership remains committed to support the Viet Nam Ministry of Agriculture and Rural Development (MARD) in innovating and developing the agricultural sector of the Mekong Delta and in achieving the development and sustainability goals as set out in the MDIRP



Melaleuca forest in the Mekong Delta. Image: Defacto



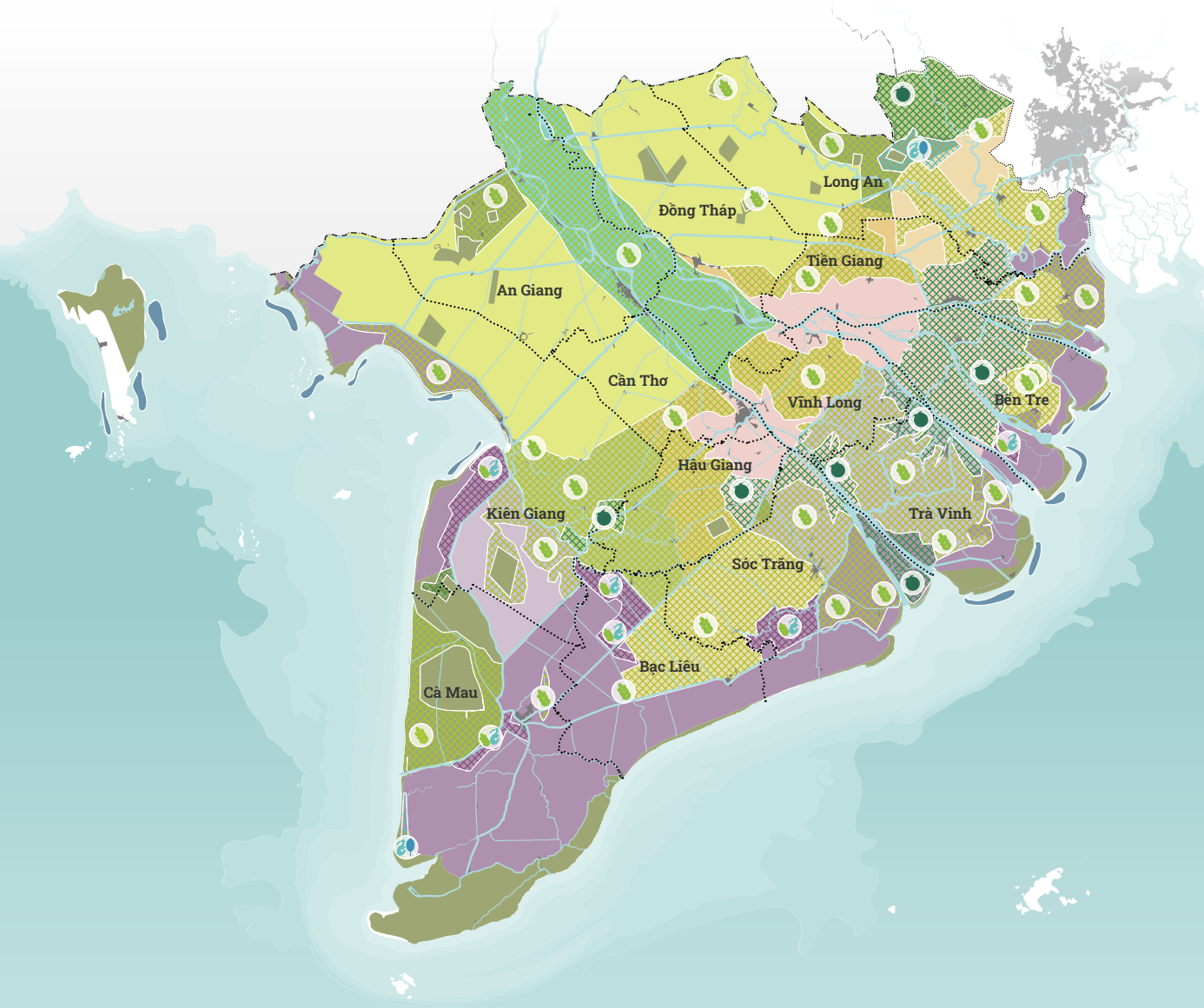
Introduction

Design principles for the agricultural transformation of the Mekong Delta

With the Mekong Delta Integrated Plan (MDIRP) the Gov. of Viet Nam set out a clear integrated plan & vision for the Mekong Delta 2030-2050 that:

1 provides an outlook for prosperous economic growth;
2 is sustainable in its resources use;
3 adaptive to the impacts of climate change.

It embraces the principles set out in Res. # 120. This plan hinges around transforming the agricultural sector & economy of the Delta into a high value economic growth sector, a sustainable land & water use practice and, adapted to the future impacts of climate change. This ATP sets out the implications for the transformation of the agricultural sector in the coming years; zone by zone and, cropping system by cropping system, setting out design principles for innovation & transformation.



Mekong ATP

Proposed agriculture use

- Rice farming
- Rice + Horticulture
- Horticulture (fresh)
- Horticulture (saline-tolerant)
- Fruit tree
- Aquaculture (brackish)
- Aquaculture (brackish) + Rice
- Rice + Aquaculture (fresh)
- Forestry + Fishery, Eco-Zone
- Marine aquaculture

Current use (transition zone)

- Rice
- Horticulture (fresh)
- Aquaculture + Rice
- Forest + Aquaculture

- Urban Area
- Provincial Border

MDIRP principles & objectives for a sustainable and prosperous development of the Mekong Delta centered around an agrarian future of high quality & high value

The MDIRP sets out a clear integrated and sustainable development plan & vision for 2030-2050 that is based on the principles set out in Res. #120: adapt to the impacts of climate change and transform agriculture from volume oriented to value & quality oriented output. These principles define the boundary conditions & objectives for the agricultural transformation in the Delta.

Drained rice field in the upper delta. Image: Defacto

Climate change & water resources availability

The impact of climate change and upstream developments are drastically changing the outlook for water resources availability in the Delta. These will impact on the future development orientation of agriculture by setting stringent conditions to which any new developments will have to conform. These are:

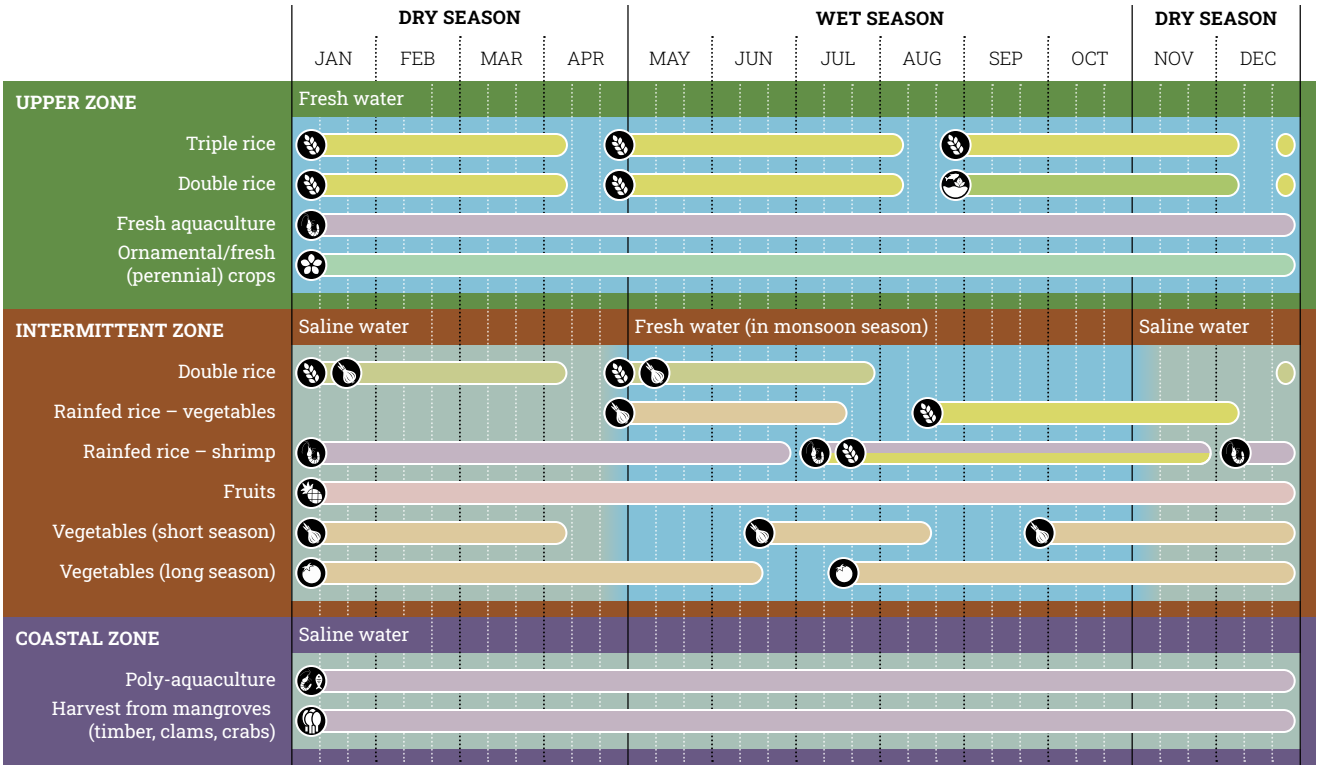
— **Reduced** availability of **freshwater** resources in the dry season.
— Increased **salinity intrusion** along the coast & progressively land inwards.
— Completely **stop** the use of **groundwater** in agriculture to combat the land subsidence.
— Be prepared to cope with **extreme** monsoon **floods** in the river system.

From a socio-economic development perspective the agricultural development is targeted to achieve economic prosperity and economic development opportunities. This is to be realized by:

— A general shift towards **higher value** produce & processing, flipping the agricultural production priorities to: aquaculture – fruits/vegetables – rice (in that order).
— Raise the income derived from agriculture and agri-food business to at least the national average.
— Generate **employment** in the Delta from agriculture and agri-food business.

To assure the sustainable resources utilization in future, the meeting of above requirements will need to foster & improve the water quality of the Delta. To achieve this, present-day impediments to water quality in agriculture will need to be overcome. These are:

— Avoidance of water stagnation (by sluicegates) in water channels by enhancing water circulation and exchange.
— Management of waterlogging in depressed and land subsidence areas trough drainage and/or aquatic land uses.
— Combatting agricultural pollution through:
  A separation of water intake and effluent drainage;
  B fostering nutrient cycling systems in agriculture, and
  C seasonal flooding and flushing of agricultural lands.


DRY SEASON
WET SEASON
DRY SEASON
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
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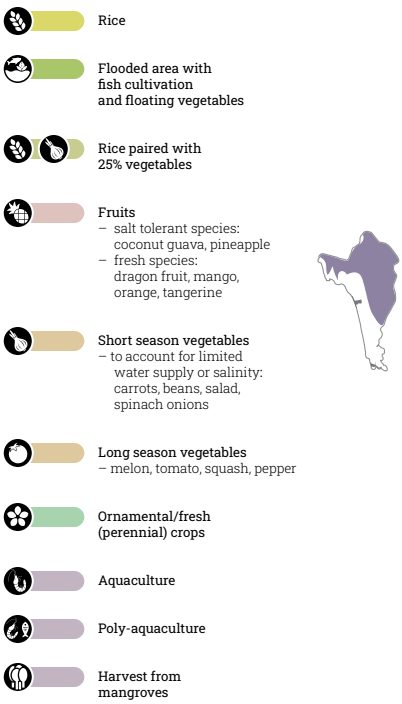
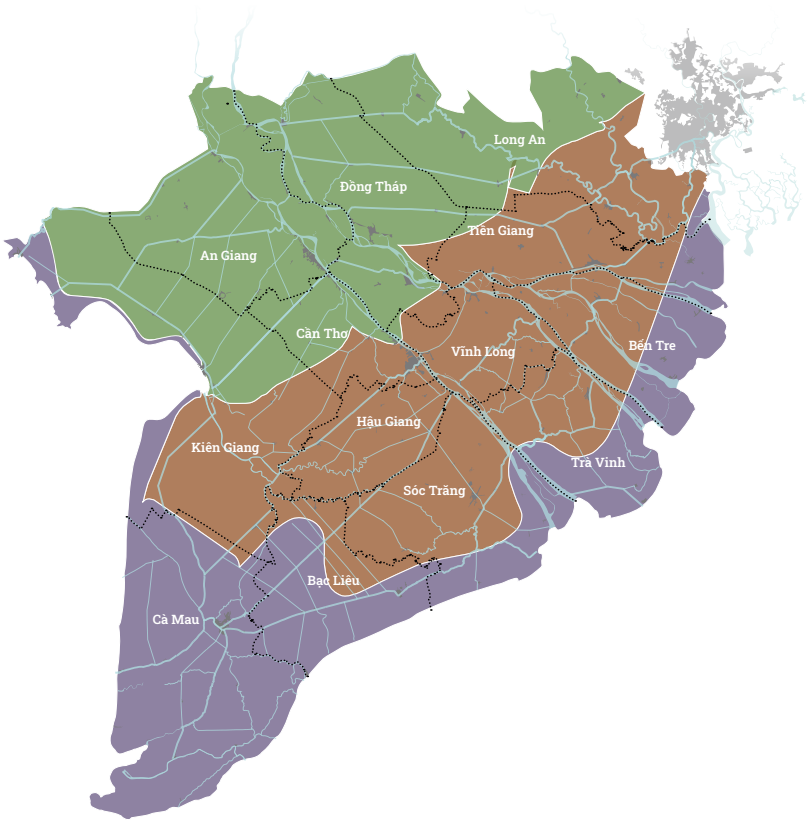
DEC
UPPER ZONE
Fresh water
Triple rice
Double rice
Fresh aquaculture
Ornamental/fresh (perennial) crops
INTERMITTENT ZONE
Saline water
Fresh water (in monsoon season)
Saline water
Double rice
Rainfed rice – vegetables
Rainfed rice – shrimp
Fruits
Vegetables (short season)
Vegetables (long season)
COASTAL ZONE
Saline water
Poly-aquaculture
Harvest from mangroves (timber, clams, crabs)


Rice
Flooded area with fish cultivation and floating vegetables
Rice paired with 25% vegetables
Fruits
– salt tolerant species: coconut guava, pineapple
– fresh species: dragon fruit, mango, orange, tangerine
Short season vegetables
– to account for limited water supply or salinity: carrots, beans, salad, spinach onions
Long season vegetables
– melon, tomato, squash, pepper
Ornamental/fresh (perennial) crops
Aquaculture
Poly-aquaculture
Harvest from mangroves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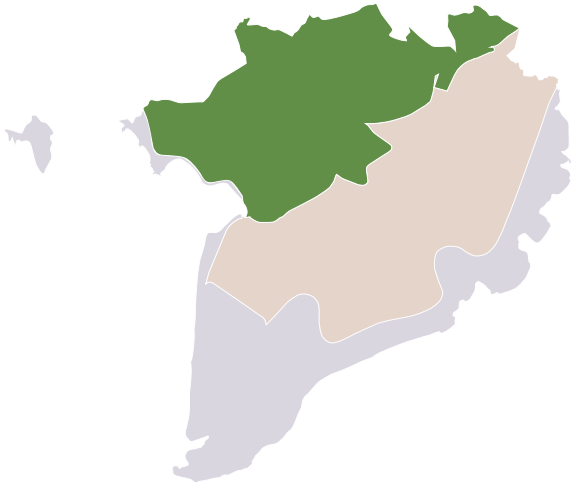
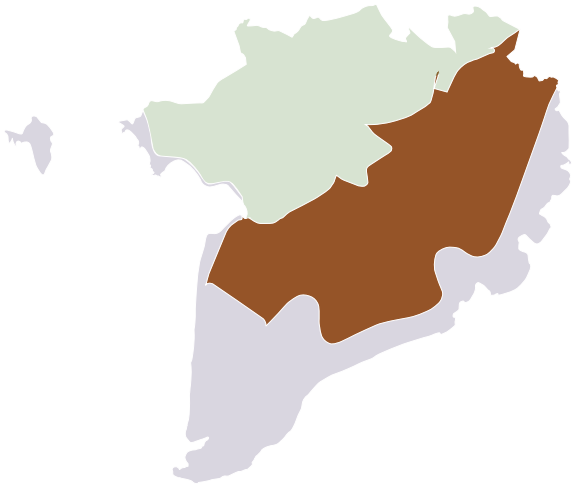
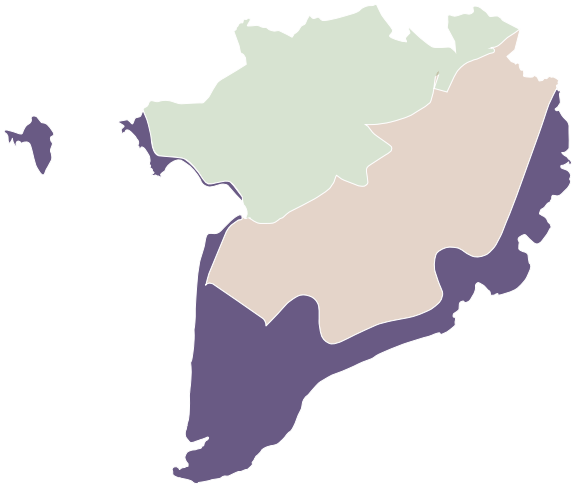
Sóc Trăng
Bạc Liêu
Cà Mau



Upper zone



Intermittent zone



Coastal zone

Water zoning

The water related impacts of climate change lead to a redefined agro-hydrological zoning of the Mekong Delta. Three basic zones define the long-term conditions on which agricultural production will need to rely on:

— **The coastal zone** that will have to entirely shift to & and rely on saline & brackish water.

— **The intermittent fresh-saline middle zone**, that will be predominantly a freshwater environment during the monsoon season but, switch to a saline/ brackish water environment during the dry season as seawater progressively intrudes.

— **The Permanent, year-round, freshwater zone** of the upper delta that has a guaranteed supply of freshwater from the rivers throughout the year.

Agricultural cropping patterns

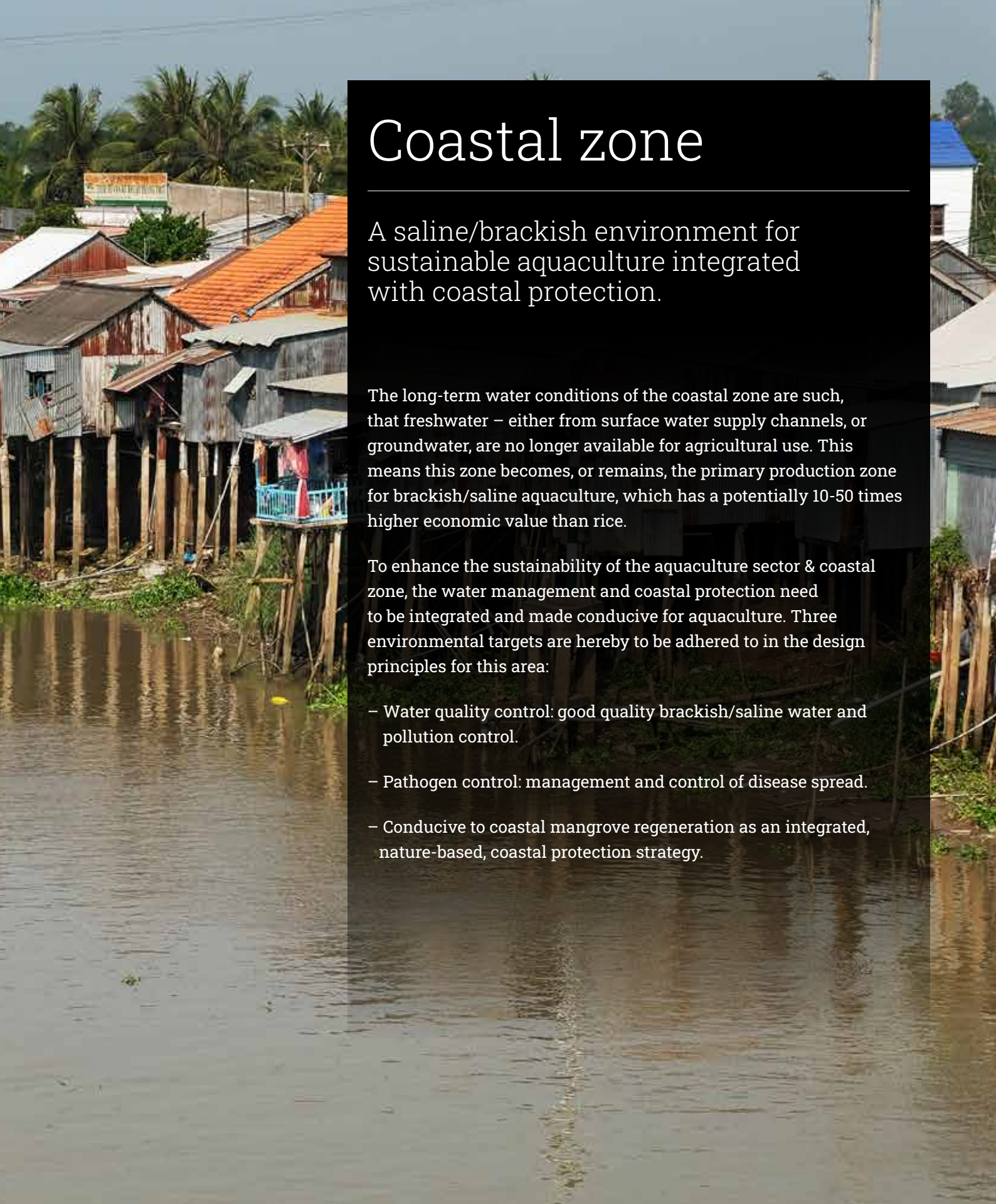
For the agricultural transformation & development of the delta, and its economy, spatially bounded cropping patterns are designed that:

1 conform to (are adapted to) the prevailing water management conditions of the agro-hydrological zones; and,
2 prioritize the higher value & quality for agricultural output in each zone.

The resulting cropping pattern strategy, as endorsed in the MDIRP, results in a re-prioritization of the agricultural production in the delta, in line with Res. #120, with a drastic shift in production outputs & areas. For 2050 agricultural outputs are foreseen to change (as compared to 2018) as: rice -34%, brackish aquaculture +7%, fresh/saline fruit +32%, fresh fruit +14% and vegetables +60%.

How these transformations of agriculture can be given shape in each of the zones is elaborated below.

Coastal Zone: Living along and transport on the river branches. Image: Defacto



Coastal zone

A saline/brackish environment for sustainable aquaculture integrated with coastal protection.

The long-term water conditions of the coastal zone are such, that freshwater – either from surface water supply channels, or groundwater, are no longer available for agricultural use. This means this zone becomes, or remains, the primary production zone for brackish/saline aquaculture, which has a potentially 10-50 times higher economic value than rice.

To enhance the sustainability of the aquaculture sector & coastal zone, the water management and coastal protection need to be integrated and made conducive for aquaculture. Three environmental targets are hereby to be adhered to in the design principles for this area:

- Water quality control: good quality brackish/saline water and pollution control.
- Pathogen control: management and control of disease spread.
- Conducive to coastal mangrove regeneration as an integrated, nature-based, coastal protection strategy.

Mekong ATP | Coastal zone

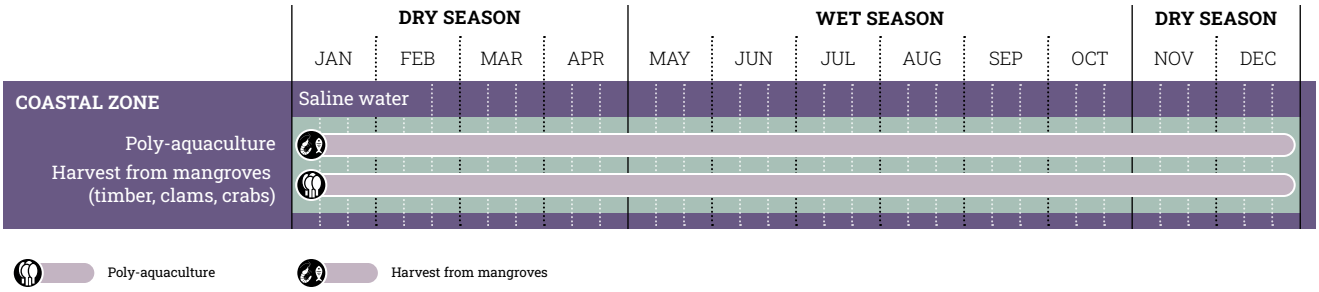
Proposed agriculture use

- Horticulture (saline-tolerant)
- Aquaculture (brackish)
- Aquaculture (brackish) + Rice
- Forestry + Fishery, Eco-Zone

Current use (transition zone)

- Rice
- Horticulture (fresh)
- Aquaculture + Rice
- Forest + Aquaculture

- Urban Area
- Provincial Border



Canal mouth along the coast. Image: Defacto

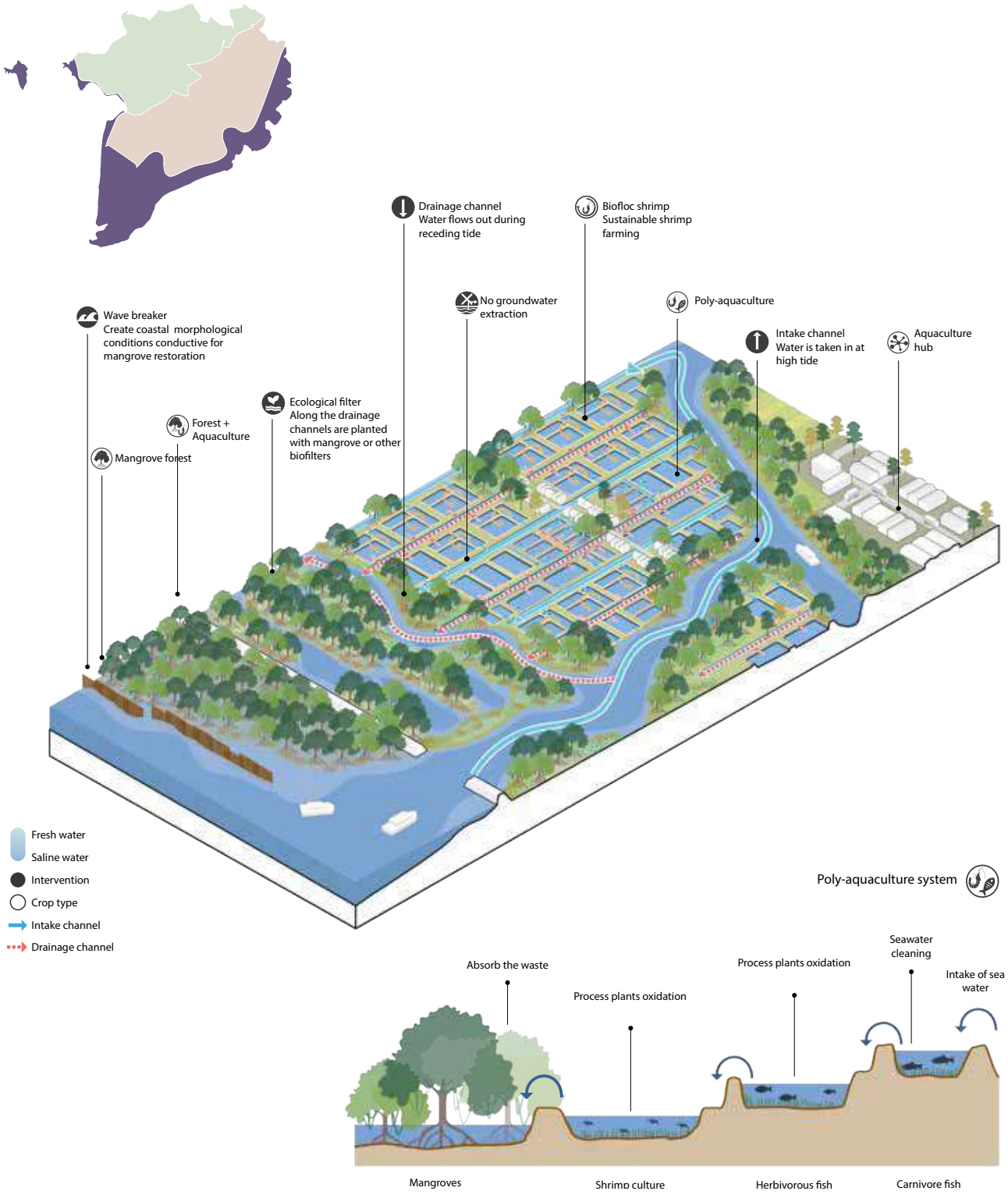
Separate in- & outflow channels

A sustainability priority for this zone and sector is to provide the brackish/saline aquaculture with a customized and tailor-made water management infrastructure that enables it to access high quality brackish/saline water through e separate water supply channel, while disposing its effluent water through a separate & designated drainage canal network. This is a critical component in: (i) safeguarding the access to good quality water; (ii) enable the circulation of water throughout the aquaculture farm, system and coastal zone; and (iii) the safe disposal of aquaculture effluent. Along the South-Sea coast, the circulation of water can be driven by the tidal energy, by taking inn water at incoming and high tide and disposing off drainage water at outgoing and low tide.

Coastal protection

The coastal protection strategy for the delta strongly hinges on the regeneration of a protective mangrove forest belt (of at least 500 m full canopy) along the shoreline. For the coastal zone this means that the aquaculture systems need to be conducive to, and in symbiosis with, the establishment and maintenance of this forest belt – along the outer shoreline for the north-east and west coast, and along the inner shoreline for the south-west coast. By considering mangroves as an integral part of sustainable aquaculture – fostered and fed along the drainage coastline zones and the banks of the creeks and canals that feed the system – this can be done. The mangroves themselves (apart from offering coastal protection) will service the aquaculture system as a nutrient cycling facility, while offering livelihood opportunities through clam, crab and fish raising, as well as ecotourism.

Coastal zone



Mono-shrimp cultivation pond with aeration equipement. Image: Defacto

Nutrient cycling & disease control

Corner stones of sustainable aquaculture centre around:
(i) nutrient cycling of intensive feed systems to reduce effluent loads and improve on-farm water quality & re-use; and
(ii) control of disease pathogens that may threat aquaculture stocks. These can be provided in two manners:

- At system level: through cascading polyculture systems, where intake water ponds are stocked with carnivore fish (e.g. sea bass) to control shrimp pathogens, followed by herbivore fish (e.g. tilapia) / sea weed/grass ponds (control of nutrients and oxygen) and shrimp ponds. Shrimp effluent is subsequently fed into the mangroves (nutrient cycling) through the dedicated drainage system.

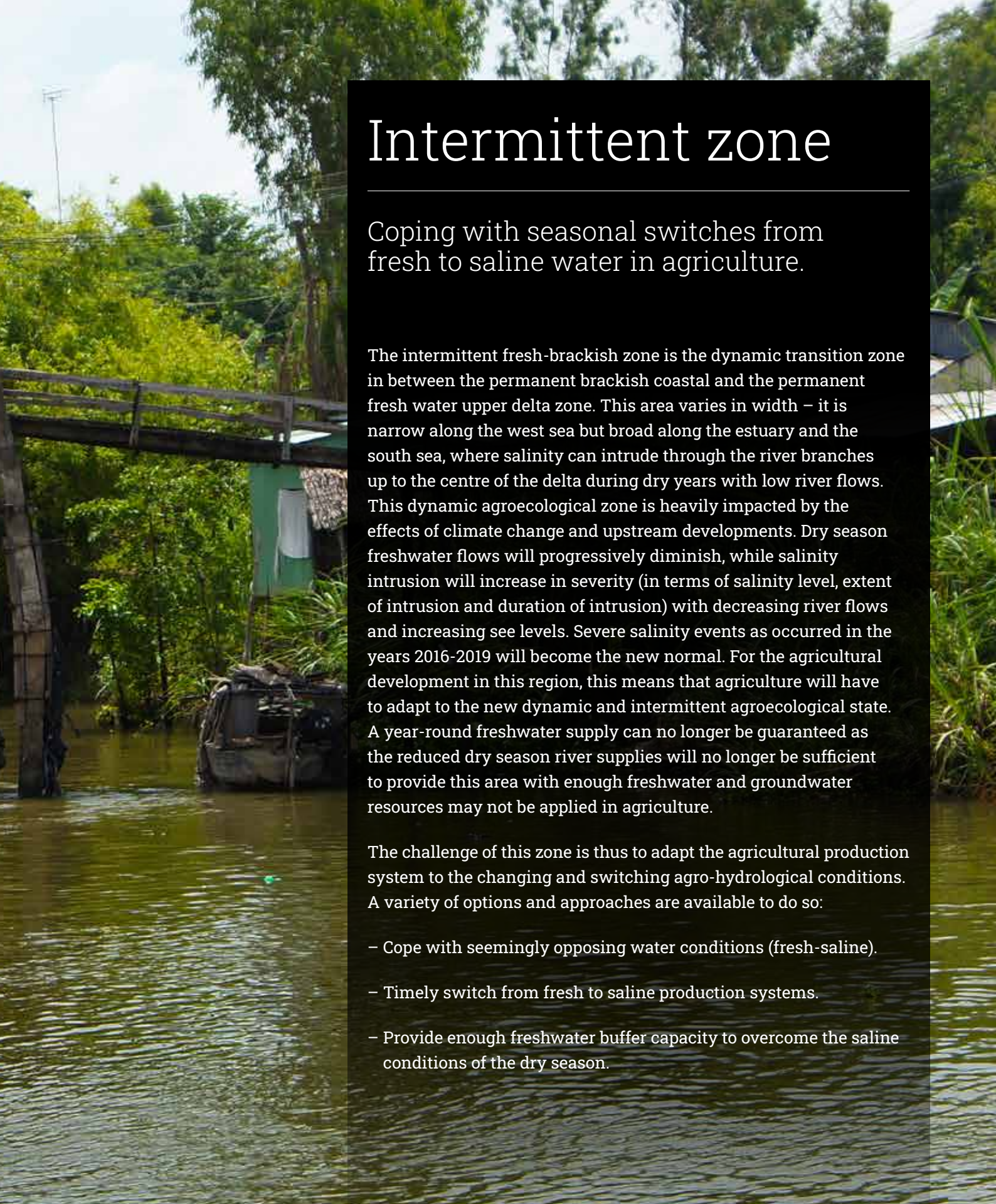
- At farm level: through Recirculation Aquaculture Systems (RAS) where water is treated and recirculated on-farm through fish (e.g. tilapia), sea weed and biofloc ponds (nutrient cycling) and water intake and drainage is minimized.

Design principles

- No groundwater use
- Separation of water intake and effluent drainage canal network
- Nutrient cycling & water reuse, on-farm and at system level (polyculture of fish, seaweed/grass, biofloc and shrimp)
- Disease control (carnivore fish in intake ponds)
- Integration with mangrove regeneration, at drainage flow location (nutrient cycling) and along intake channels
- Fostering of polyculture systems
  - Mangroves, clams, crab & fish
  - Seaweed/seagrass, fish, shrimp, with processing to feed, food & cosmetic industries
  - Carnivore/herbivore/shrimp

The technical lay-out of canal systems, integration with mangrove forest belts, as well as the diverse options for on-farm & system level configurations of polyculture-based nutrient cycling and water control re-use systems, needs to be tailor made within the landscape.

Rivers and canals: crossroads for transportation. Image: Defacto



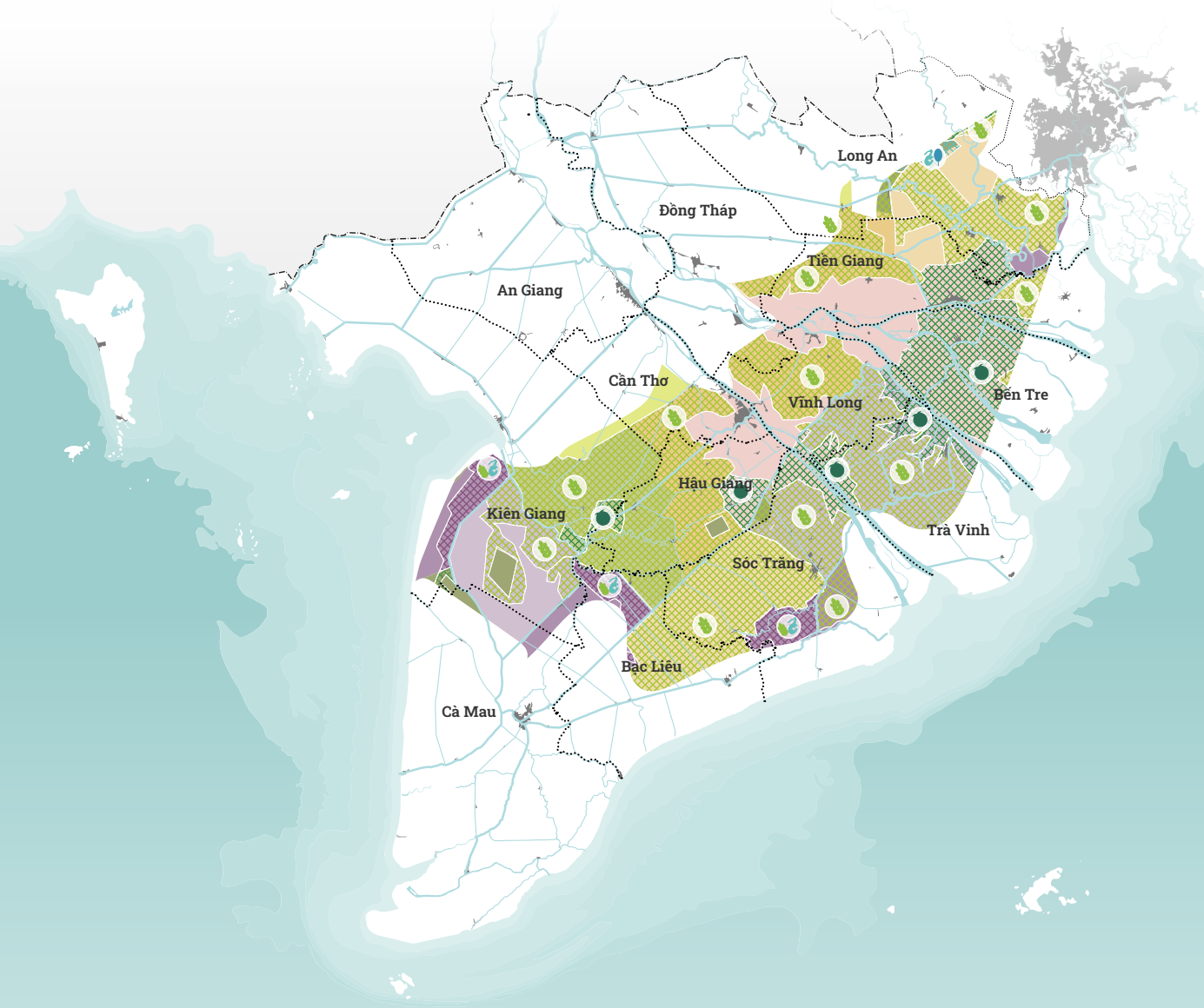
Intermittent zone

Coping with seasonal switches from fresh to saline water in agriculture.

The intermittent fresh-brackish zone is the dynamic transition zone in between the permanent brackish coastal and the permanent fresh water upper delta zone. This area varies in width – it is narrow along the west sea but broad along the estuary and the south sea, where salinity can intrude through the river branches up to the centre of the delta during dry years with low river flows. This dynamic agroecological zone is heavily impacted by the effects of climate change and upstream developments. Dry season freshwater flows will progressively diminish, while salinity intrusion will increase in severity (in terms of salinity level, extent of intrusion and duration of intrusion) with decreasing river flows and increasing see levels. Severe salinity events as occurred in the years 2016-2019 will become the new normal. For the agricultural development in this region, this means that agriculture will have to adapt to the new dynamic and intermittent agroecological state. A year-round freshwater supply can no longer be guaranteed as the reduced dry season river supplies will no longer be sufficient to provide this area with enough freshwater and groundwater resources may not be applied in agriculture.

The challenge of this zone is thus to adapt the agricultural production system to the changing and switching agro-hydrological conditions. A variety of options and approaches are available to do so:

- Cope with seemingly opposing water conditions (fresh-saline).
- Timely switch from fresh to saline production systems.
- Provide enough freshwater buffer capacity to overcome the saline conditions of the dry season.



Mekong ATP | Intermittent zone

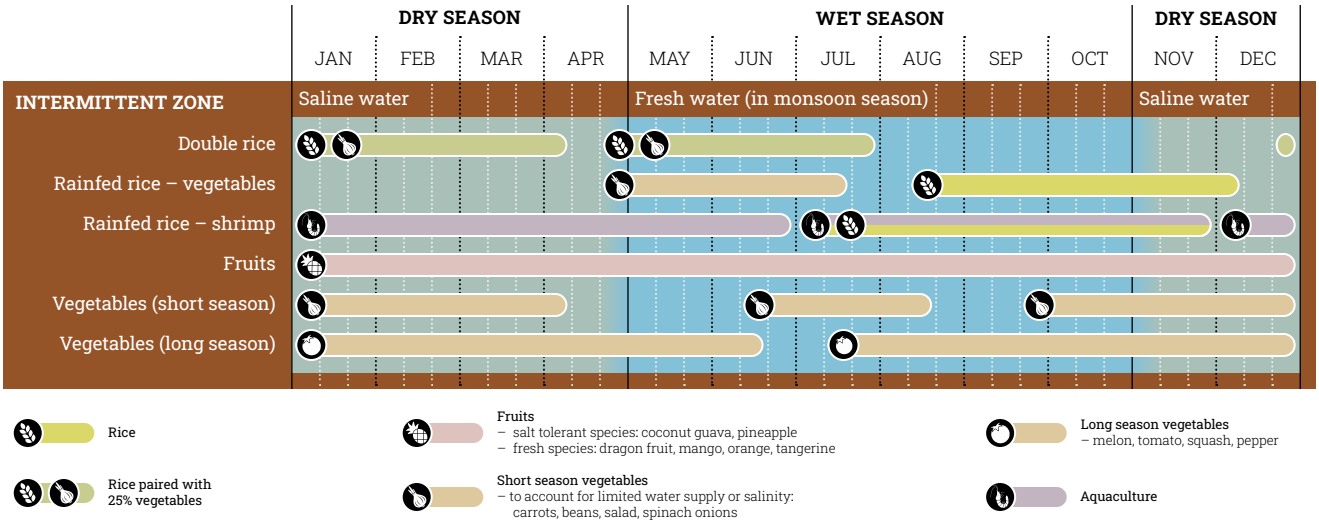
Proposed agriculture use

- Rice farming
- Rice + Horticulture
- Horticulture (fresh)
- Horticulture (saline-tolerant)
- Fruit tree
- Aquaculture (brackish)
- Aquaculture (brackish) + Rice
- Forestry + Fishery, Eco-Zone

Current use (transition zone)

- Rice
- Horticulture (fresh)
- Aquaculture + Rice
- Forest + Aquaculture

- Urban Area
- Provincial Border



Freshwater prawns. Image: Defacto

An Phuoc Plum. Image: Defacto

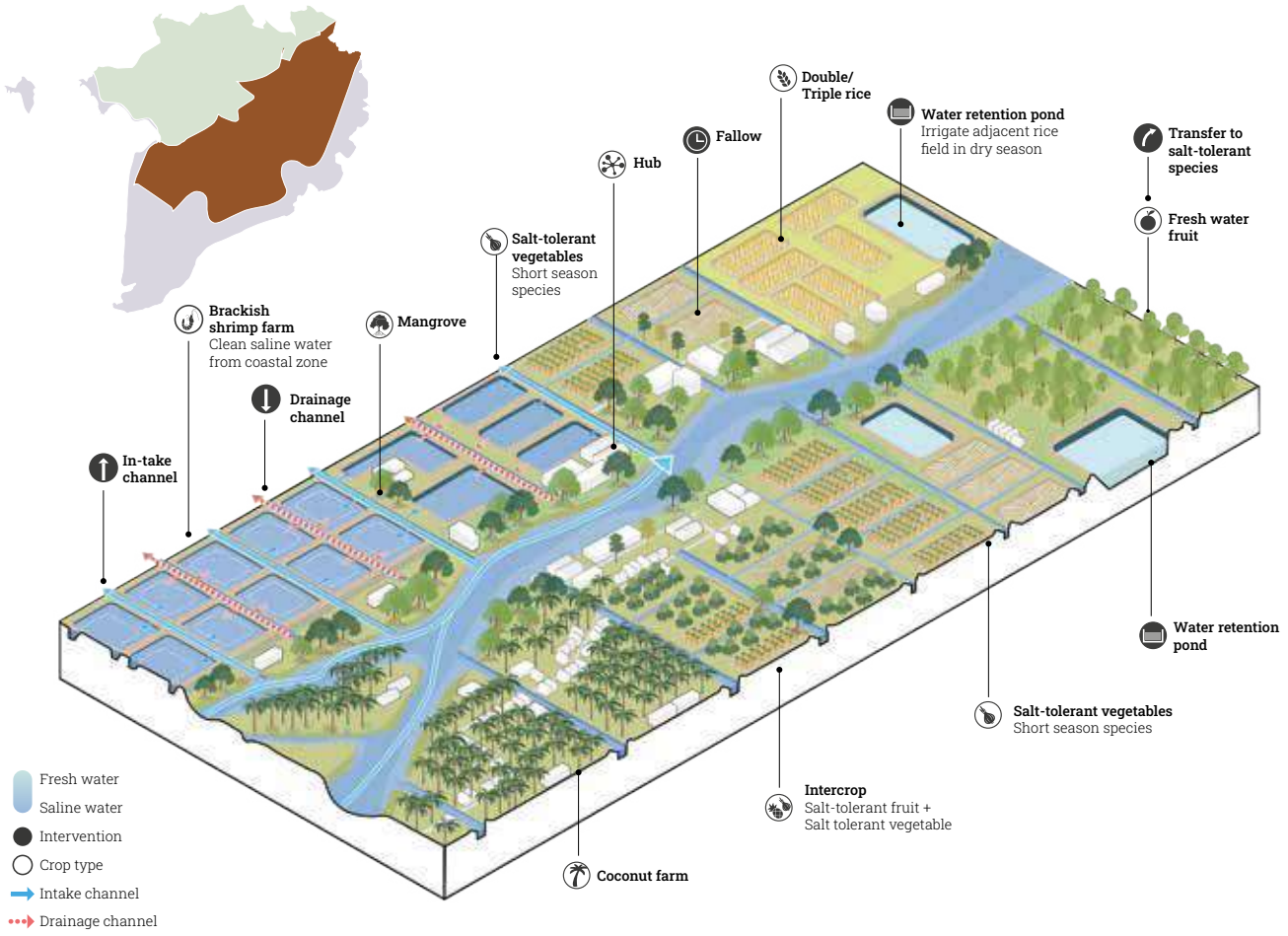
Rice-shrimp

The traditional rice-shrimp production system is, in principle, well adapted to this intermittent agro-hydrological zone. Growing rainfed rice during the fresh monsoon season, followed by the raising of shrimp during the saline dry season. To improve its sustainability, as well as its value & quality, the rice-shrimp system should be served by **separate** water **intake** and effluent **drainage** canal network. This is critical to ensure that farmers: (i) have access to good quality brackish/ saline water; (ii) are flexible in their timing of the rice & shrimp crops (separation of drainage of rice and ponding of shrimp); and (iii) avoid cross-contamination of farms when disease-stricken shrimps are drained. Value (and quality) can further be enhanced by supporting innovations in mixed rice/fresh prawns systems followed by shrimp; and developments in combining extensive and intensive shrimp.

Rice-vegetables / vegetables-vegetables

Alternative switch systems are based on alternating between freshwater crops (rice or vegetables) in the rainy season to salt tolerant vegetables in the dry season. The latter are still an agricultural realm of research & development, in particular with regard to the development of marketing options. With progressive salinization of this, and other coastal, zone, the demand for salt tolerant crops is set to grow.

Intermittent zone | Dry season



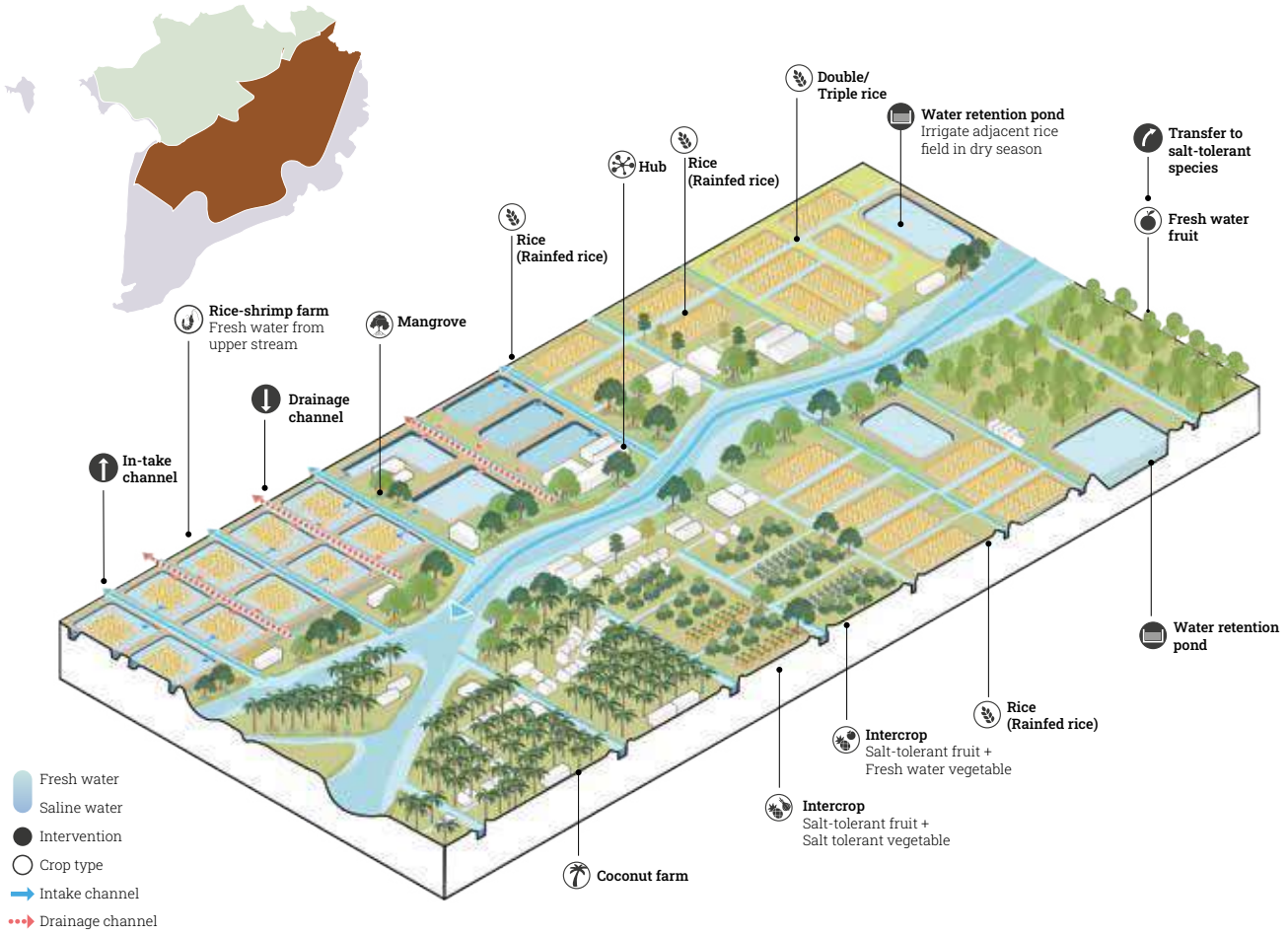
Design principle

- Fresh – Saline gradient: North to South, moving North.
- **No groundwater** use in agriculture.
- Rice/Prawn – Shrimp intermittent switch system: largest growth sector (area & volume) → provide separate **water intake** & **drainage** network.
- Short season vegetables: large growth sector. As flexible crop or in combination with storage.
- Salt tolerant fruits: growth area (South to North), search for new varieties.
- Salt tolerant vegetables: target R&D for "switch" strategy.
- Integrated water storage/fresh aquaculture/irrigated vegetables/fruit for buffer strategy (North), nature-based, coastal protection strategy.

Salt-tolerant

Especially for perennial fruits, the intermittent fresh-saline agro-hydrological zone requires a gradual shift towards salt-tolerant crops & varieties. Coconut is the established example of such a crop (e.g. Ben Tre) that can thrive under intermittent fresh-saline water conditions. Pineapple is also a fruit with relative high salt tolerance that may cope with increased salinity. Crop breeding programs will have to be targeted towards enlarging the crop & variety choices available for prolonged salinity exposure (of longer duration and increased severity). Fresh fruits will be progressively restricted to the upper inland reaches of the intermittent zone, to be replaced by salt tolerant varieties as salt intrudes progressively land inwards.

Intermittent zone | Monsoon season



Short-term vegetables

Short season vegetables (30-60 days) are an important target crop for this intermittent zone, as it provides a high value cropping option (as compared to rice) and flexibility to respond to changing agro-hydrological conditions. As the timing, extent and duration of salinity intrusion varies across years and across the area (coast to inland), short-term vegetables allow for reduction in intensity (from 5 to 4 to 3 crops per year) in response to the severity of salinity at relative low cost & risk.

Buffer capacity

With diminishing freshwater supply capacity from the upstream delta in the dry season (due to diminishing river flows and more pronounced salinity intrusion) the safeguarding of freshwater in the dry season will depend on surface storage capacity. Surface ponds/tanks can be deployed to store excess freshwater of the rainy season to irrigate vegetables (or fruits) in the dry season. Combination with high value (short season) vegetables and freshwater aquaculture will have to be sought to offset the costs of converting land to water storage facilities. Defining optimization strategies for such integrated water storage-aquaculture-irrigated vegetables systems will govern the agriculture R&D agenda.

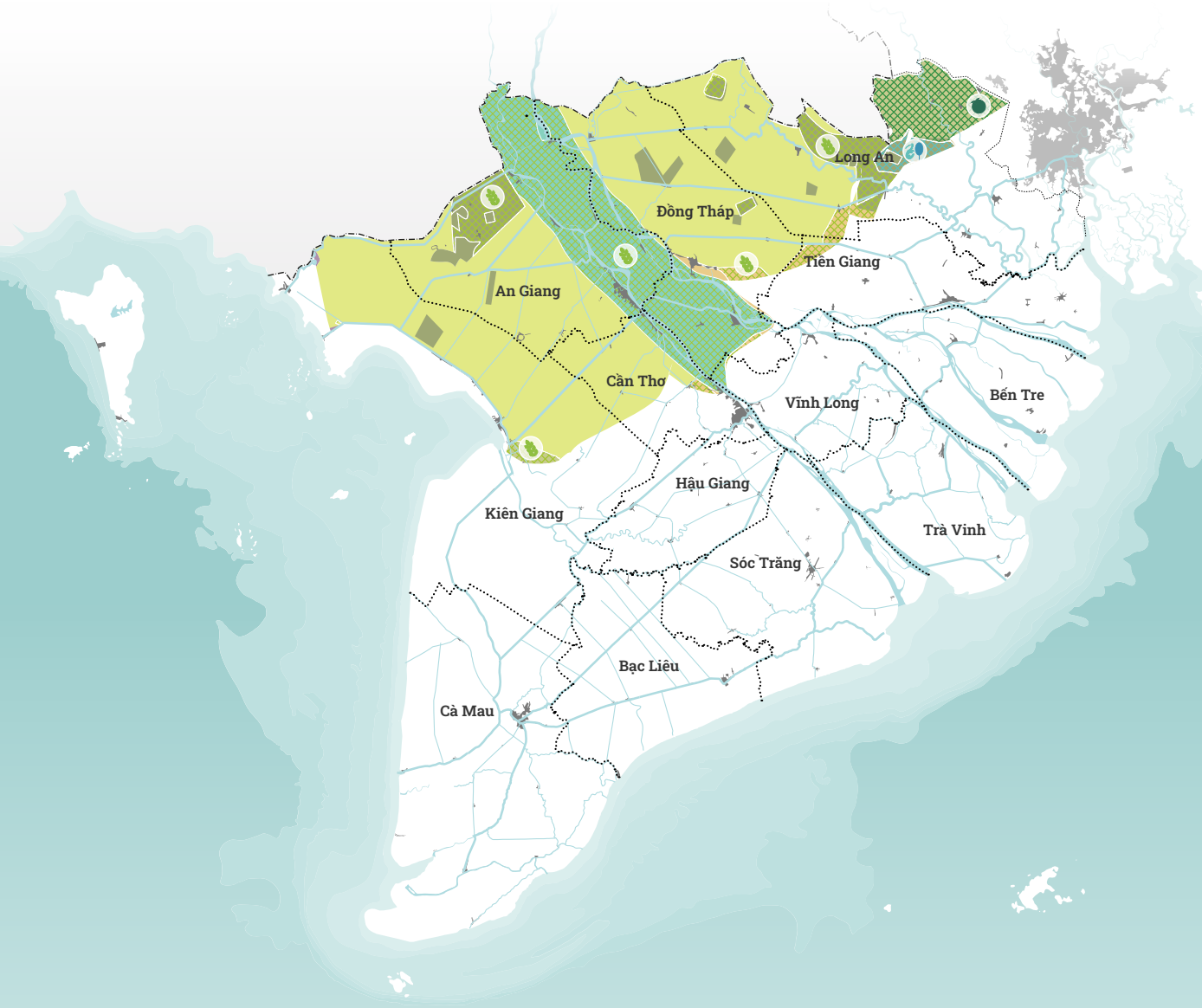
Pineapple farm in Hau Giang. Image: Defacto

Rice fields in the upper delta. Image: Defacto

Fresh upper zone

Permanent freshwater upper zone for rice, freshwater aquaculture, melaleuca and ornamental/vegetables.

The upper delta, characterized by its vast floodplains, the XEN quadrangle and plain of reeds, is the agro-hydrological zone of the delta with permanent, year-round, freshwater supply for agricultural use. Thanks to its relative upstream position and dense canal network fed by the rivers, freshwater supplies are guaranteed in the wet and dry season.



Mekong ATP | Upper zone

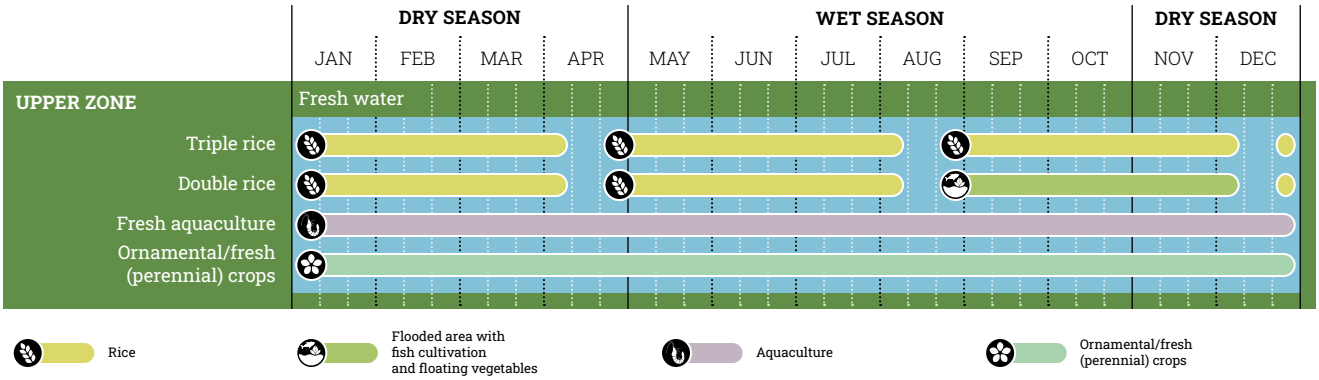
Proposed agriculture use

- Rice farming
- Rice + Horticulture
- Horticulture (fresh)
- Rice + Aquaculture (fresh)
- Forestry + Fishery, Eco-Zone

Current use (transition zone)

- Rice
- Horticulture (fresh)
- Forest + Aquaculture

- Urban Area
- Provincial Border



Vegetable fields. Image: Defacto

Rice: triple vs. double cropping

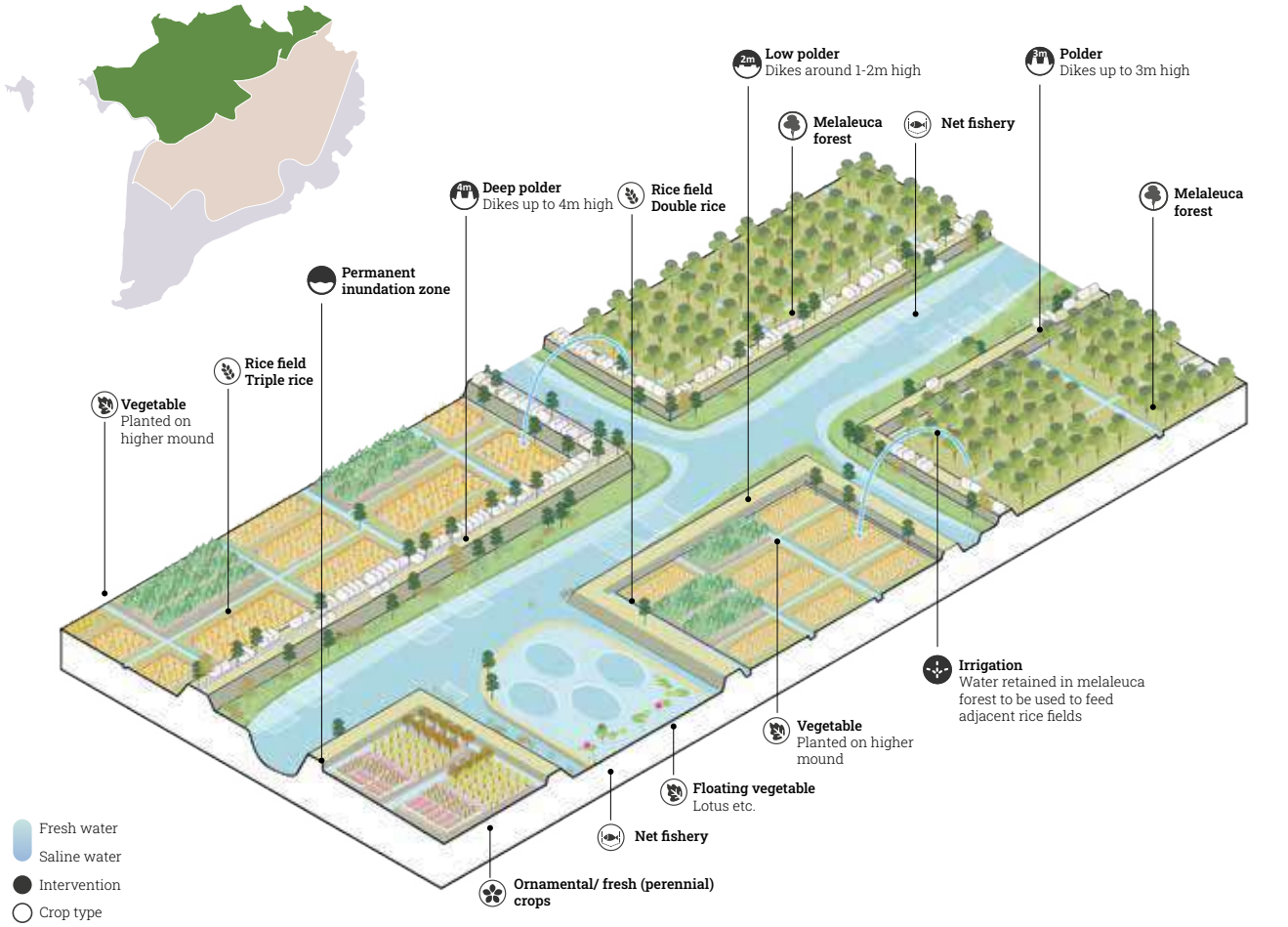
Given the freshwater availability and the presence of good soils, the upper zone remains the primary focus area for rice production in the delta. The majority of the reduced rice production target (from 24 million in 2018 to 16 million tons per year by 2050) will come from the upper zone. From a flood safety & sustainability perspective, restoration of the floodplains & annual river flood dynamics should be a priority target. For flood safety, to provide sufficient water retention capacity in the upper delta to cope with climate change induced extreme river floods, alleviate riverbank erosion pressures and, reduce the flood risks in the middle delta (Can Tho). For sustainability, to facilitate the periodic (annual) flushing of intensively cultivated soils and the deposition of fertile silt.

Even with the reduced 16 million tons per year production target, however, pressure will remain on the upper delta to continue with triple rice cultivation behind high dikes. To prepare for flood safety in the event of extreme monsoon floods, remaining high (triple rice) dike polders should be classified in calamity polders that designate the polders, in order of breaching sequence in case of extreme floods. To minimize flood damages, high investment developments (as perennial fruit trees, intensive vegetables, and housing) should be prevented in designated calamity polders.

This is particularly applicable to the XEN quadrangle, where the density of high dike triple rice polders is high. In the plain of reeds continuation of the double-rice + flood season should be enhanced and restored as much as possible.

Rice cultivation (triple & double) is foreseen to shift from current volume targets to aromatic quality targets that fetch higher prices on both domestic and export markets. To keep pace with national average income levels, rice farming in the future will have to consolidate, scale-up and mechanize – in particular for mono-crop farming in triple rice systems.

Upper zone | Dry season



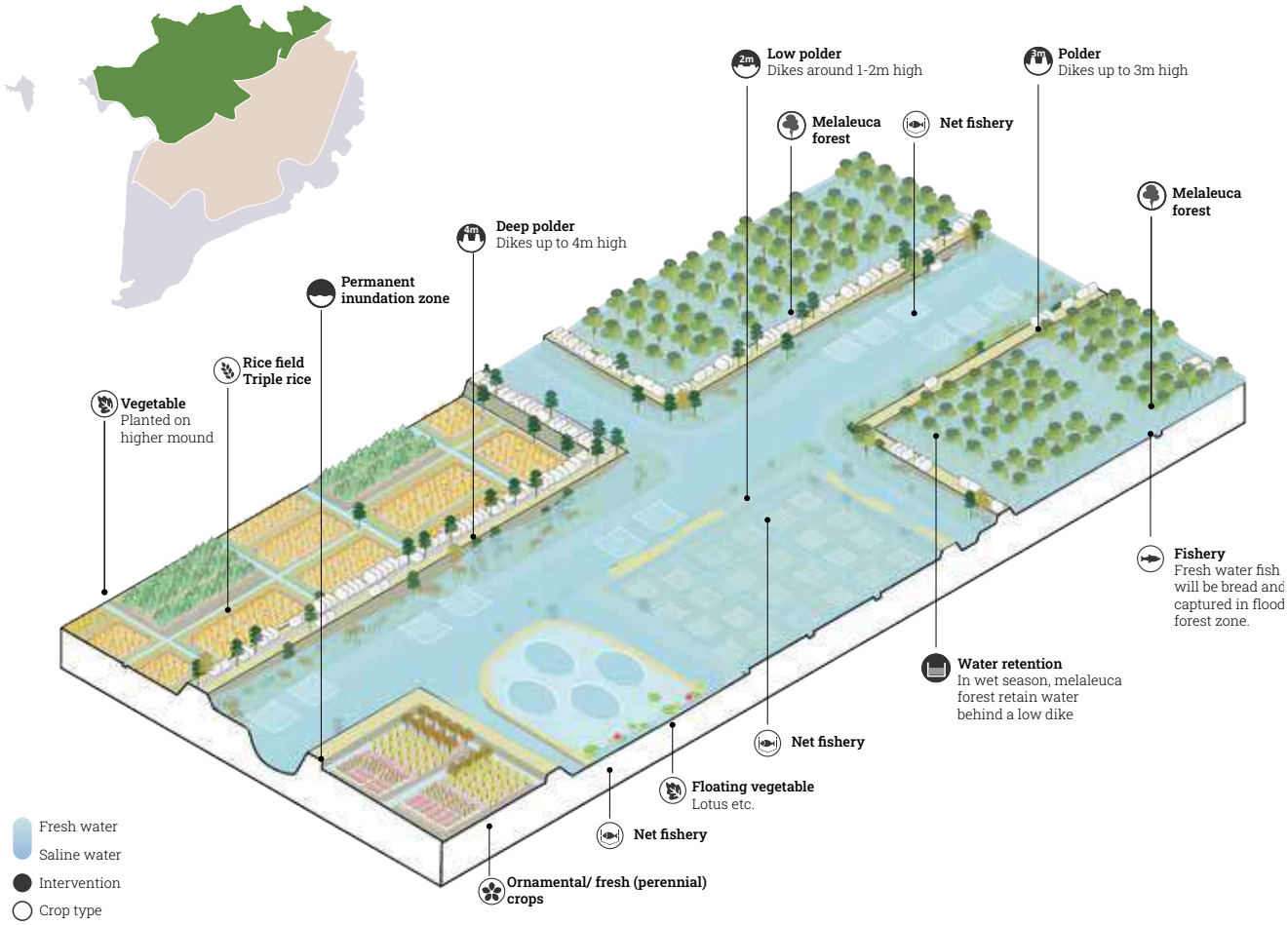
Vegetables, ornamental plants & fruits

Diversification into higher value crops as vegetables, ornamental plants and fruit trees will increase as farmers seek higher income opportunities. Vegetables may be applied on small patches in double & triple rice systems, as currently emerging, or as floating vegetables (with aquaculture) in the flood season. Ornamental plants and fruit trees, as perennial upland crops, will increase the pressure for high dikes on the floodplains, and will need to be regulated carefully on the most suitable areas (e.g. flood protected areas).

Freshwater aquaculture

With its year-round freshwater supply guarantees, the upper zone will become the primary production zone of the delta for freshwater aquaculture. In particular the pangasius sector will continue to consolidate and expand its presence in the upper delta to avoid the salinity hazards of the intermittent zone. It is expected to more than double in volume & value by 2050. As a high value production strategy, the raising of freshwater prawns – in combination with rice or in sequence of a double rice + flood – and snakehead fish – in combination with melaleuca and/or flood – is expected to rise significantly in this zone. Targeting higher value freshwater aquaculture in combination with rice & other flood-based cultures will benefit sustainable developments at the raising of fish/prawns impose higher standards on the water & soil quality in these integrated production systems.

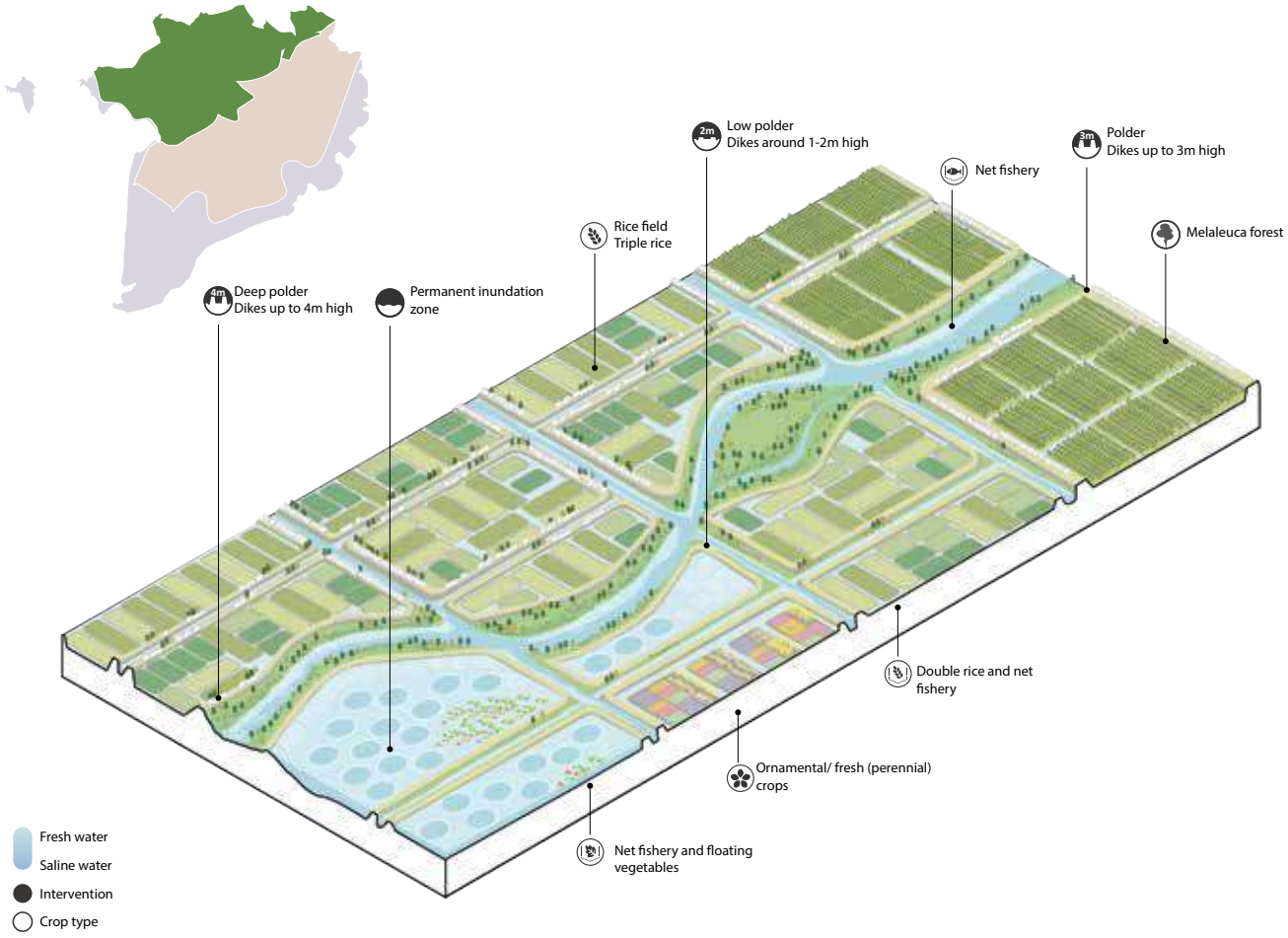
Upper zone | Monsoon season



Melaleuca forests

The MDIRP embraces clearly set reforestation targets (set at 11% land cover by 2050) for the delta, as part of its sustainability targets. In the upper delta this is given shape by regenerating the melaleuca wetland forest areas; as part of restoring the floodplains retention capacity, enhancing the biodiversity, as well as recovering the fish spawning areas for the Mekong fish population; In terms of livelihoods, this reforestation can be paired with the development of ecotourism and snakehead fish culture.

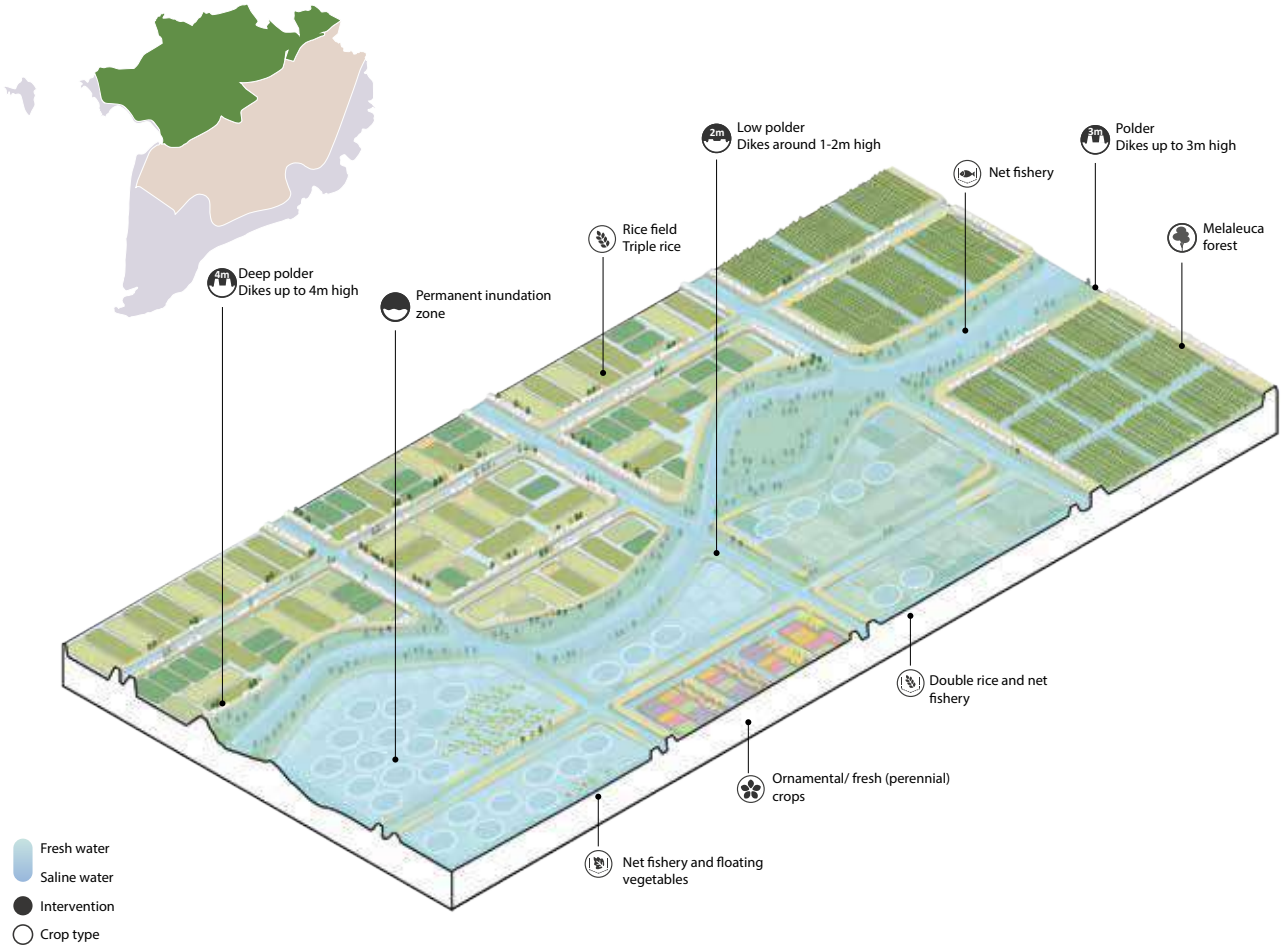
Upper zone | Dry season zoning



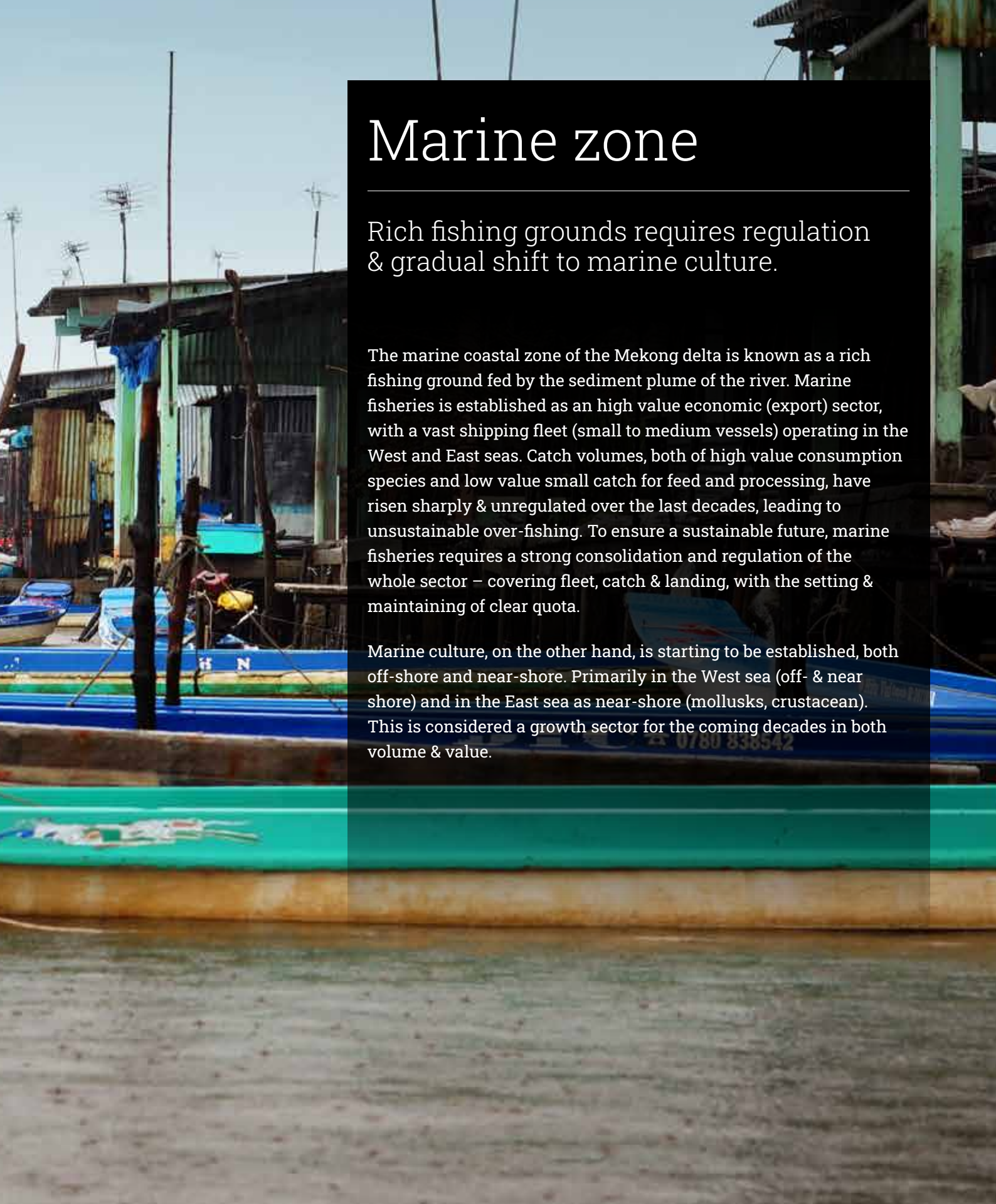
Design principle

- Restore & preserve the floodplains water retention capacity (living with floods).
- Continuation of rice focus production area:
  - 35% reduction of volume of rice by 2050
  - Shift from volume to value (aromatic) production
  - Up-scaling & mechanization in monoculture farms
- Calamity polder designation for high dike (triple rice) polders to cope with extreme flood events, avoiding high investment land use & cover.
- Focus area & high growth for freshwater aquaculture (pangasius, prawn, snakehead fish), with farms & systems design to cope with annual flooding (e.g. flood and floodplain friendly).
- Melaleuca forest growth area, in combination with ecotourism and aquaculture.
- Target high value crop diversification (vegetables, ornamental plants, fruits) that are flood friendly (floating with aquaculture or intensive small scale in protected areas).

Upper zone | Monsoon season zoning



Fishing boats. Image: Defacto



Marine zone

Rich fishing grounds requires regulation & gradual shift to marine culture.

The marine coastal zone of the Mekong delta is known as a rich fishing ground fed by the sediment plume of the river. Marine fisheries is established as an high value economic (export) sector, with a vast shipping fleet (small to medium vessels) operating in the West and East seas. Catch volumes, both of high value consumption species and low value small catch for feed and processing, have risen sharply & unregulated over the last decades, leading to unsustainable over-fishing. To ensure a sustainable future, marine fisheries requires a strong consolidation and regulation of the whole sector – covering fleet, catch & landing, with the setting & maintaining of clear quota.

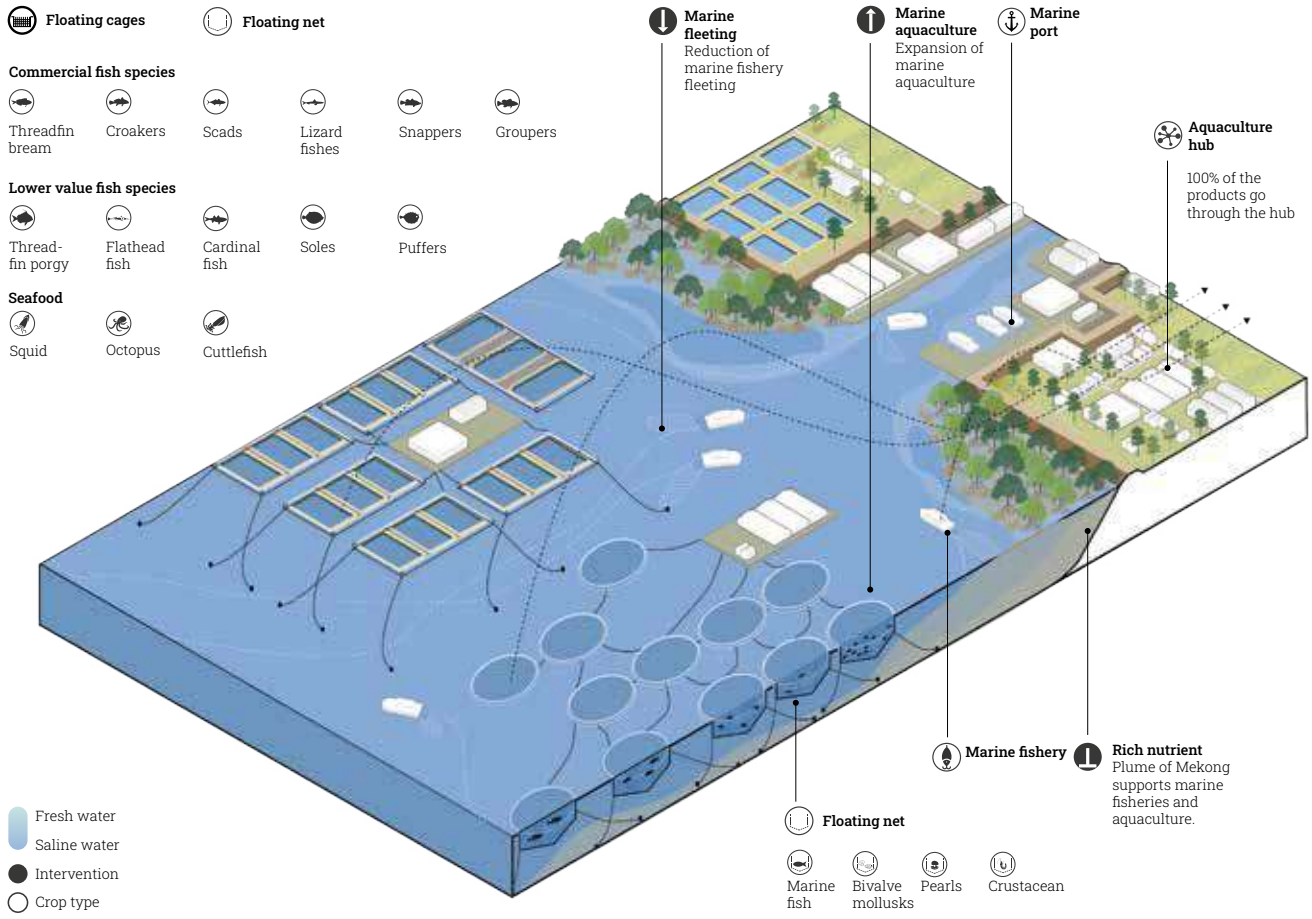
Marine culture, on the other hand, is starting to be established, both off-shore and near-shore. Primarily in the West sea (off- & near shore) and in the East sea as near-shore (mollusks, crustacean). This is considered a growth sector for the coming decades in both volume & value.

Mekong ATP | Marine zone

Proposed agriculture use

- Marine aquaculture
- Marine fishing fleet
- Marine aquaculture
  - Floating cages
  - Commercial species
  - Lower values species
  - Sea food
- Main marine route
- Port
- Urban Area
- Provincial Border

Marine zone



Design principle

- Consolidation & strong regulation of marine fisheries across fleet, catch & landing, with imposition of specific quotas per species and fishing zones.
- Improvement of fish landing & processing infrastructure, and fleet, for value assurance.
- High growth in marine culture (off- & near-shore) covering fish, mollusks and crustaceans.
- Assurance of non-intrusion with coastal mangrove regeneration (or integrated forest culture systems).
- Fleet regulation & management aligned with landing ports and marine hubs.

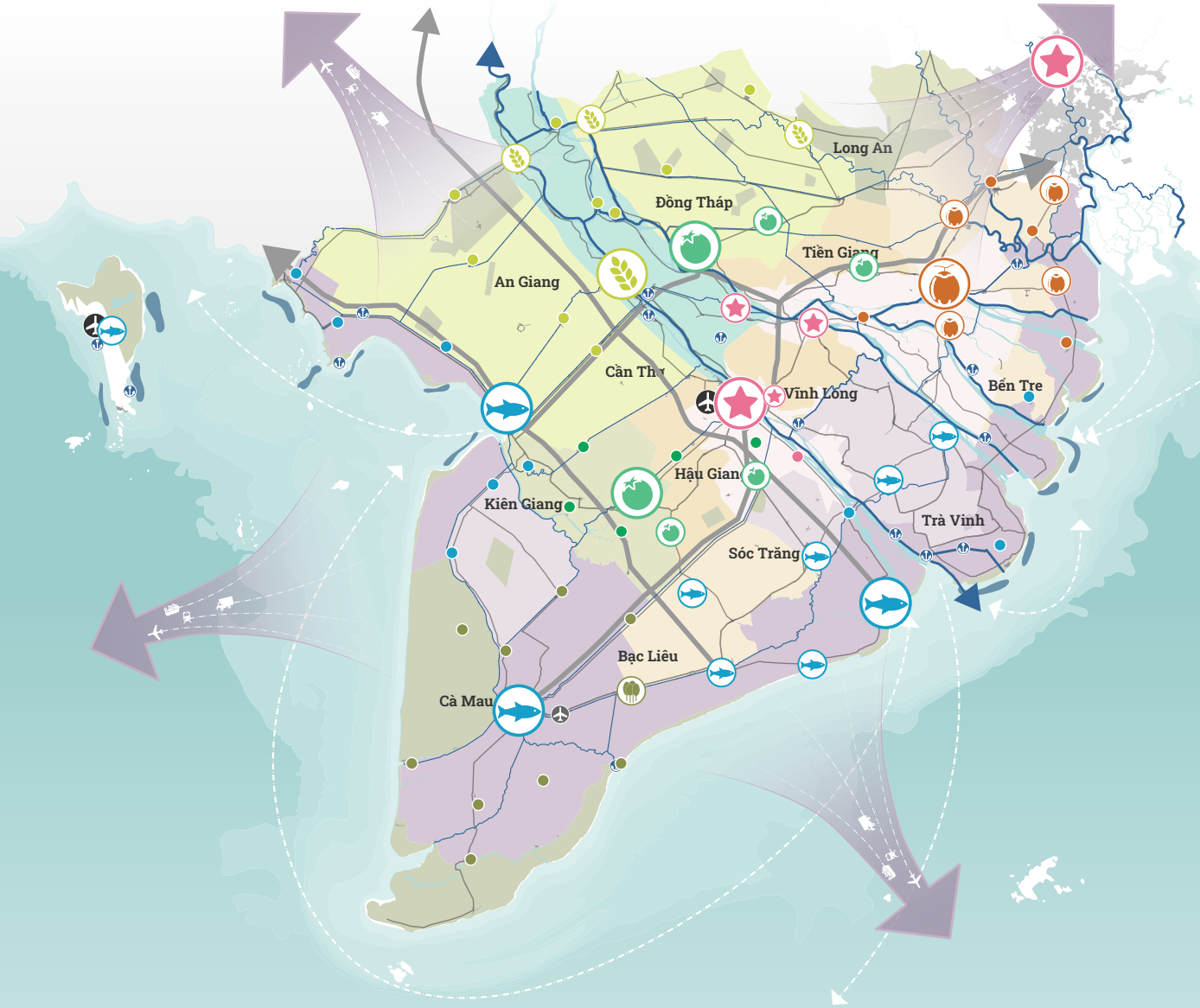
Vegetable greenhouse. Image: Defacto

Agribusiness hubs

Agribusiness hubs network: facilitators of value creation, higher income, and job creation.

In order to facilitate the economic development objectives of achieving higher economic growth, income and employment derived from agri-food businesses in the Mekong delta, as specified in the MDIRP, the agricultural production needs to be served by a thriving agribusiness sector. The MDIRP, and its associated ATP, foresee herein with the enabling of a specified network of agribusiness hubs.

The agribusiness hubs are foreseen to become the processing and servicing hubs & nodes in the (transport) network of the delta that effectively link the diverse agricultural production areas of the delta to domestic, regional, and international markets & consumers. As service providers they are meant to become R&D centres of innovation for agricultural developments towards higher quality & value creation, as well as sustainable production methods.



Mekong ATP | Hub network

Indication agro-Industrial hubs

- Regional
- Aquaculture
- Rice
- Forestry
- Vegetable
- Horticulture/Fruiticulture
- Cargo flow

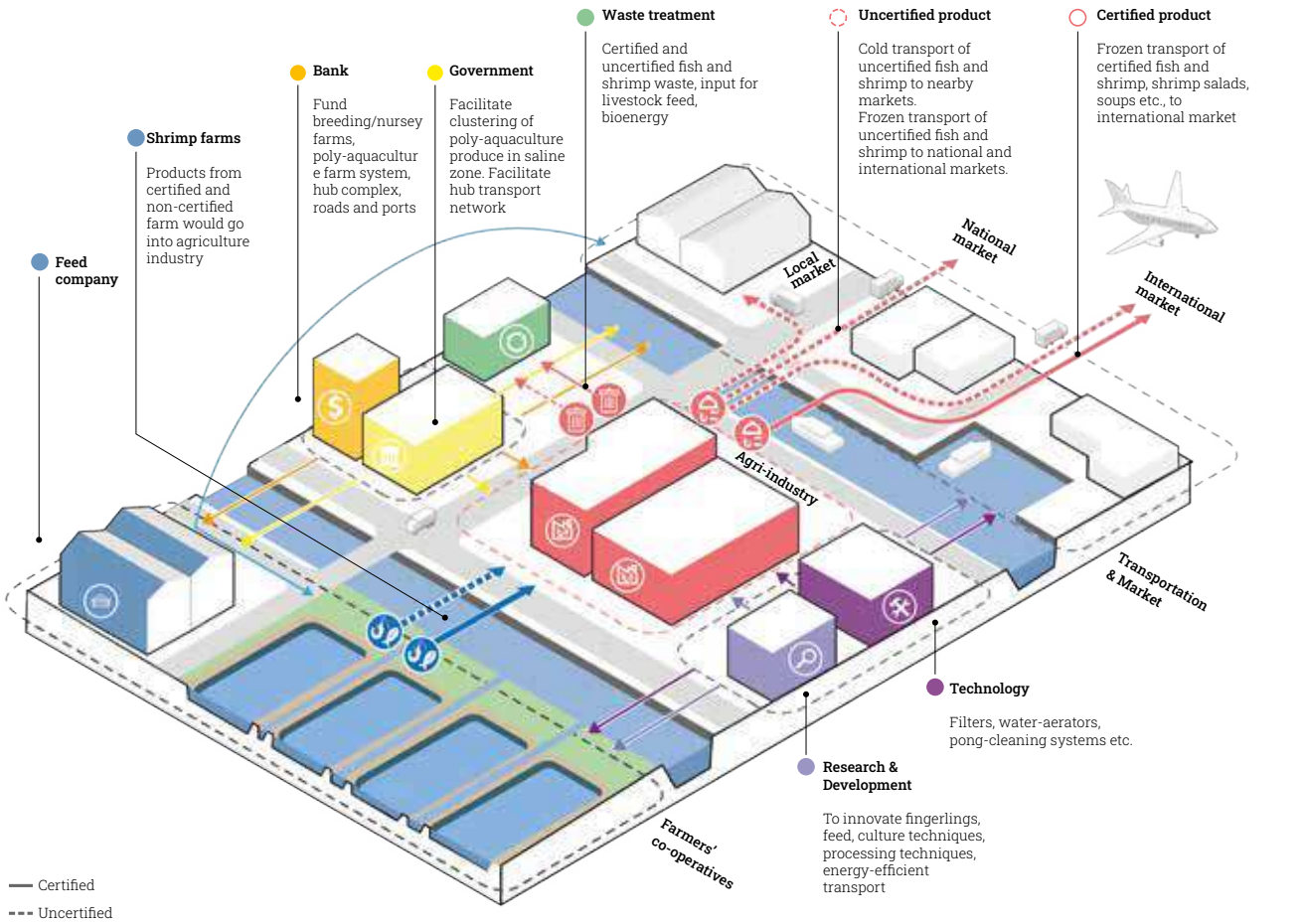
Transportation network

- International airport
- Regional airport
- Port
- Expressway
- National road
- Waterway
- Marine shipping route

Long-term agriculture zone

- Rice farming
- Rice + Horticulture
- Horticulture (fresh)
- Horticulture (saline-tolerant)
- Fruit tree
- Aquaculture (brackish)
- Aquaculture (brackish) + Rice
- Rice + Aquaculture (fresh)
- Forestry + Fishery, Eco-Zone
- Marine aquaculture

Hub for produce from brackish aquaculture



Service hubs

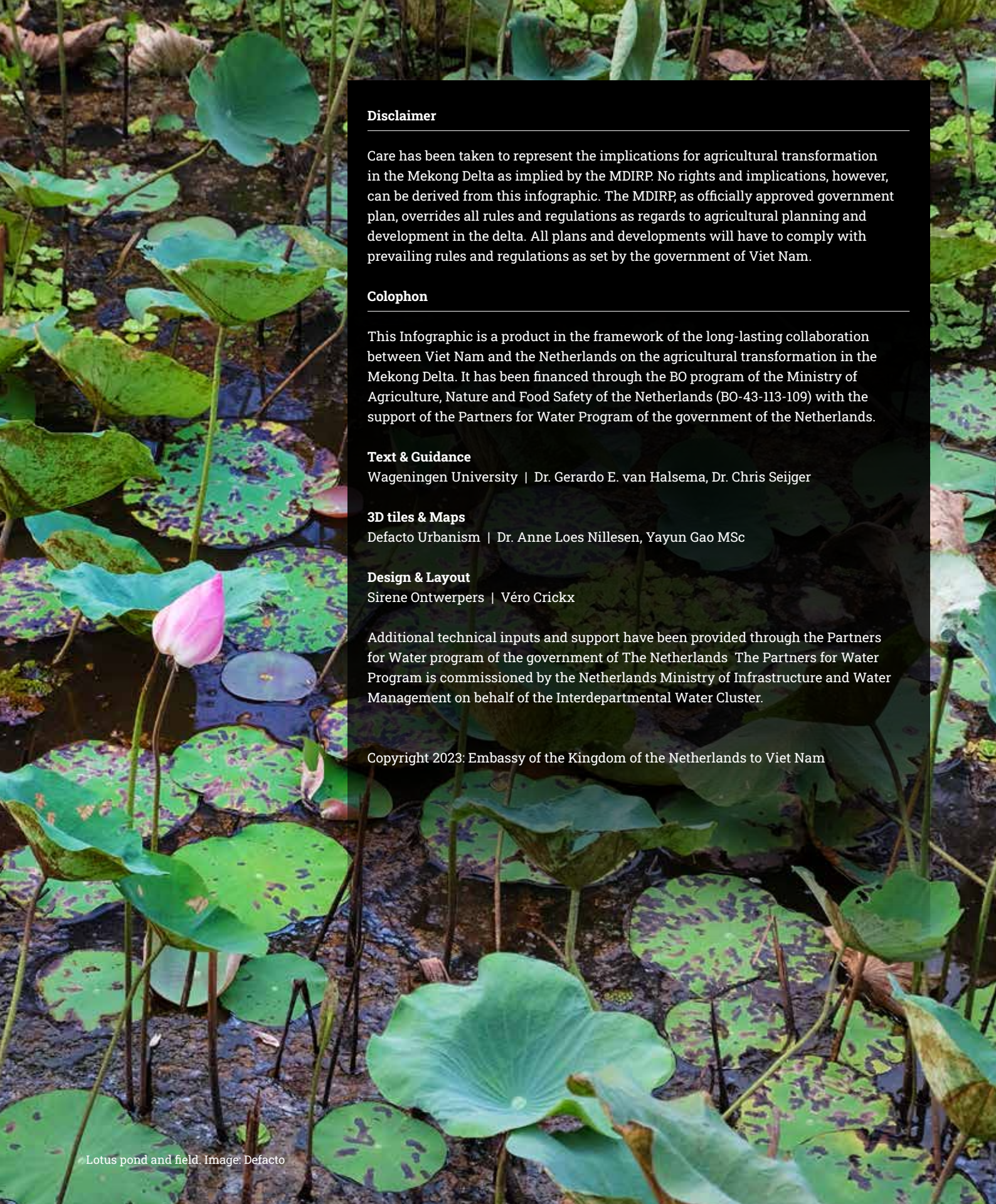
The premise behind the agribusiness hubs network is to bring together, and facilitate, the diverse business and service providers around a specific value chain and agricultural commodity in one hub, where economies of scale can be taken up by concentration of volumes, and specific product/produce focus enhances vertical (farm-business) and horizontal (farm-farm) integration along the value chain. The aim is to attract a diverse set of service providers and businesses in one hub that cover the various elements of the value chain: e.g. input & stock/feed providers; farm technology providers; product handling, storage and transport (including cold storage); packaging (materials & services); trace, quality control & certification (technology & services); processing; marketing & trading; research & education; financing; etc. Whereby by cross linkages and sharing of waste streams and half/by products may lead to economies of scale and sustainability gains. Each hub shall be situated in a node of the road/water, air transportation network and provide with basic infrastructure and facilities. The concentration of services & businesses to become the economic engine behind the value creation and provision of higher income jobs in the delta.

Following the spatial distribution of agricultural production across the agro-hydrological zones, the agribusiness hubs will be spatially distributed over the delta, so that each hub is optimally situated to its agricultural production hinterland. This will also facilitate a spatially distributed economic development.

Processed fish at market stall. Image: Defacto

Design principles

- Spatial distribution of the hubs in accordance with the spatial orientation of the agricultural development strategy:
  - Can Tho – regional centre, R&D, high tech;
  - Ben Tre – coconut, fruit & vegetables;
  - Dong Thap – fruit, ornamental, vegetables & fresh aquaculture;
  - An Giang – rice & aquaculture;
  - Kien Giang – aquaculture, tourism, national security;
  - Hau Giang – collection, primary processing & logistics;
  - Ca Mau – saline aquaculture;
  - Soc Trang – marine fisheries & seafood.
- Provision of basic infrastructure & services (energy, water supply & treatment) and connection to transport network and plans.
- Fostering of expertise centres of services and businesses around specified value chains.



Disclaimer

Care has been taken to represent the implications for agricultural transformation in the Mekong Delta as implied by the MDIRP. No rights and implications, however, can be derived from this infographic. The MDIRP, as officially approved government plan, overrides all rules and regulations as regards to agricultural planning and development in the delta. All plans and developments will have to comply with prevailing rules and regulations as set by the government of Viet Nam.

Colophon

This Infographic is a product in the framework of the long-lasting collaboration between Viet Nam and the Netherlands on the agricultural transformation in the Mekong Delta. It has been financed through the BO program of the Ministry of Agriculture, Nature and Food Safety of the Netherlands (BO-43-113-109) with the support of the Partners for Water Program of the government of the Netherlands.

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Lotus pond and field. Image: Defacto

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Life along and on the river. Image: Defacto