

BRIEF DOCUMENT OF BIYYAM KAYAL

State / Union Territory: Kerala

Name and address of person(s) compiling this information:

1. Member Secretary, State Wetland Authority, Kerala (Director, Directorate of Environment and Climate Change, Govt. of Kerala), 4th Floor, KSRTC Terminal Complex, Thampanoor, Thiruvananthapuram-1.
2. Er. Kalaiarasan P., Environmental Engineer, Directorate of Environment and Climate Change , Govt. Of Kerala, 4th Floor, KSRTC Terminal Complex, Thampanoor, Thiruvananthapuram-1.

Section 1: Identification, Location and Jurisdiction

1.1 Name of the Wetland (Alternative names, including in local language should be given in parenthesis after official name)

Biyyam Kayal

1.2 Name of the Village(s), Tehsil(s), Municipal area (s):

Villages: Edappal, Izhuvattirutti, Marancheri, Nannamukku, Perumbadappu, Ponnani Nagaram, Veliyamkode.

Taluk: Ponnani

Municipal areas: Ponnani

1.3 Name of the District(s) in which wetland complex is located:

Malappuram

1.4 Geographical coordinates (Latitude and Longitude, to degree, minutes and second)

Latitude : From 10°43'21.38"N to 10°40'26.13"N

Longitude : From 75°56'22.48"E to 76°04'15.23"E

1.5 Name of the Department / Agency which has jurisdiction over the wetland / wetlands complex:

Local Self Governments, Irrigation Department, Kerala Coastal Zone Management Authority and State and Wetland Authority Kerala

Section 2: Site Characteristics

2.1 Area of wetland / wetlands category (ha) : 921.35 ha

2.2 Wetland type (Please tick appropriate categories and sub-categories)

Category	Subcategory
<input type="checkbox"/> Natural (Inland)	<input type="checkbox"/> Permanent lakes <input type="checkbox"/> Seasonal/ intermittent lakes <input type="checkbox"/> Permanent streams/ creeks <input type="checkbox"/> Seasonal/ intermittent streams/ creeks <input type="checkbox"/> Oxbow <input type="checkbox"/> River floodplain <input type="checkbox"/> Permanent freshwater marshes <input type="checkbox"/> Seasonal/ intermittent freshwater marshes <input type="checkbox"/> Shrub-dominated wetlands <input type="checkbox"/> Tree-dominated wetlands <input type="checkbox"/> Geothermal wetlands <input type="checkbox"/> Karst and other subterranean hydrological systems
<input checked="" type="checkbox"/> Natural (Coastal)	<input type="checkbox"/> Coastal lagoon <input checked="" type="checkbox"/> Estuary <input checked="" type="checkbox"/> Intertidal mud, sand or salt flats <input checked="" type="checkbox"/> Mangroves <input type="checkbox"/> Coral reefs
<input type="checkbox"/> Human-made	<input type="checkbox"/> Aquaculture pond <input type="checkbox"/> Tank <input type="checkbox"/> Saltpan <input type="checkbox"/> Dam / Reservoir

2.3 Depth (m) Average: 1.5 below msl, Maximum: 3.5 below msl

2.4 Elevation (m above mean sea level) 0 to 140m MSL (Including the Zone of Influence)

2.5 Water regimes

a) Main source of water (tick all applicable)

- Rainfall Groundwater Catchment runoff
 Direct / indirect inflow from river Others, please specify _____

- b) Water permanence
 Mostly permanent Mostly intermittent
- c) Destination of water from wetland
 Feeds groundwater To downstream catchment To river To sea
- d) Water pH
 Acid (< 5.5) Circumneutral (5.5 – 7.4) Alkaline (> 7.4) Not known
- e) Water salinity
 Fresh (< 0.5 g/l) Brackish (0.5 – 30 g/l)) Euhaline (30- 40 g/l) Hypersaline (>40g/l) Not known
- f) Nutrient in water
 Eutrophic Mesotrophic Oligotrophic Not known

2.6 Climatic setting

- a) Annual Rainfall /Snowfall(mm) : 2877
- b) Temperature (°C) : Minimum- 25.6, Maximum- 29.5
- c) Humidity (%) : Minimum- 43, Maximum- 72

2.7 Area of zone of influence (in ha) 35703.05 ha

2.8 Major land use within zone of influence (provide as approximate % of catchment area)

Forests	: 0.97
Plantation	: 0.36
Agriculture	: 42.2
Settlements (Urban & Rural)	: 50.52
Industrial	: 0.00
Waterbody	: 5.95

2.9 Map of wetland complex and zone of influence

(To be enclosed as Annex I and II to this proposal):

Section 3: Biodiversity

3.1 Notable plant species present in wetland

Acanthus ilicifolius, *Avicennia officinalis*, *A. marina*, *Rhizophora mucronata*, *R. apiculata*, *Brugierra cylindrica*, *Sonneratia alba*, *Excoecaria agallocha*, *Aegiceras corniculatum*,

Nymphaea lotus, *N. pubescens*, *N. stellata*, *Cleome viscosa*, *Drymaria cordata*, *Trianthema portulacastrum*, *Bergia ammannioides*, *B. capensis*, *Cardiospermum halicacabum*, *Cassia tora*, *C. occidentalis*, *Crotalaria juncea*, *Mimosa rubicaulis*, *M. pudica*, *Smithia geminiflora*, *Ammania baccifera*, *A. multiflora*, *Ludwigia repens*, *L. parviflora*, *Trapa bispinosa*, *Mukia scabrella*, *Glinus lotoides*, *Mollugo pentaphylla*, *Borreria articularis*, *Hedyotis leschenaultiana*, *Oldenlandia corymbosa*, *Acanthospermum hispidum*, *Ageratum conyzoides*, *Eclipta alba*, *Emilia sonchifolia*, *Sphaeranthus indicus*, *Spilanthus calva*, *Synedrella nodiflora*, *Tridax procumbens*, *Vernonia cinerea*, *Lobelia dichotoma*, *Nymphoides cristatum*, *N. indicum*, *Convolvulus arvensis*, *Ipomea aquatica*, *Merrimia tridentate*, *Merremia umbellate*, *M. vitifolia*, *Monochoria vaginalis*, *Limnophila heterophylla*, *Scoparia dulcis*, *Utricularia aurea*, *U. flexuosa*, *U. stellaris*, *Hygrophila auriculata*, *Justicia japonica*, *Leucas aspera*, *L. cephalotes*, *Aervalanata*, *Alternanthera sessilis*, *Digera muricata*, *Polygonum barbatum*, *Phyllanthus maderasptersis*, *P. urinaria*, *Hydrilla verticillata*, *Hydrolea zeylanica*, *Largarosiphon alternifolia*, *Limnocharis flava*, *Vallisneria spiralis*, *Eichhornea crassipes*, *Lindernia hypsoides*, *Commelina benghalensis*, *Cyanotis axillaris*, *Pandanus furcatus*, *Typha angustata*, *T. elephantiana*, *T. bispinosa*, *Pistia stratiotes*, *Lemma gibba*, *L. polyrrhiza*, *Potamogeton crispus*, *P. indicus*, *P. pectinatus*, *Ruppia maritime*, *Zanichella palustris*, *Najas indica*, *Bulbostylis barbata*, *Cyperus bifax*, *C. compressus*, *C. difformis*, *C. haspan*, *C. iria*, *C. malaccensis*, *Cyperus papyrus*, *C. tenuispica*, *Eleocharis capitata*, *E. chaetaria*, *Kyllinga brevifolia*, *Lipocarpa chinensis*, *Pycreus odoratus*, *Rhynchospora corymbosa*, *Scirpus articulatus*, *S. grossus*, *S. supinus*, *Zizania aquatic*, *Arundo donax*, *Brachiaria mutica*, *Coixlachrymal*, *Cynodon dactylon*, *Dactyloctenium aegypticum*, *Dimeria pubescens*, *D. hohenackeri*, *D. thwaitesii*, *Echinochloa colona*, *E. crus galli*, *E. stagnina*, *Eleusine indica*, *Glyceria fluitans*, *Heteropogon contortus*, *Hygroryza aristata*, *Imperata cylindrica*, *Ischaemum muticum*, *Leersia hexandra*, *Paspalum dilatatum*, *P. scrobiculatum*, *P. vaginatum*, *Phragmites karka*, *Sacciolepis indica*, *S. curvata*, *Saccharum spontaneum*.

3.2 Notable animal species present in wetland

Birds: *Trachybaptus ruficollis*, *Pelecanus philippensis*, *Sula dactylatra*, *Phalacrocorax carbo*, *P. fuscicollis*, *P. niger*, *Anhinga melanogaster*, *Ardea cinerea*, *A. purpurea*, *A. grayii*, *Bubulcus ibis*, *Casmerodius albus*, *Dupetor flavicollis*, *Egretta garzetta*, *E. gularis*, *Ixobrychus cinnamomeus*, *I. sinensis*, *Mesophoyx intermedia*, *Nycticorax nycticorax*, *Anastomus oscitans*, *Ciconia ciconia*, *C. episcopus*, *C. nigra*, *Mycteria leucocephala*, *Platalea leucorodia*, *Threskiornis melanocephalus*, *Dendrocygna javanica*, *Anas acuta*, *A. clypeata*, *A. crecca*, *A. poecilorhyncha*, *A. querquedula*, *A.*

strepera, *A. nyroca*, *Nettapus coromandelianus*, *Accipiter badius*, *A. nisus*, *Circus aeruginosus*, *C. macrourus*, *C. melanoleucos*, *Elanus caeruleus*, *Halia sturindus*, *Milvus migrans*, *Pandion haliaetus*, *Pernis ptilorhyncus*, *Francolinus pondicerianus*, *Galloperdix spadicea*, *Amaurornis phoenicurus*, *Fulica atra*, *Gallinul achloropus*, *Porphyrio porphyrio*, *Porzana fusca*, *Hydrophasianus chirurgus*, *Metopidius indicus*, *Glareo lalactea*, *Himantopus himantopus*, *Recurvirostra amurensis*, *Vanellus indicus*, *V. malabaricus*, *Charadrius mongolus*, *C. dubius*, *C. hiaticula*, *C. alexandrinus*, *Limosa limosa*, *L. lapponica*, *Numenius phaeopus*, *N. arquata*, *Tringa tetanus*, *T. stagnatilis*, *T. nebularia*, *T. ochropus*, *T. glareola*, *Xenus cinereus*, *Actitis hypoleucos*, *Calidris tenuirostris*, *C. ferruginea*, *Limicola falcinellus*, *Gallinago gallinago*, *G. stenura*, *Calidris alba*, *C. minuta*, *C. temminckii*, *Philomachus pugnax*, *Larus cachinnans*, *L. brunnicephalus*, *L. ridibundus*, *Chlidonias hybridus*, *Sterna caspia*, *Columba livia*, *Streptopelia chinensis*, *S. decaocto*, *Psittacus akrameri*, *P. cyanocephala*, *Clamator jacobinus*, *Hierococcyx varius*, *Cuculus micropterus*, *Cacomantis sonneratii*, *Eudynamis scolopacea*, *Centropus sinensis*, *Tyto alba*, *Athene brama*, *Strix leptogrammica*, *Tachymarptis melba*, *Apus affinis*, *Cypsiurus balasiensis*, *Ceryle alcyon*, *Alcedo atthis*, *Halcyon capensis*, *Halcyon smyrnensis*, *Halcyon pileata*, *Merops philippinus*, *M. orientalis*, *Coracias benghalensis*, *Megalaima viridis*, *Dinopium benghalense*, *Hirundo daurica*, *H. rustica*, *Oriolus oriolus*, *O. xanthornus*, *Dicrurus caeruleus*, *D. leucophaeus*, *D. macrocercus*, *Acridotheres fuscus*, *A. tristis*, *Aegithina tiphia*, *Artamus leucorhynchus*, *Corvus macrorhynchos*, *C. splendens*, *Dendrocitta vagabunda*, *Chloropsis cochinchinensis*, *Pycnonotus cafer*, *P. jocosus*, *Copsychus saularis*, *Oenanthe deserti*, *Saxicola caprata*, *Saxicoloides fulicata*, *Terpsiphone paradise*, *Turdoides affinis*, *Turdoides caudatus*, *Turdoides striatus*, *Turdoides subrufus*, *Cisticola juncidis*, *Prinia hodgsonii*, *Prinia inornata*, *Prinia socialis*

Fish: *Alepes djedaba*, *Scoliodon laticaudus*, *Carangoides ferdau*, *C. hedlandensis*, *C. malabaricus*, *Sphyrna lewini*, *Megalops cyprinoides*, *Megalaspis cordyla*, *Scomberoides commersonianus*, *Hilsa ilisha*, *Lycodontis tile*, *Carangoides sexfasciatus*, *C. praeustus*, *Muraena soxcinereus*, *Anguilla bengalensis*, *Nemata losanaus*, *Leiognathus blochii*, *Anodon tostomachacunda*, *Leiognathus bindus*, *Sardinella longiceps*, *Sardinella dayi*, *Mene maculata*, *Herklotsichthys quadrimaculatus*, *Apolectus niger*, *Escualos athoracata*, *Cynoglossus lingua*, *C. puncticeps*, *Thryssa vitrirostris*, *Chanos chanos*, *Paraplagusia bilineata*, *Puntius sarana subnasutus*, *Euryglossa orientalis*, *Arius arius*, *A. maculatus*, *A. cealatus*, *Chelonodon patoca*, *Secutor insidator*, *Lutjanus argentimaculatus*, *L. fulviflamma*, *L. eherenbergii*, *Mystus gulio*, *M. montanus*, *Gerres filamentosus*, *Bregmaceros maclellandi*, *Pomada sysargenteus*, *P.*

maculatus, *Pseudocryptes lanceolatus*, *Sicyopterus griseus*, *Daysciaena albida*, *Eleotris fusca*, *Dendrophis russelli*, *Trypauchen vagina*, *Johnius russelli*, *Siganus canaliculatus*, *Otolithes ruber*, *Siganus javus*, *Monodactylus argenteus*, *Trichiurus lepturus*, *Drepane punctatus*, *Rastrelliger kanagurta*, *Scatophagus argus*, *Scomberomorus guttatus*, *Psuedetroplus maculatus*, *Pampus argenteus*, *Etroplus suratensis*, *Hyporhamphus limbatus*, *H.dussumieri*, *Oreochromis mossambica*, *Liza macrolepis*, *L.parsia*, *L.tade*, *Strongylura strongylura*, *Microphis cuncalus*, *Thryssa mystax*, *T.malabarica*, *T.dussumieri*, *Oxyurichthys tentacularis*, *Cynoglossus cynoglossus*, *C.arel*, *Pseudorhombus elevates*, *Stolephorus indicus*, *S.commerstoni*, *Pampus chinensis*, *Leiognathus splendens*, *L.equula*, *L.brevirostris*, *Ilisha melastoma*, *Corica soborna*, *Scorpaenopsis leonine*, *Mugil cephalus*, *Grammoplites scaber*, *Sphyrna barracuda*, *Platycephalus indicus*, *Eleutheronematetra dactylum*, *Lates calcarifer*, *Polydactylus indicus*, *Ambassis commersoni*, *A. gymnocephalus*, *Acanthurus nigrofuscus*, *Zebrasoma xanthurus*, *Epinephelus malabaricus*, *Callionymus fluviatilis*, *Epinephelus tauvina*, *Awaous gutum*, *Therapon jarbua*, *Glossogobius giuris*, *Sillago sihama*, *Oligolepis cylindriceps*, *Lactarius lactarius*, *Carcharhinus limbatus*

Butterflies: *Neptis hylas*, *Euthalia aconthea*, *Ariadne merione*, *Junonia almanac*, *J.atlites*, *Hypolimnas misippus*, *Hasora badra*, *Suastus gremius*, *Gangara thyrsis*, *Telicota ancilla*, *Pelopidas mathias*, *Catopsilia pomona*, *C. pyranthe*, *Eurema hecabe*, *Leptosia nina*, *Cepora nerissa*, *Delias eucharis*, *Pachliopta aristolochiae*, *P. hector*, *Papilio polytes*, *P. polymnestor*, *Graphium sarpedon*, *Lampides boeticus*, *Jamides celeno*, *Curetis thetis*

3.3 Species of conservation significance (rare, endangered, threatened, endemic species)

Pampus argenteus (VU) *Pelecanus philippensis*, *Anguilla bengalensis*, *Limosa limosa*, *Scoliodon laticaudus* (NT), *Sphyrna lewini* (CR)

3.4 Major plant invasive alien species

Eichhornea crassipes, *Salvinia molesta*

3.5 Major animal invasive alien species:

Data not available

Section 4: Ecosystem services

Importance	Relevant for the site (please tick yes or no)	If Yes, Details (upto 50 words for each category)
Source of drinking water for people living and around	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	-
Source of water for agriculture	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Majority of the people depend on agriculture as their livelihood (70%). The Biyyam regulator-cum-bridge built across the backwaters regulates the flow of water for farming.
Fisheries	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Majority of the local people in the coastal region were dependent on fishery resources. The total marine fish landings is about 25,000 t per year, of which 10000 t is caught by the mechanised vessels including trawlers and the rest by motorized and non-motorized traditional fishing crafts. Fishing methods such as, Net fishing like Trawl netting, seine netting (Bag type, Purse type) Trap fishing, Hand fishing, Hand line and long line methods are commonly seen.
Cultivation of aquatic food plants	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Rice is the most important crop cultivated in the Pokkali fields of the wetland. Punja and Mundakan is the crop raised over the entire Pokkali area. Other local varieties of paddy include Kokkan, Chitiyani, Kuruva, Thavalakannan, Chengazhama, Thekkancheera, Chelivelyan, Palthondi.
For buffalo wallowing and use of domesticated animals	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Under the cattle farming, livestock such as cows, goats, buffalo etc. are reared. It is a major source of income (15%) in Biyyam wetland. Paddy cultivation along with cattle feeding helps increasing needs of the generations. Later, animal husbandry was even extended to poultry farming, especially duck rearing in certain portions of the wetland.
Medicinal plants	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<i>Eclipta alba</i> and <i>Acorus calamus</i> are reported here
Buffering communities from extreme events as floods and storms	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Not assessed quantitatively

Importance	Relevant for the site (please tick yes or no)	If Yes, Details (upto 50 words for each category)
Groundwater recharge	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Not assessed quantitatively
Water purification	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Not assessed quantitatively
Acts as a sink for sediments	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Not assessed quantitatively
Has significant cultural and religious values	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<p>In Biyyam Kayal annual boat races are held during Onam which includes women rowers. Biyyam wetland is also famous for ‘Kaalapoottu’, which is racing of bulls. As part of an effort to revive the timeworn festival, Edappal Grama Panchayath and various cultural organizations in the district jointly organized Poorada Vanibham - a major agricultural festival held in connection with Onam.</p> <p>It also promotes certain best rituals and art forms of ancient tradition. ‘Thira’ is one among them and there are lots of Hindu temples in the Biyyam wetland area. Kodancheryjuma masjid is the oldest mosque which is a landmark in Maranchery. Munabathbeevijaram etc are some of the popular mosques in the Biyyam wetland area.</p>
Is a site for recreation and tourism	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<p>Biyyam Kayal is one of the finest tourist destinations in Ponnani area. Almost 78% of the people involved in tourism activity in Biyyam wetland. Biyyam Hanging Bridge is a notable attraction of Biyyam Kayal. This place is famous for Kaalapoottu, which is racing of bulls. A boat race held in its extensive stretch of water during the third day of Onam (August-September) draws a large number of people from far and near. Women rowers also participate in the race. Now developed into a tourist centre, the lake has a water sports facility set up by the District Tourism Promotion</p>

Importance	Relevant for the site (please tick yes or no)	If Yes, Details (upto 50 words for each category)
		Council (DTPC) which is also a prime attraction of the Estuary.
Supports noteworthy plants species	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Eventhough a small land area, it supports a large variety of flora (Section 3.1).
Supports noteworthy animal species	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	The Biyyam wetland system supports a wide range of fauna, including aquatic and terrestrial animals (Section 3.2).
Site of high congregation of migratory water birds	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	The Paddy fields in the catchment area (Zone of Influence) of the Estuary act as feeding, roosting and breeding ground for many species of migratory and resident birds. During the months of February/April, thousands of migratory birds arrive here. White Ibis, Glossy Ibis, Painted Stork, Asian open billed storks, Purple Moorhen and cormorants are sighted here.
Supports life cycle of fish or amphibians	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Supports life cycle of fishes mentioned in Section 3.2
Any other, please list		

Section 5: Pre-Existing Rights and Privileges

Nature of right and privilege	Relevant for the site (please tick yes or no)	Does this negatively impact the wetland's ecological health?	Brief description (upto 50 words for each category)
Community Fishing (without any lease or permission from government department)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Not assessed	Thirty six fish species were recorded from the Biyyam Kayal. Majority have high commercial importance as food and ornamental fishes.
Fishing under lease from government department	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not assessed	-
Harvest of plants (without any lease or permission from government department)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Not assessed	Not assessed quantitatively
Agriculture or horticulture within wetland	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Agriculture is the major occupation of the people near the wetland, 90%

Nature of right and privilege	Relevant for the site (please tick yes or no)	Does this negatively impact the wetland's ecological health?	Brief description (upto 50 words for each category)
		<input type="checkbox"/> Not assessed	of the people are practicing agriculture, mostly paddy.
Grazing	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Not assessed	Not assessed quantitatively
Religious practices	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Not assessed	Kodanchery Juma Masjid (oldest mosque which is a landmark in Maranchery), and Munabath Beevi Jaram (Puthuponnani) are some of the popular mosques in the Biyyam wetland area.
Withdrawal of water for domestic use	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not assessed	-
Withdrawal of water for agriculture or fisheries	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Not assessed	In 'Kadumkrishi' water management is very important as it requires continuous pumping out of water and towards the end of the crop there is a need to supply irrigation water as well. For Punja water requirements in the early stages of crop are met from summer flow in the rivers and in the storage canals and in later stages water from dams are used for irrigation.
Bathing or wallowing of domestic animals	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Not assessed	Animal husbandry extended to poultry farming, especially duck rearing in certain portions of the wetland.
Plying of boats	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Not assessed	Boats are used for different purposes including tourism, local commuting and cultural activities.
Any other, please list here	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not assessed	

Section 6: Present and Potential Threats

Threat	Degree	Present or Potential	Additional information, if any
Changes in water inflow and outflow	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium	<input checked="" type="checkbox"/> Present <input type="checkbox"/> Potential	In many of the water channels connecting Biyyam Kayal and

Threat	Degree	Present or Potential	Additional information, if any
	<input type="checkbox"/> Low		the paddy fields, the water flow has been clogged from the small water channels due to the dumping of waste and construction of small bunds. So the water flow into the Biyyam Kayal is reduced and hence the total water storage capacity of Biyyam Kayal and associated rice fields got squashed.
Pollution	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Low	<input checked="" type="checkbox"/> Present <input type="checkbox"/> Potential	Solid waste accumulation is a major issue of Biyyam Kayal and causes very serious damages to the environment.
Unsustainable harvest of biological resources	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Low	<input checked="" type="checkbox"/> Present <input type="checkbox"/> Potential	Unsustainable resource utilisation has been reported by nearby inhabitants.
Mining	<input type="checkbox"/> High <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Low	<input checked="" type="checkbox"/> Present <input type="checkbox"/> Potential	Sand mining is one of the threats in Biyyam kayal. The issue has seen in some areas of Biyyam wetland but not assessed quantitatively
River bank erosion	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low	<input checked="" type="checkbox"/> Present <input type="checkbox"/> Potential	The erosion has been recorded from here, but not assessed quantitatively.
Encroachment	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Low	<input checked="" type="checkbox"/> Present <input type="checkbox"/> Potential	The wetland is under threat due to different levels of anthropogenic pressures and activities like urban development, encroachment, disturbances from excessive recreational activities and tourism.
Spread of invasive species	<input type="checkbox"/> High <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Low	<input checked="" type="checkbox"/> Present <input type="checkbox"/> Potential	<i>Eichhornia crassipes</i> and <i>Salvinia molesta</i> are the major invasive species in some of the pockets of the wetland
Water mixing	<input type="checkbox"/> High <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Low	<input checked="" type="checkbox"/> Present <input type="checkbox"/> Potential	Not assessed quantitatively.
Reduction of migratory birds	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Low	<input checked="" type="checkbox"/> Present <input type="checkbox"/> Potential	

Section 7: Activities Proposed to be prohibited [other than those listed in Rule 4(2) of Wetlands Rules]

Activity	Place a tick mark if relevant	Prohibition within wetlands or zone of influence	Level of Prohibition (in terms of people, restricted area or any other)	Name of department / agency responsible for Prohibition	Additional information, if any

Section 8: Activities Proposed to be regulated

Activity	Place a tick mark if relevant	Regulation within wetlands or zone of influence	Level of regulation (in terms of people, restricted area or any other)	Name of department / agency responsible for regulation	Additional information, if any
Withdrawal of water / impoundment/diversion or any other hydrological intervention	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Wetland / Wetlands complex boundary <input type="checkbox"/> Zone of influence	Within the wetland	Wetland Management Unit, SWAK, Irrigation Department	All those activities which alter the hydrological connectivity/sustainability of the wetland need to be regulated and prior permission from the Wetland Management Unit/SWAK is required.
Harvesting of resources (living / non-living)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Wetland / Wetlands complex boundary <input type="checkbox"/> Zone of influence	Within the wetland	SWAK, LSGs, Wetland Management Unit, District Collector	Unscientific harvest is to be regulated
Discharge of treated sewage/ effluent / wastewater	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Wetland / Wetlands complex boundary <input type="checkbox"/> Zone of influence	Within the wetland	SWAK/ LSGs/ Wetland Management Unit/ District Collector/ Pollution	Prior permission from Wetland Management Unit/ SWAK

Activity	Place a tick mark if relevant	Regulation within wetlands or zone of influence	Level of regulation (in terms of people, restricted area or any other)	Name of department / agency responsible for regulation	Additional information, if any
				Control Board	
Any other.					

Section 9: Activities Proposed to be permitted

Activity	Place a tick mark if relevant	Within wetlands or zone of influence	Additional information, if any
	<input type="checkbox"/>	<input type="checkbox"/> Wetland / Wetlands complex boundary <input type="checkbox"/> Zone of influence	

Section 10: Listing of Available Scientific Resources Used

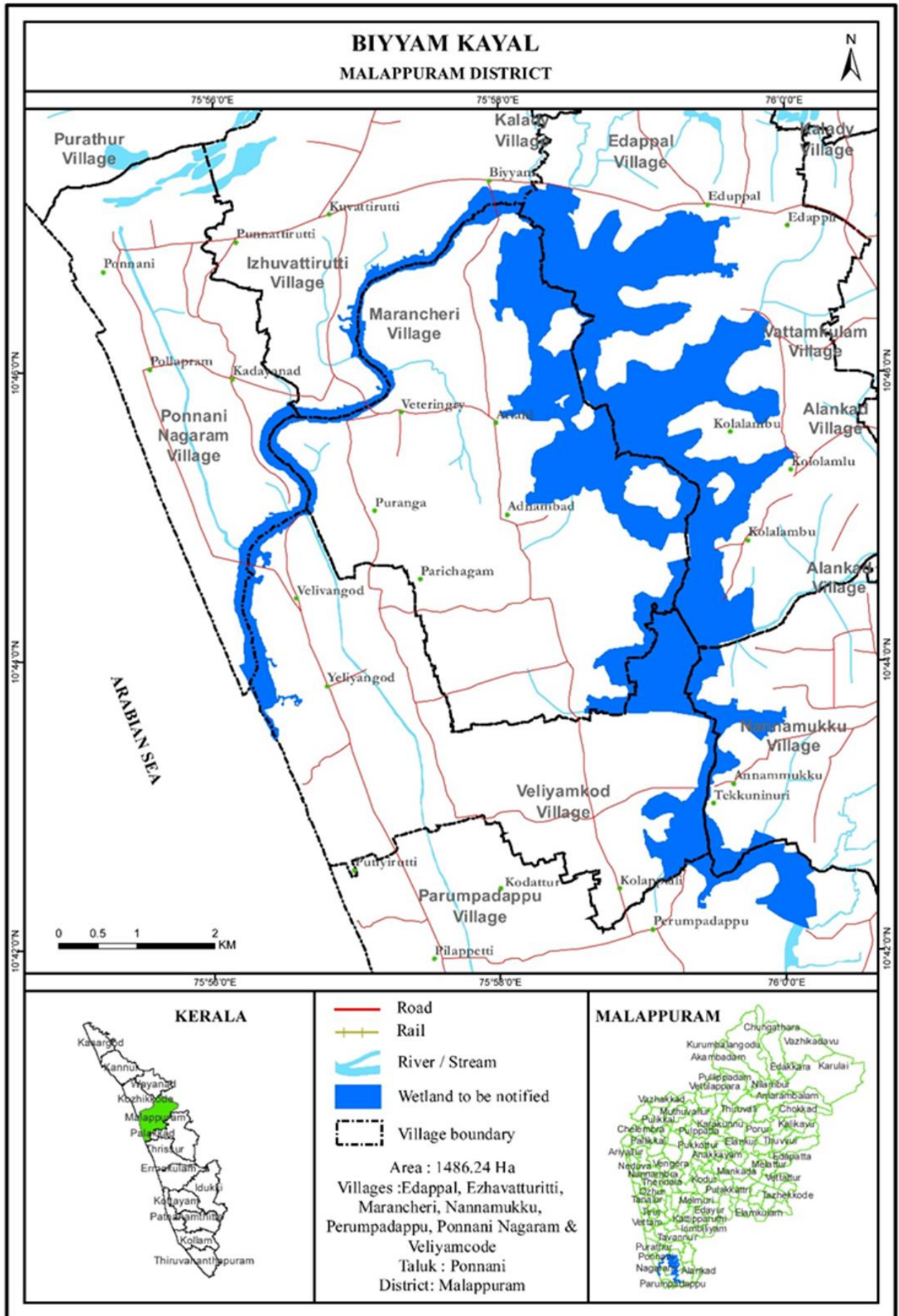
1. Management Action Plan for the conservation of Biyyam Kayal, Malappuram District. CWRDM. 2019. Centre for Water Resources Development and Management, Kozhikode.
2. Ground Water Information Booklet of Malappuram District, Kerala State, Government of India, Ministry of Water Resources, Central Ground Water Board, December 2013.

CHECKLIST

- Responsible agency has been clearly identified and details of contact person included
- Wetland/ wetlands complex boundary has been delineated using GIS and firmed up by adequate ground truthing
- Wetland/ wetlands complex map has been provided at required scale
- Zone of influence has been delineated and included in wetland map or a separate map
- Wetland zone of influence is sufficient to manage all activities

- Site's importance have been listed, and for major categories, justification is provided
- Site's biodiversity values are listed, and for major categories, justification is provided
- List of pre-existing rights and privileges is provided
- Consistency or inconsistency of pre-existing rights and privileges is indicated to be best of available knowledge
- Threats to site are listed, and for major categories details are provided
- Activities prohibited, beyond those already listed in Rule 4(2) have been mentioned
- List of activities to be regulated within wetlands and zone of influence is provided
- List of activities to be permitted is provided

Annexure I



Annexure II

