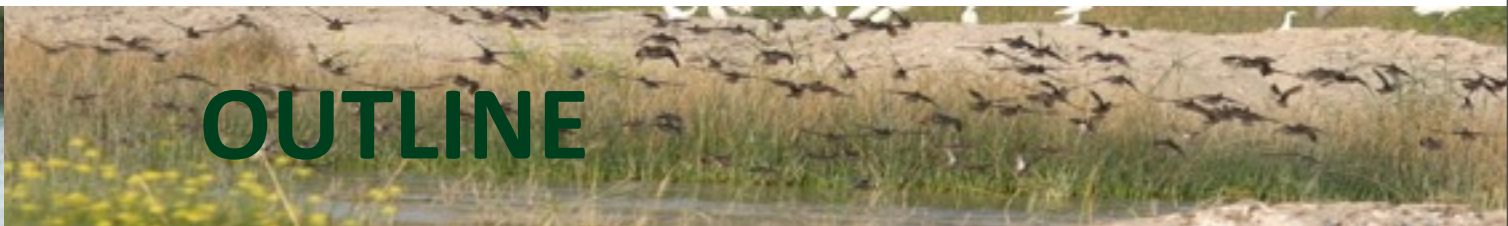


Impacts on the Environment and Biological Diversity of Chotiari Reservoir in Pakistan

- 
- Muhammad Husnain – Technical University of Berlin, Germany
(husnain@mail.tu-berlin.de)
 - Dr. Wolfgang Wende – Leibniz-Institute of Ecological and Regional Development
Dresden, Germany
 - Dr. Elke Bruns – Technical University of Berlin, Germany



OUTLINE

- Introduction
- The Chotiari Reservoir
- Ecological Significance of the Reservoir Site
- EIA of the Project
- Present Situation
- Conclusions

Introduction

- EIA in Pakistan – Adoption and Legislation
- PEPA 1997 & IEE Guidelines 2000
- Fairly Good Framework but Not Performing Well
- Poor consideration of Biodiversity Issues in EIS
- The Case Study of Chotiari Reservoir

The Chotiari Reservoir

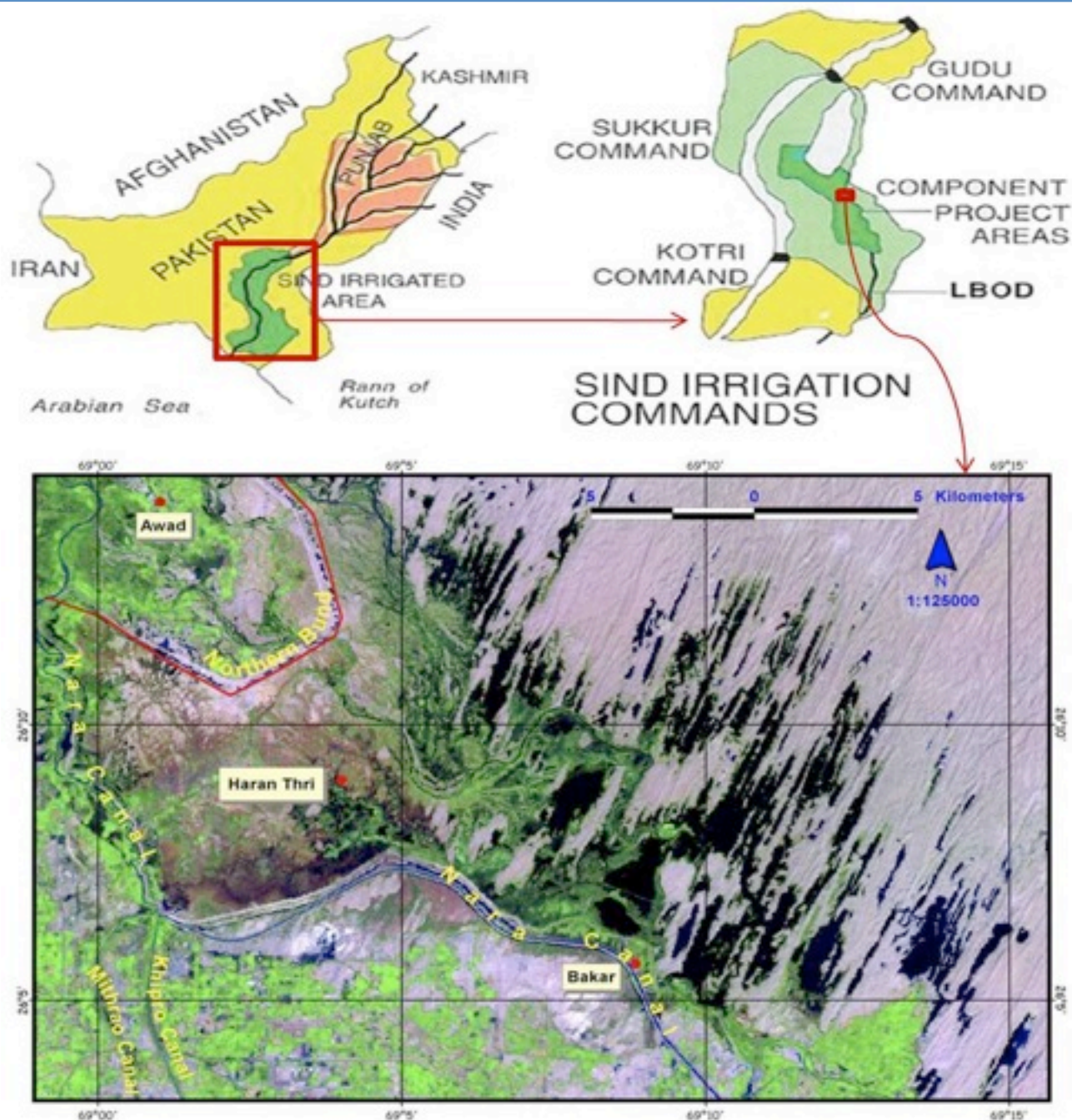
● Background of Reservoir Construction

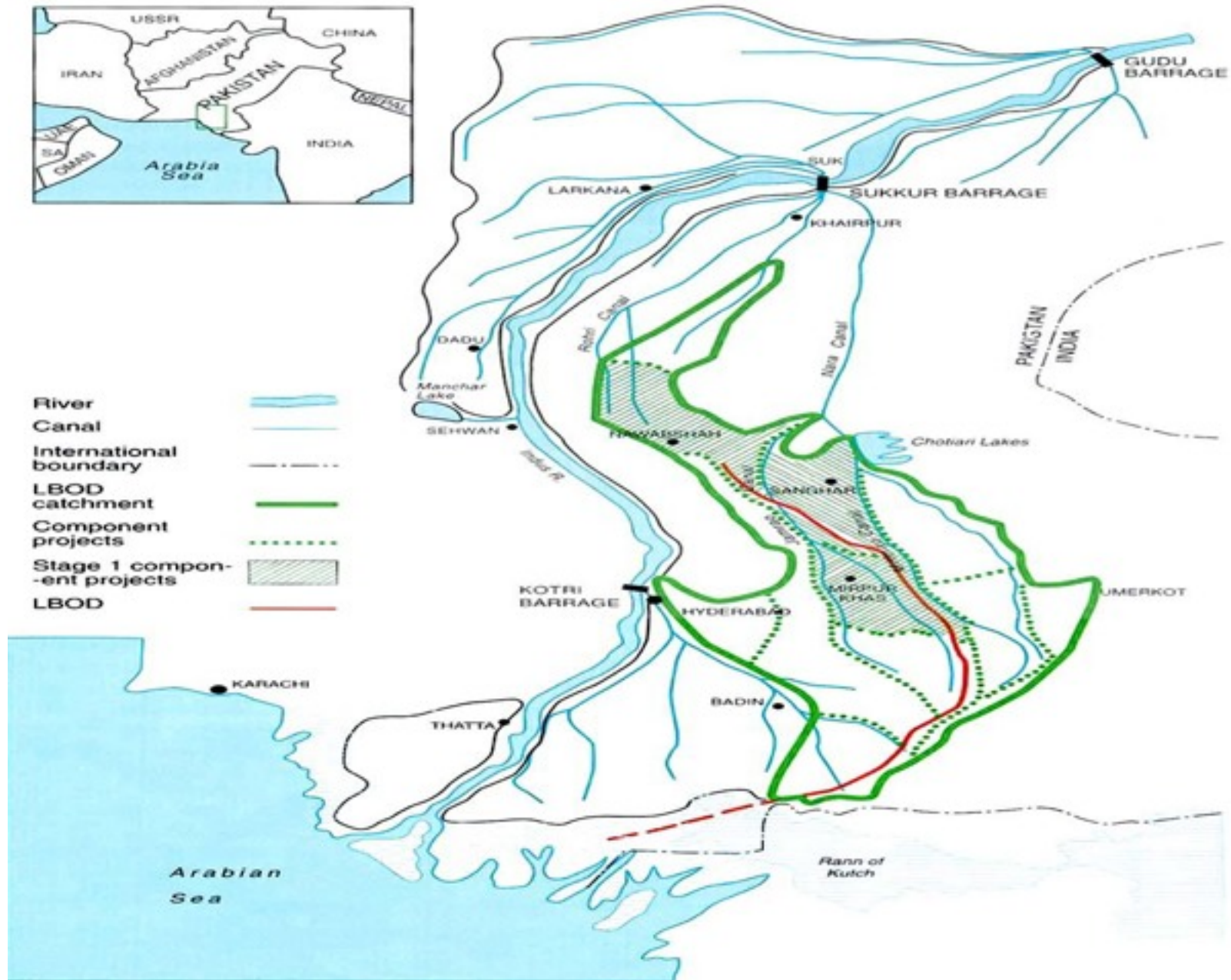
- Agriculture, the major contributor to country's GDP, depends on irrigation
- Extensive development of the irrigation infrastructure – waterlogging and salinization
- Leftbank Outfall Drainage Project (LBOD)

● The Reservoir

- Off-canal storage reservoir along the left bank of Nara Canal
- Created in a natural depression that was cluster of lakes prior to its construction
- Maximum Capacity 0.71 MAF at 87.5 FEC – Open water surface area 18,210 hectares
- Its Irrigation potential is 60,700 hectares – It facilitates winter cropping

Location Map of the Reservoir





Ecological Significance of the Site

- Wetland Complex – A mosaic of Diverse habitats of
Fresh & brackish water lakes

Agricultural lands



Riverine Forest



Reedbeds & swamps



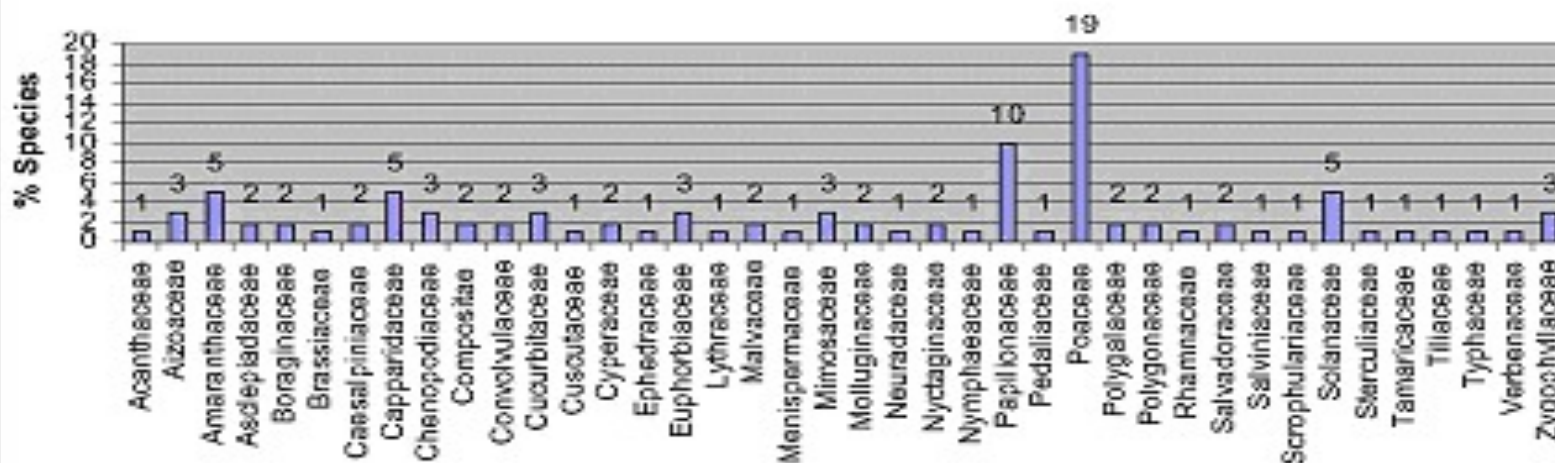
Rangelands



Sand dunes



Contribution of Plant Families to Overall Flora of Chotiari



Floral Diversity of the Area

Aquatic

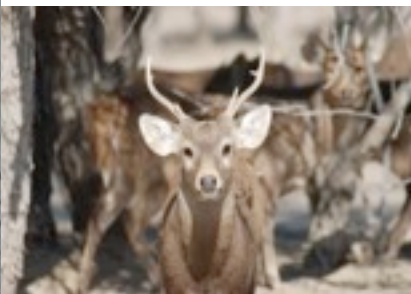
Total 57 hydrophyte sp.
41 sp. Of
Floating,
Emergents
&
Submergents
are
Identified

Cultivated

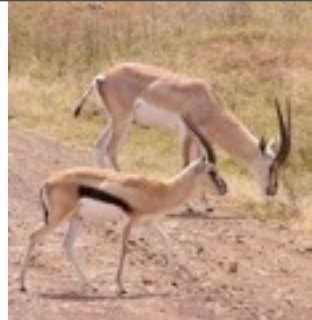
16 Sp.
Major crops
Wheat
Cotton
Sugarcane
Rice

Terrestrial

Over 170 dryland sp.
woody; acacia, Ziziphus,
Dalburgia, populus, prosipus,
Euclyptus
The Dominant is poaceae
Commiphora stocksiana
Endemic to sindh
Status is rare



Faunal Diversity of the Area



Large mammals

Small mammals

Birds

Reptiles & amphibians

Fish

Planktons

Total 14 sp.
 Caracal
 Fishing cat
 Hog Deer
 Asian jackal
 B.Fox
 D.Fox
 Chinkara
 Smooth C.Otter
 Jungle Cat
 I-Mongoose
 G.Mongoose
 I.Wild Boar
 I.D.cat
 F.Donkey

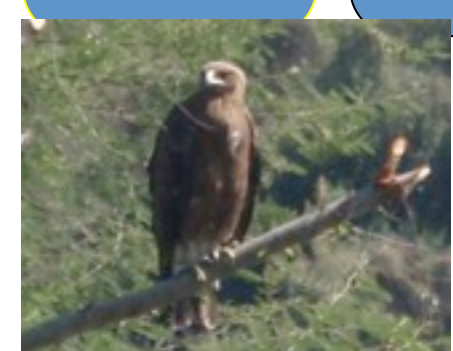
Total 19 sp.
 L.N. Bat
 L.E.Hedgehog
 I.D.Jird
 Sand col.rat
 Y.Bellied bat
 While most of the
 Other sp. are
 Threatened in the
 area

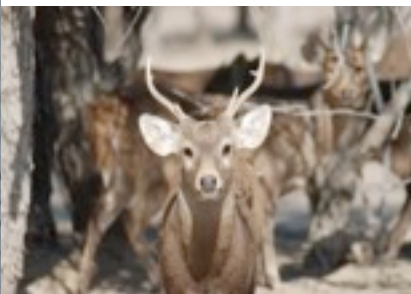
Total 108 sp.
 Resident+visiting
 80-summer-72-winter
 7 rare sp.
 Marbled Teal &
 P.Fish Eagle are
 Globally V.
 All bustards,
 Herons, egrets
 Paddy birds
 Falcons, eagles
 Birds of prey
 Spotbill duck
 Are procted under
 WPO-1972

Total 58 sp.
 Snakes =25
 Lizards =20
 Chelonians =9
 Amphibians=3
 Crocodile=1
 All python snakes,
 Monitor & spiny-
 Tailed lizards,
 Freshwater turtles
 Are P. list.
 Marsh crocodile is
 An endangered sp.
 Gavial-last seen in
 1990.

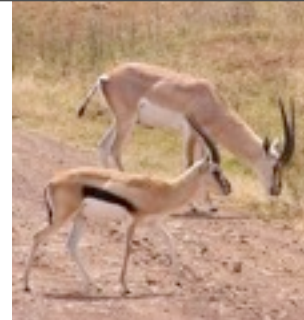
Total 51 sp.
 13. High EI
 4. Fairly high EI
 9. Aquarium
 21. less EI but
 Provide food for
 Aquatic carnivores

Phytoplanktons
Total 359 sp.
 Distributed in
 40 families &
 9 phylla
Zooplanktons
4 of each
 Trestrial & aquatic
 Groups-identified
 Detail/complete
 Data NA





Faunal Diversity of the Area



Large mammals

Small mammals

Birds

Reptiles & amphibians

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Fishing cat
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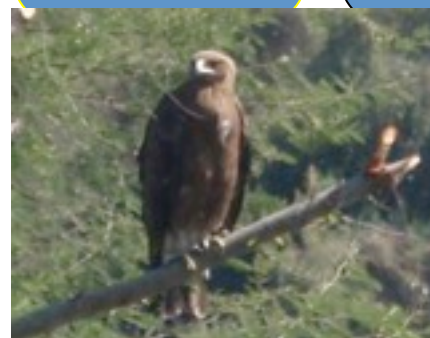
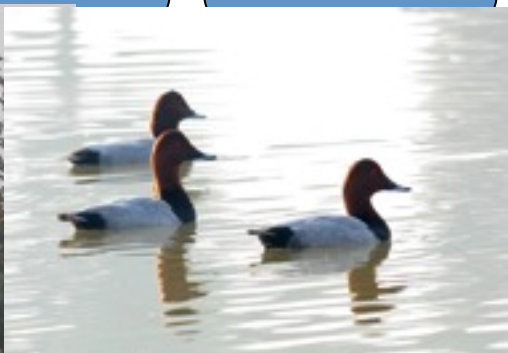
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Groups-identified
Detail/complete
Data NA



EIA of the Project

- The EIA was carried-out by **Mott MacDonald** and **NESpak**
- Quite sound report on baseline information
- Completely failed to evaluate any alternative
- Many shortcomings in impact identification & prediction specifically in the case of biodiversity assessments
- Considerably failed in assessing the indirect and secondary impacts
- Underestimated seepage loss and associated consequence of waterlogging and salinization

Present Situation

- The project caused substantial lossess to habitats
- It submerged and destroyed Riverine Forest
- It has enhanced burdened on rangelands
- Fish Stocks of lakes are depleting
- The project has abandoned vast area of agricultural lands in and around the reservoir
- Poverty has been enhanced among the local communities of farmers, fishermen and herders

Introduction

The Reservoir

Ecological significance of the Site

EIA of the Project

Present Situation

Conclusions

Introduction

The Reservoir

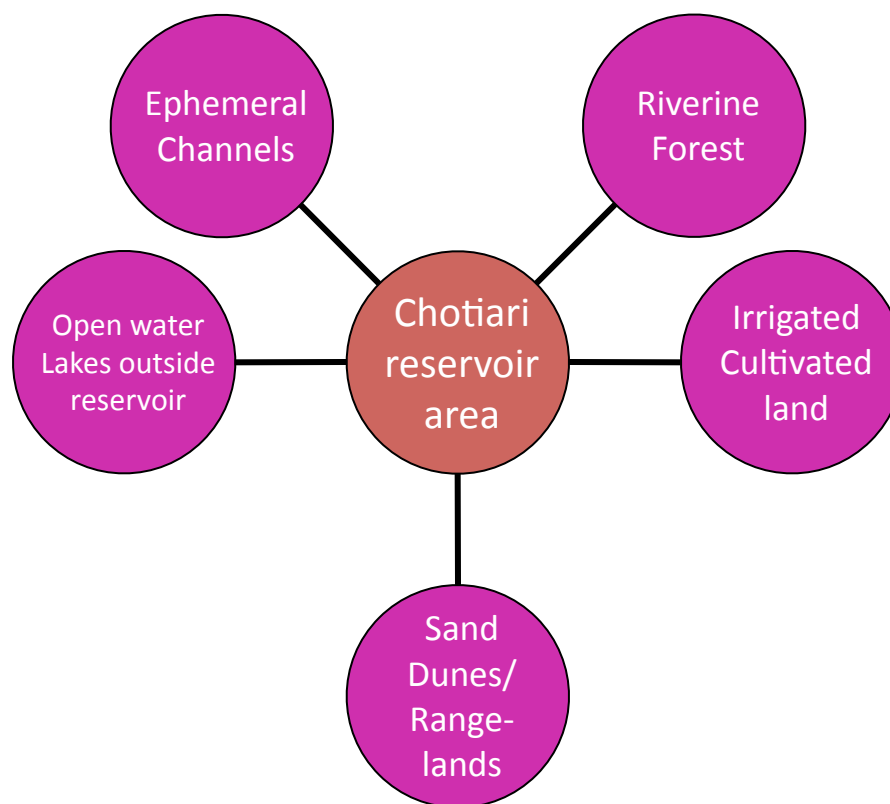
Ecological significance of the Site

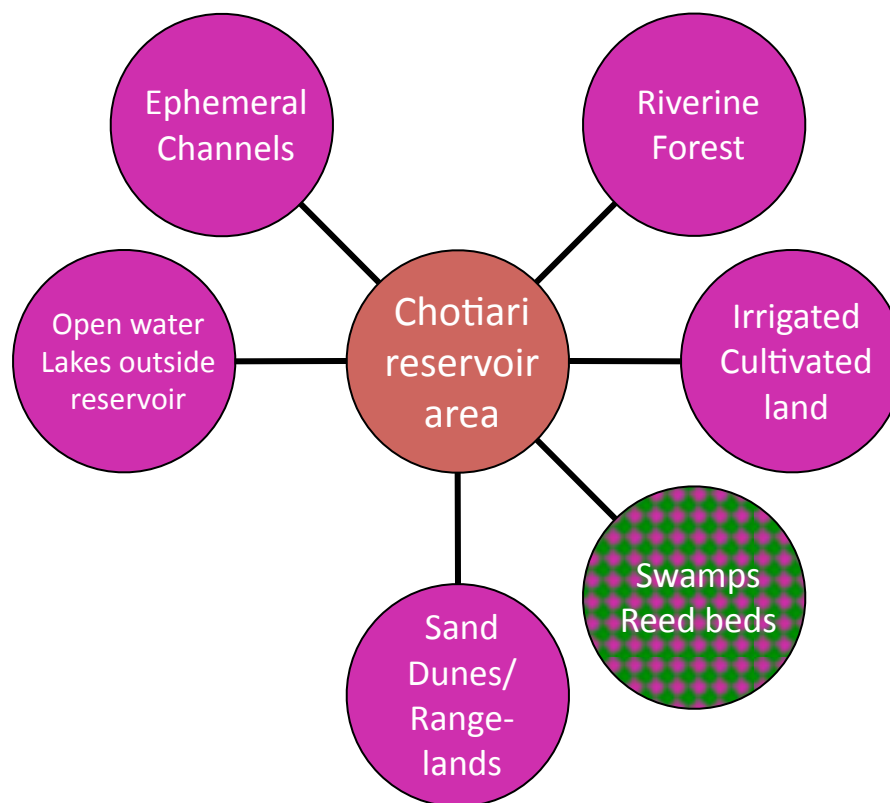
EIA of the Project

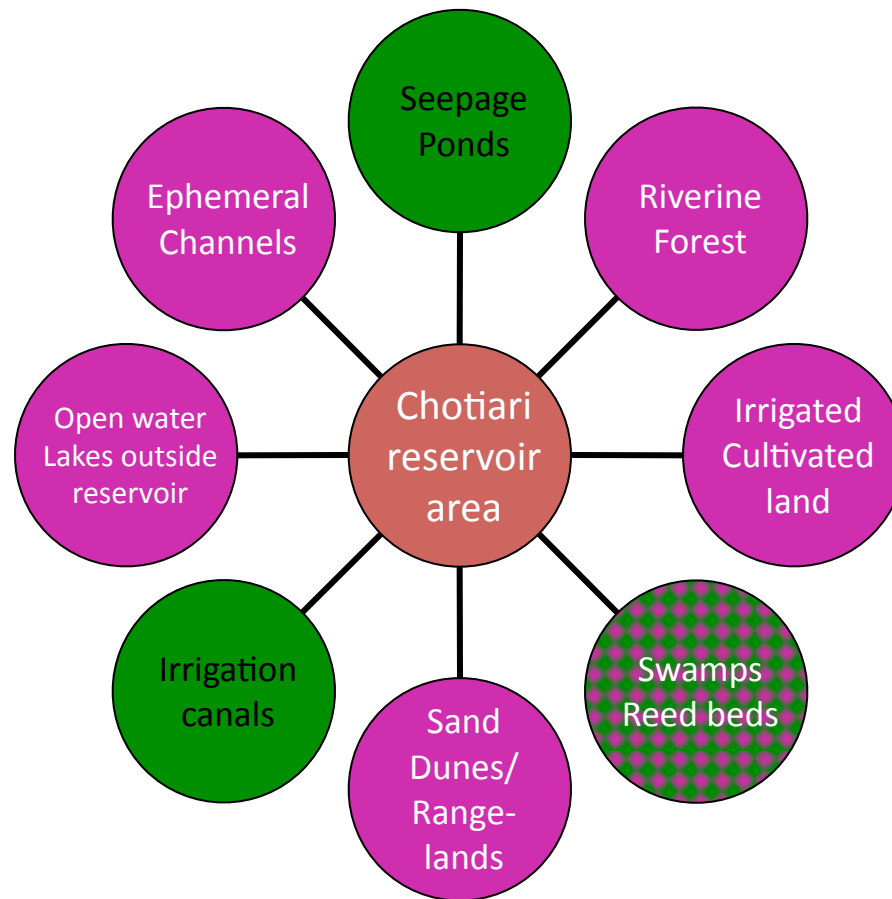
Present Situation

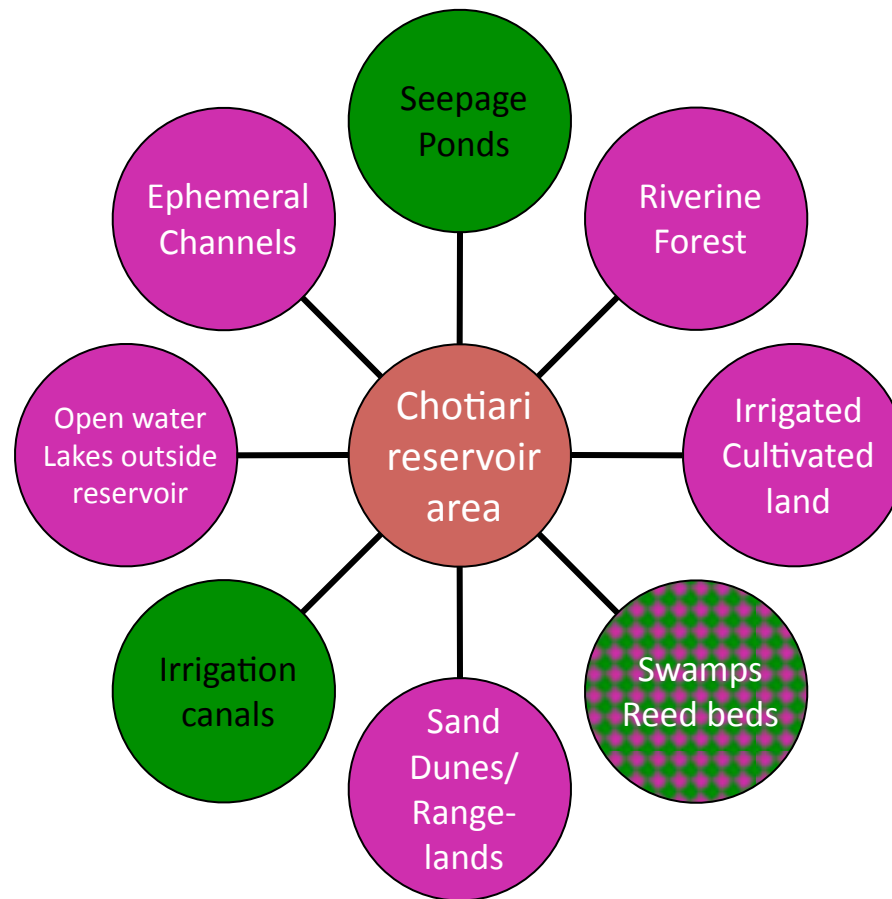
Conclusions

Chotiari
reservoir
area



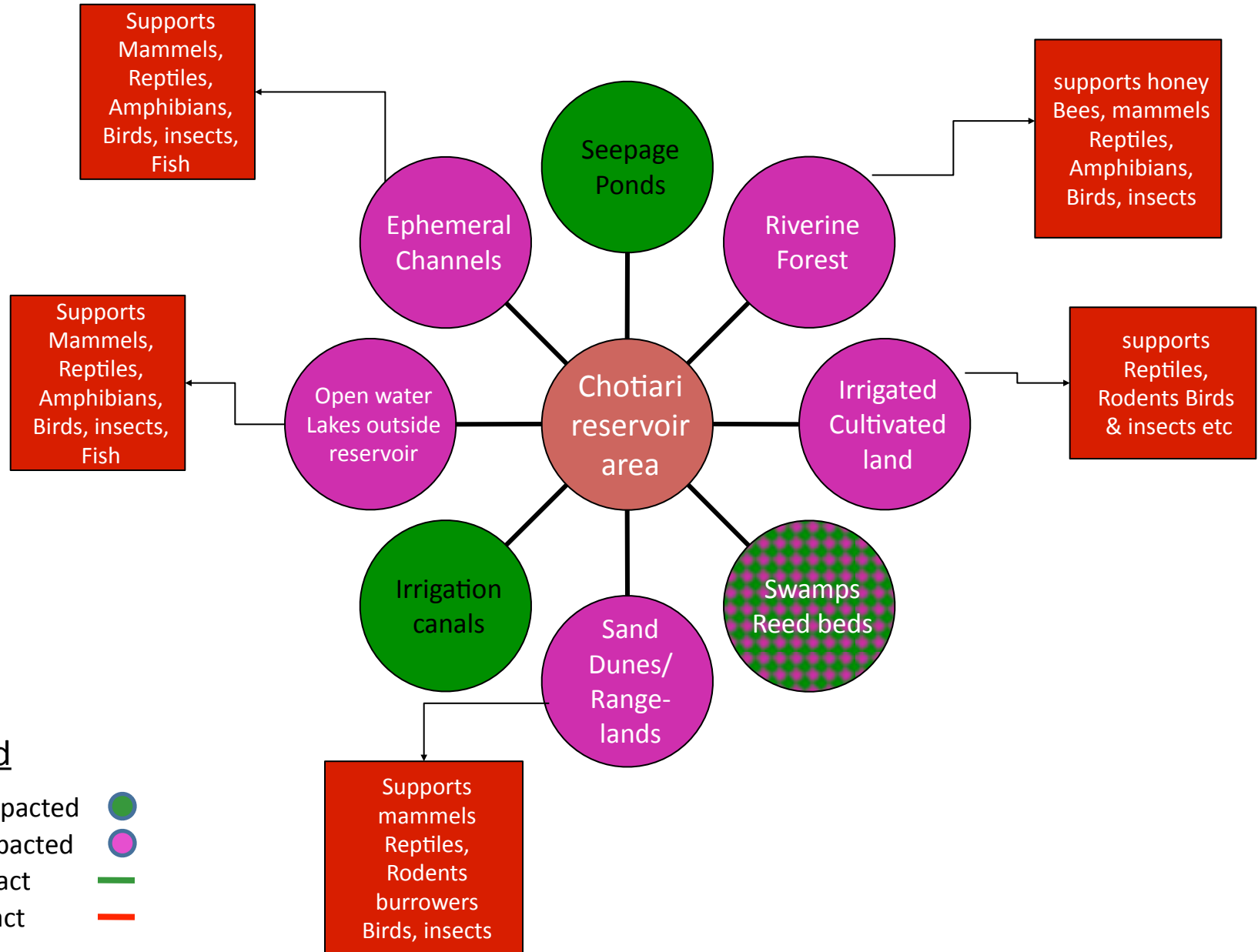


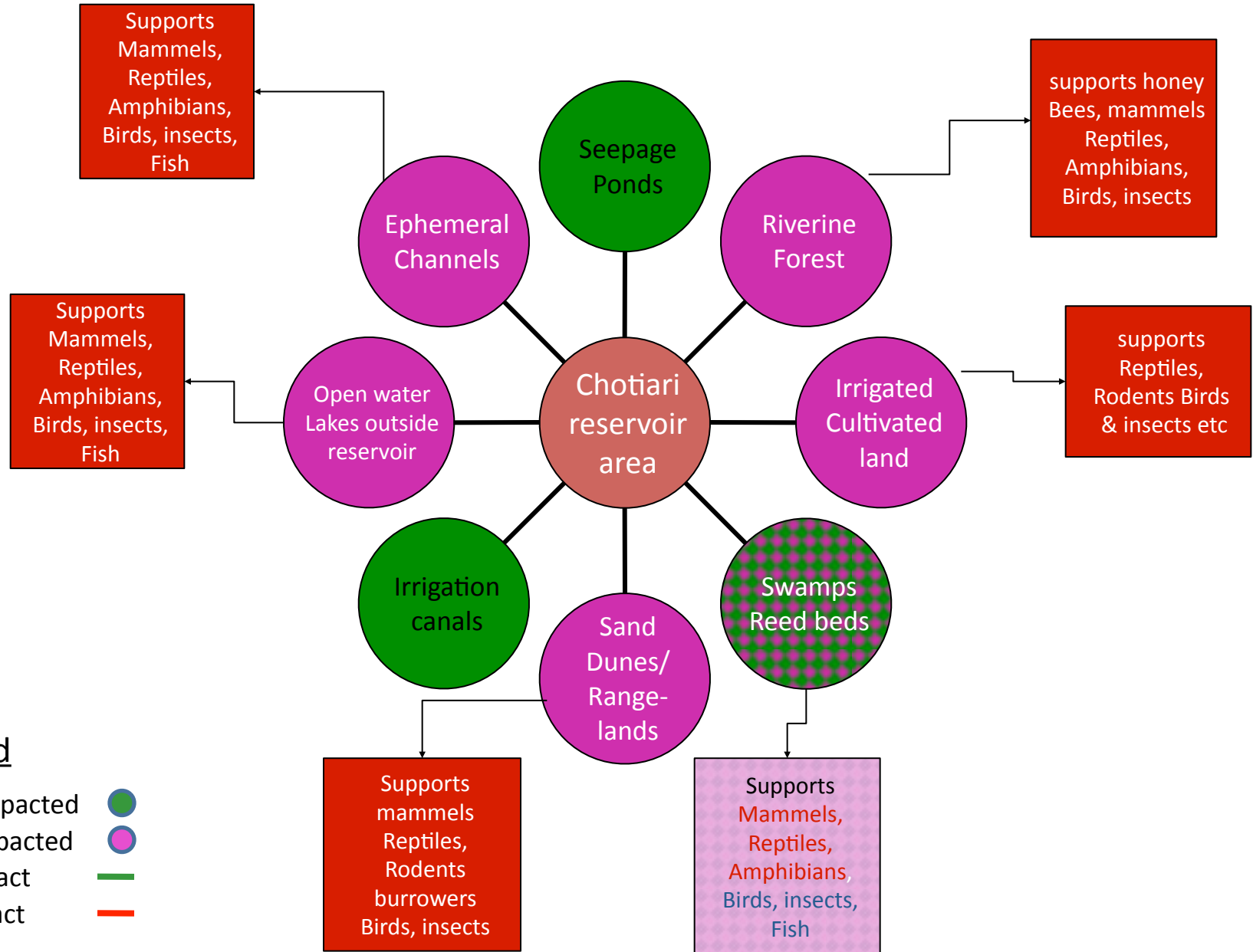


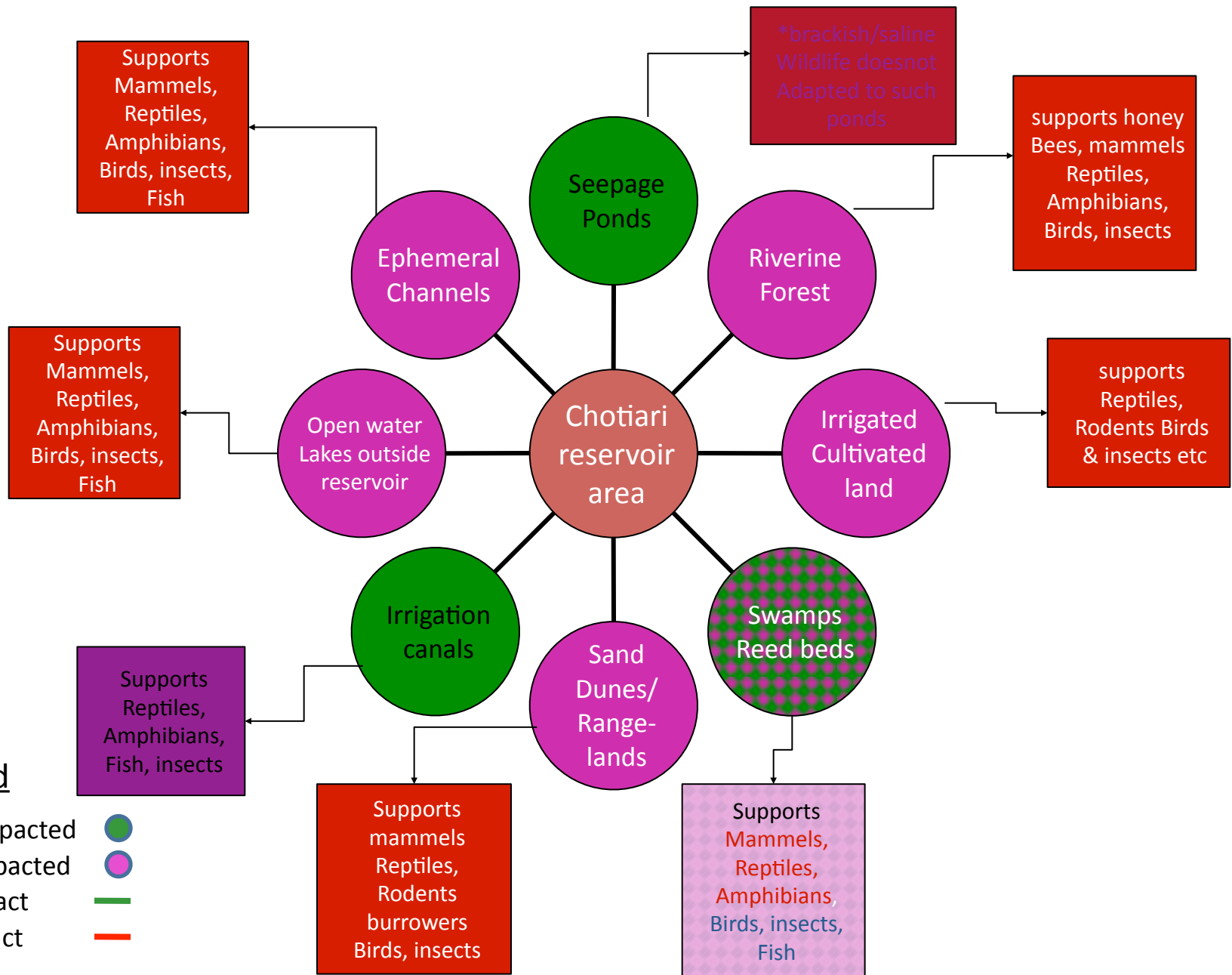


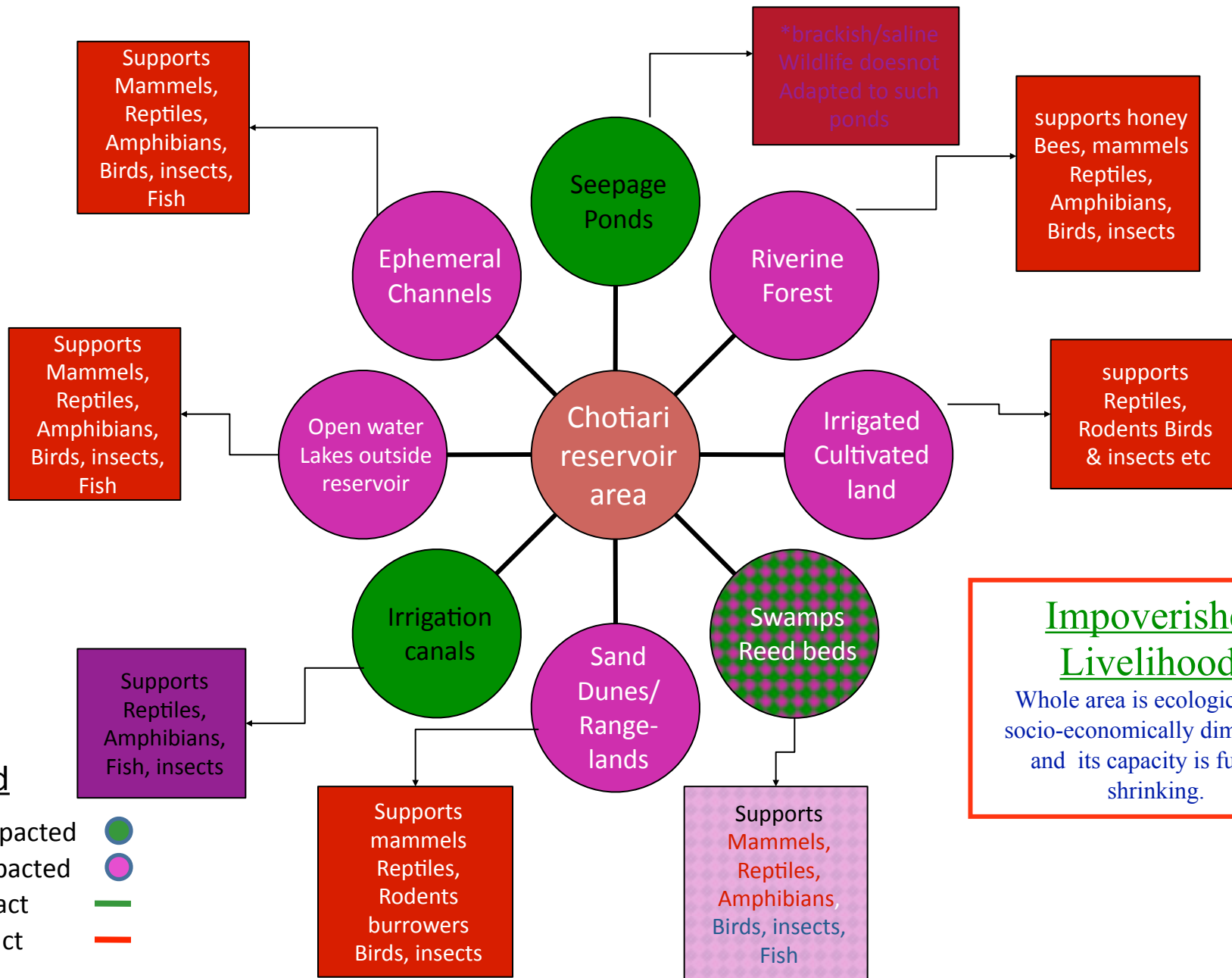
Legend

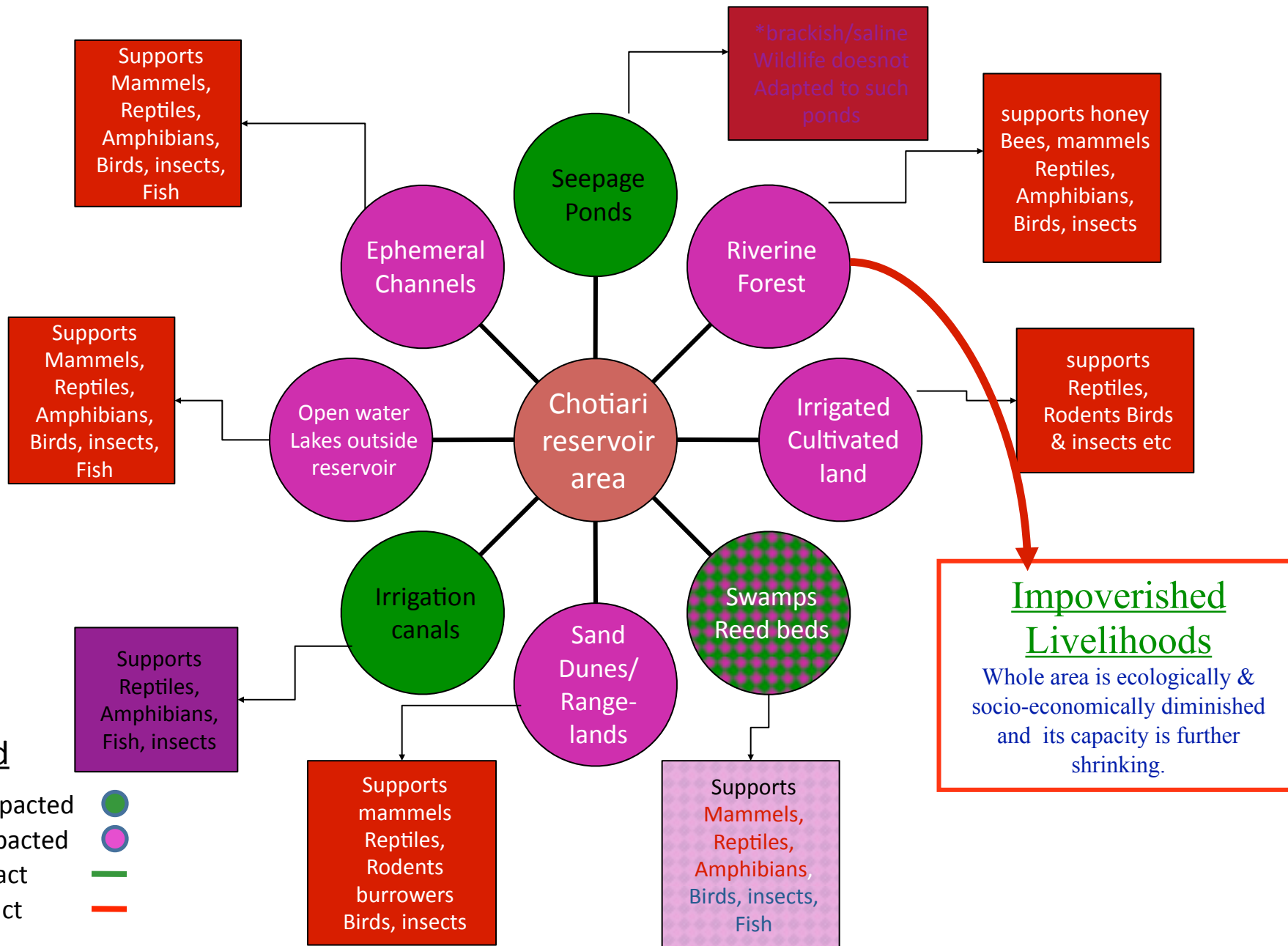
- +vely impacted ●
- vely impacted ●
- +ve impact —
- ve impact —

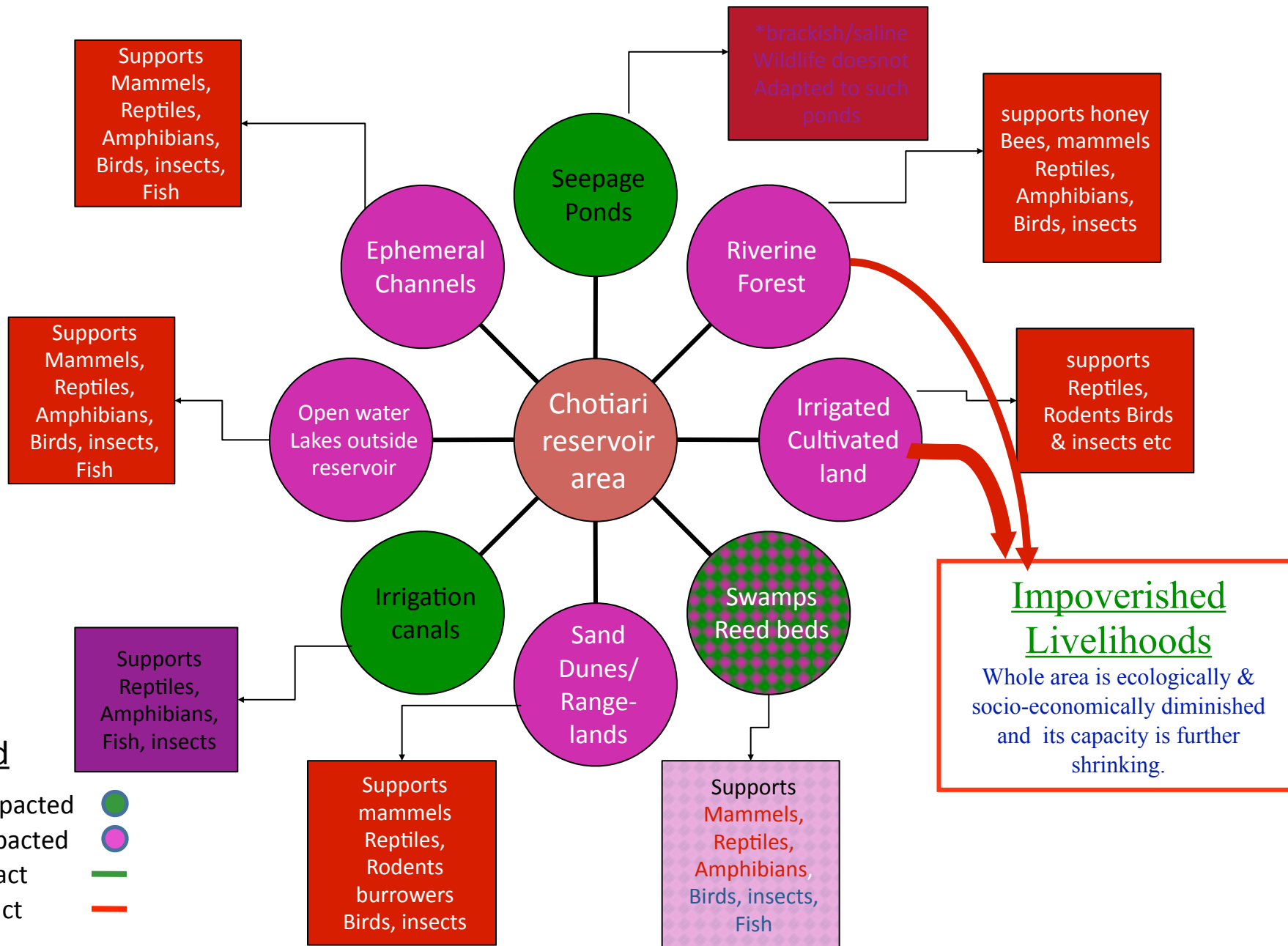


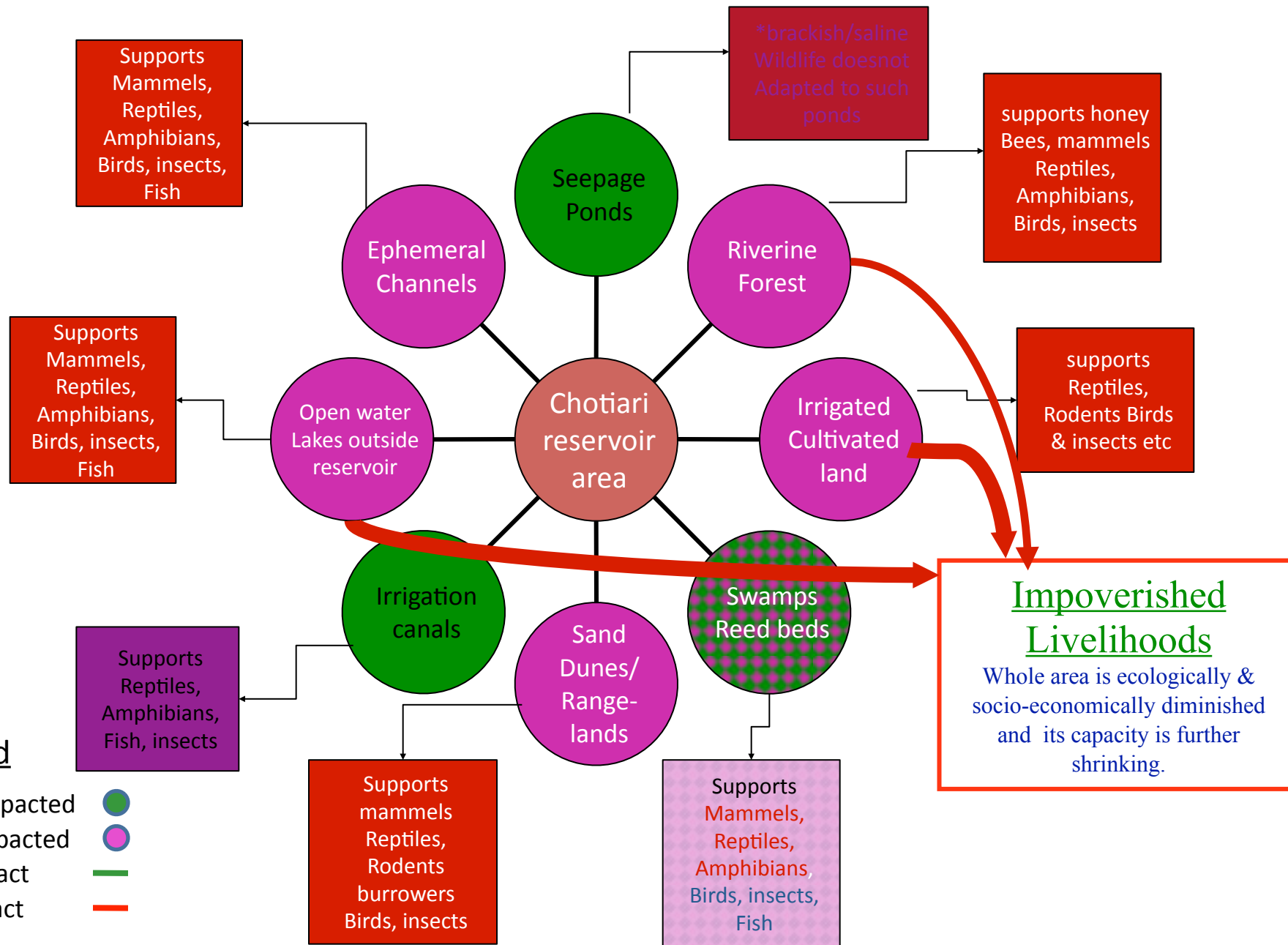


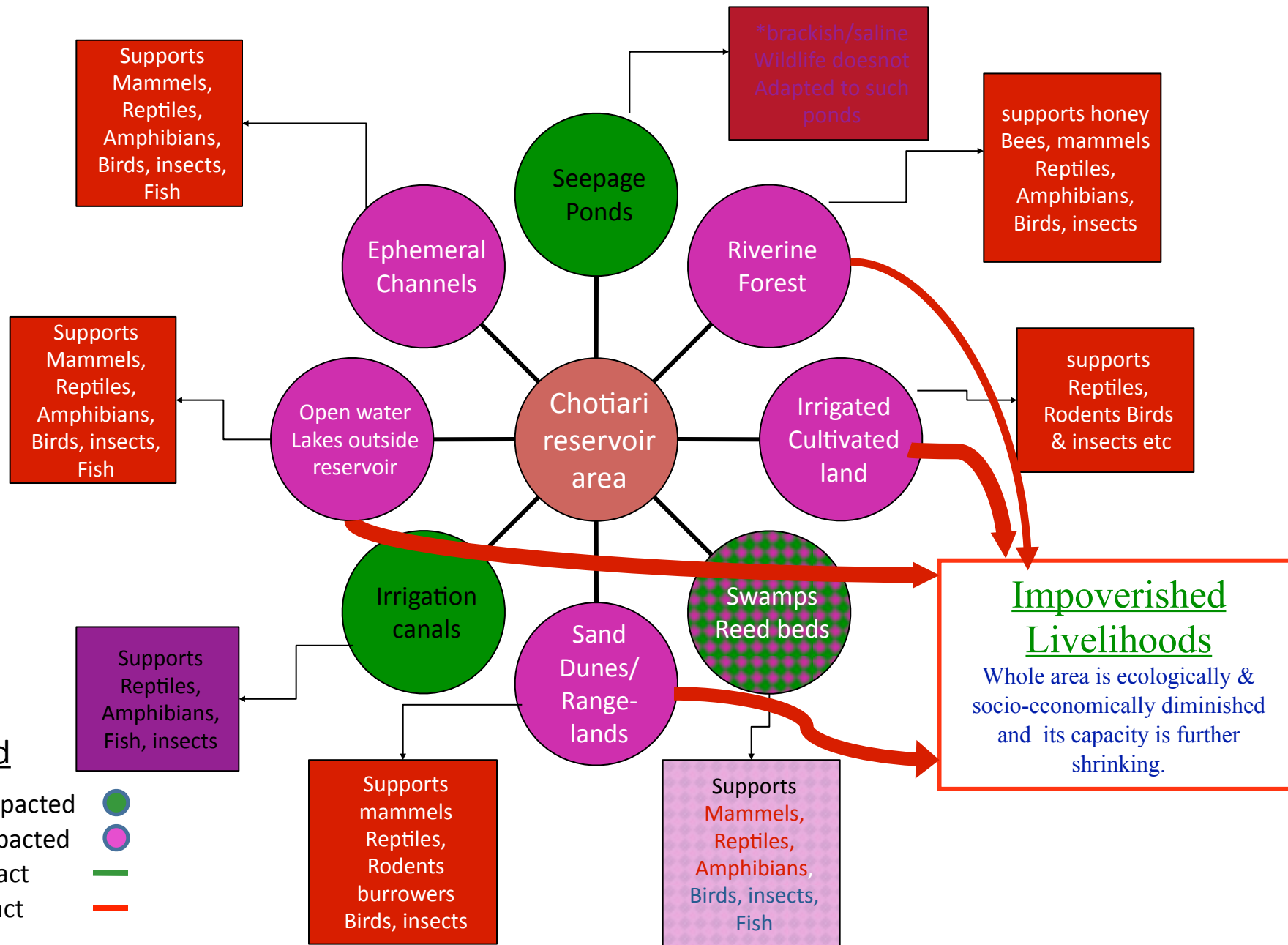


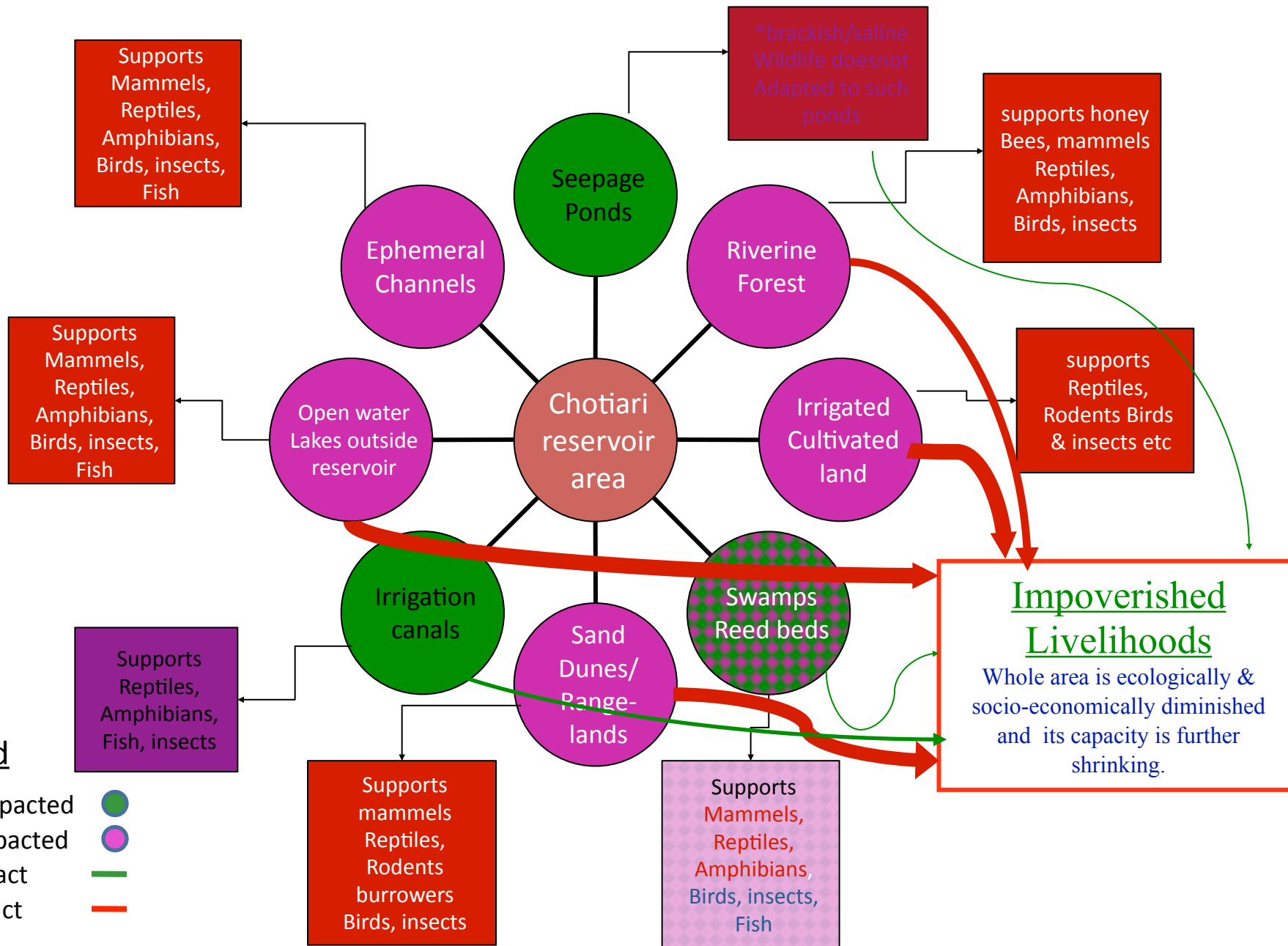


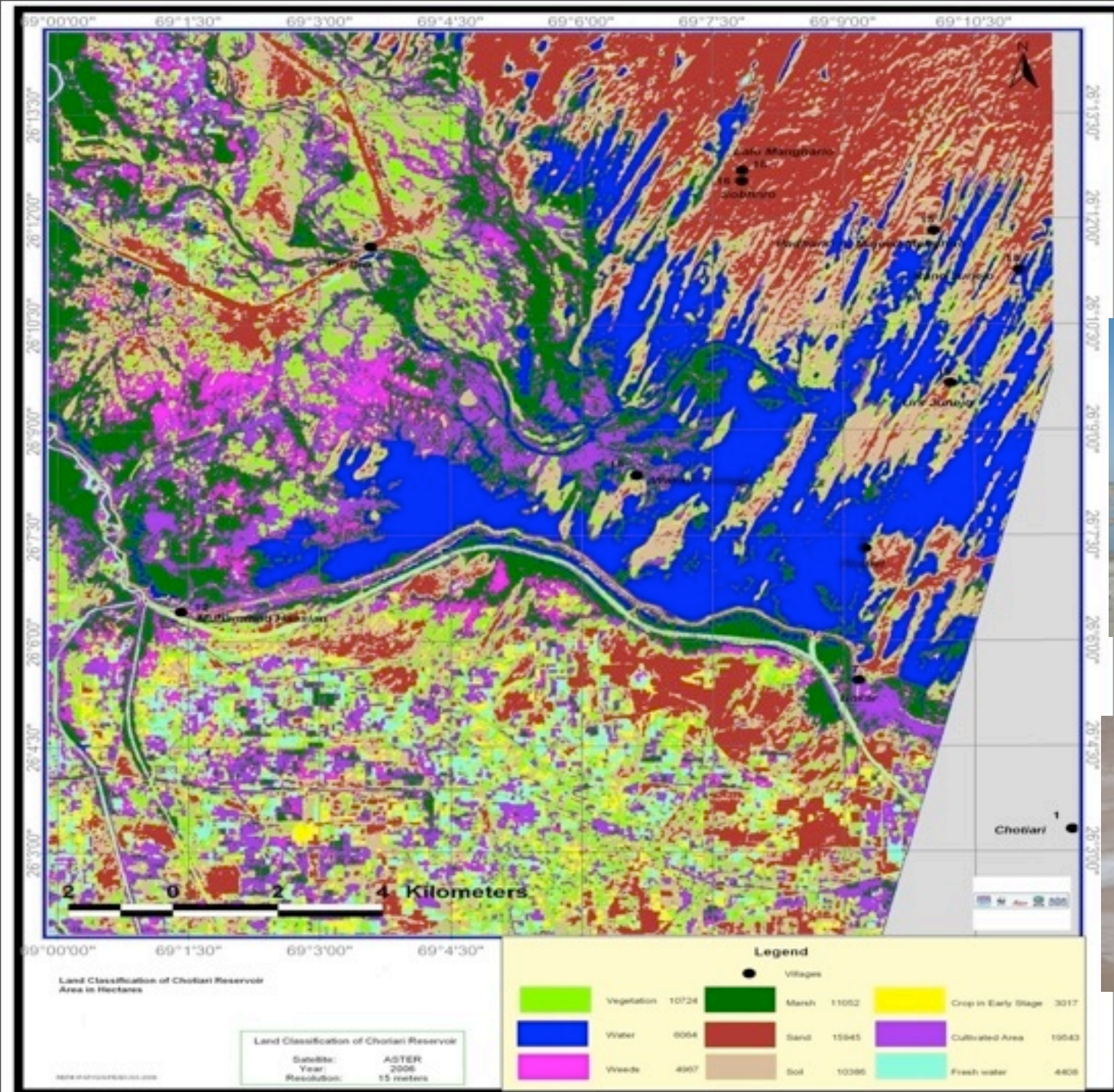






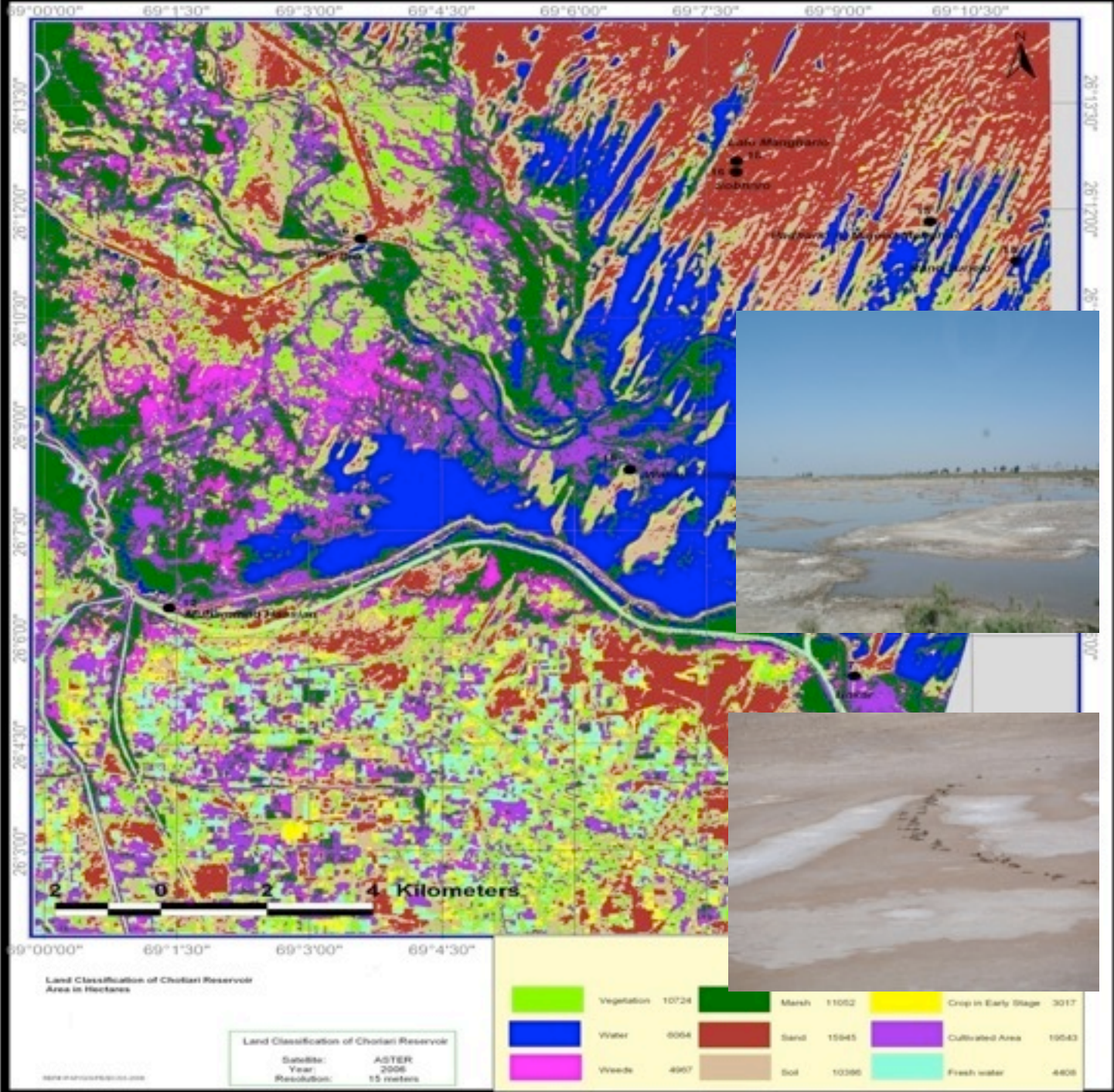




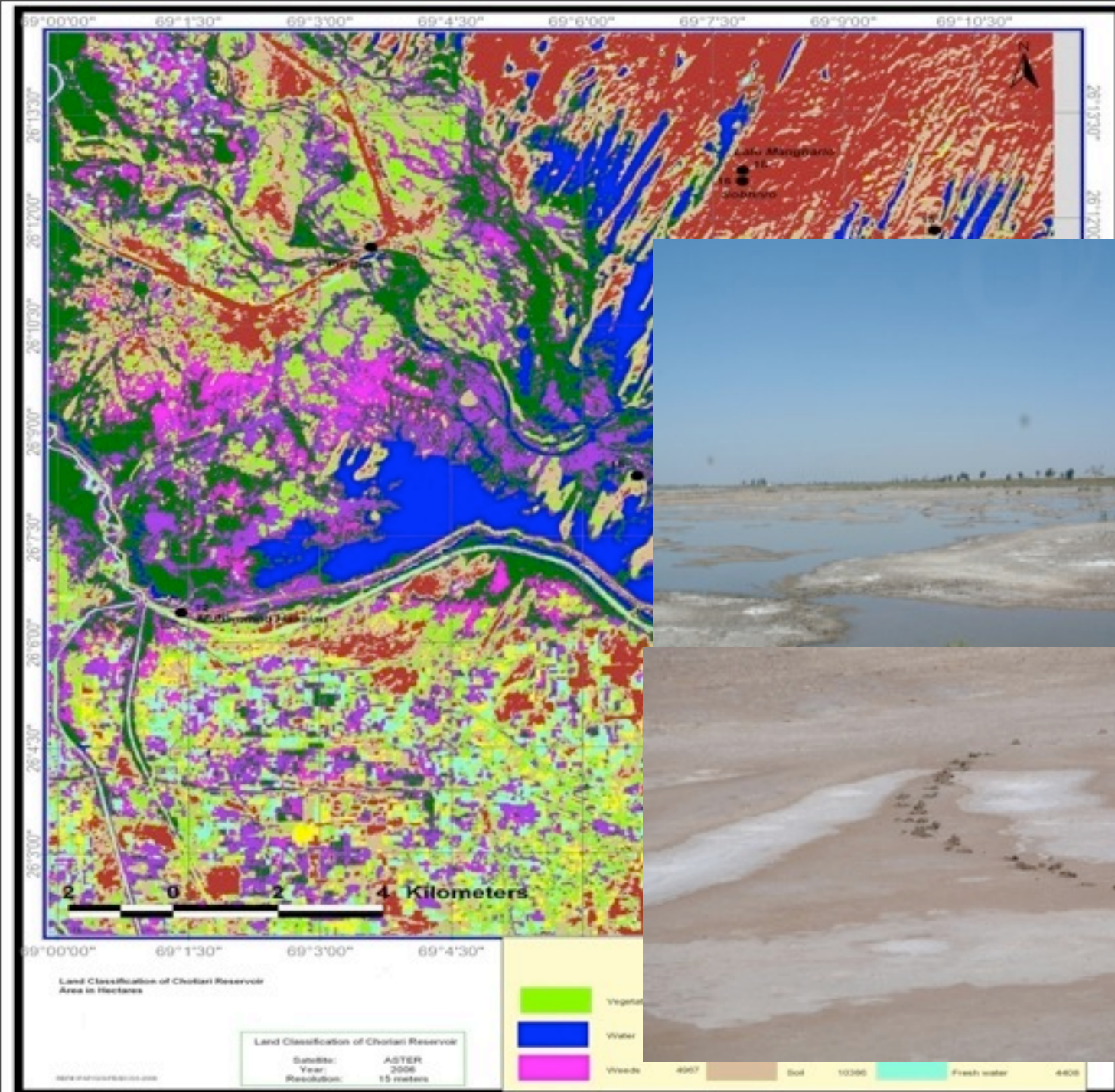


- Image indicates about **30,000** hec. of fertile land is at water logging & salanization risk
- Claimed benefit = **60,700** hec. for one season
- Fertile land loss = **about 30000 (K)** hec. for 2 seasons
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Conclusions

- The Chotiari Reservoir is one of many cases in Pakistan where EIA failed to address the biodiversity issues and sustainability of natural resources
- The case can be characterized by;
 - Absence of alternative evaluations
 - Inadequate coverage of impacts on biodiversity and natural income resources
 - Weak mitigation and offset measures
 - Absence of follow-up
- Biased report by the consultants
- Inadequate capacity of the EPA to review and analyse the report

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Ranking-Best Report Awards

Capacity enhancement-training to analyse & Review –
networking

Acknowledgements

I wish to thank for the support of Indus for All Programme to carry out this work and especially I am grateful to Robert E. Whale (a.k.a. Rab Nawaz), Ali Dehlavi and Saeed ul Islam with whom I shared my ideas and debates.



Thank You for Your Patience & Interest