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Valuation of Ecosystem Services of the Sudd Wetland for Green Infrastructure Planning and Development

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NBDF Economic Valuation of Wetland Ecosystem Services
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Outline

- Background and justification
- Methodology
- Results and discussion
- Conclusions
- Recommendations

Background & Justification

- The Sudd Wetland is one of the Nile wetlands ecosystems located in South Sudan and recognized under the Ramsar Convention as a Wetland of International Importance (Azab, 2017; MoE, 2015).
- The Nile Bains TEEB has conducted a fairly sizable studies on ecosystem valuations.
- South Sudan is among the countries with limited attempt of such studies.
- It was based on this motivation that the study on Sudd wetland is initiated.

Methodology

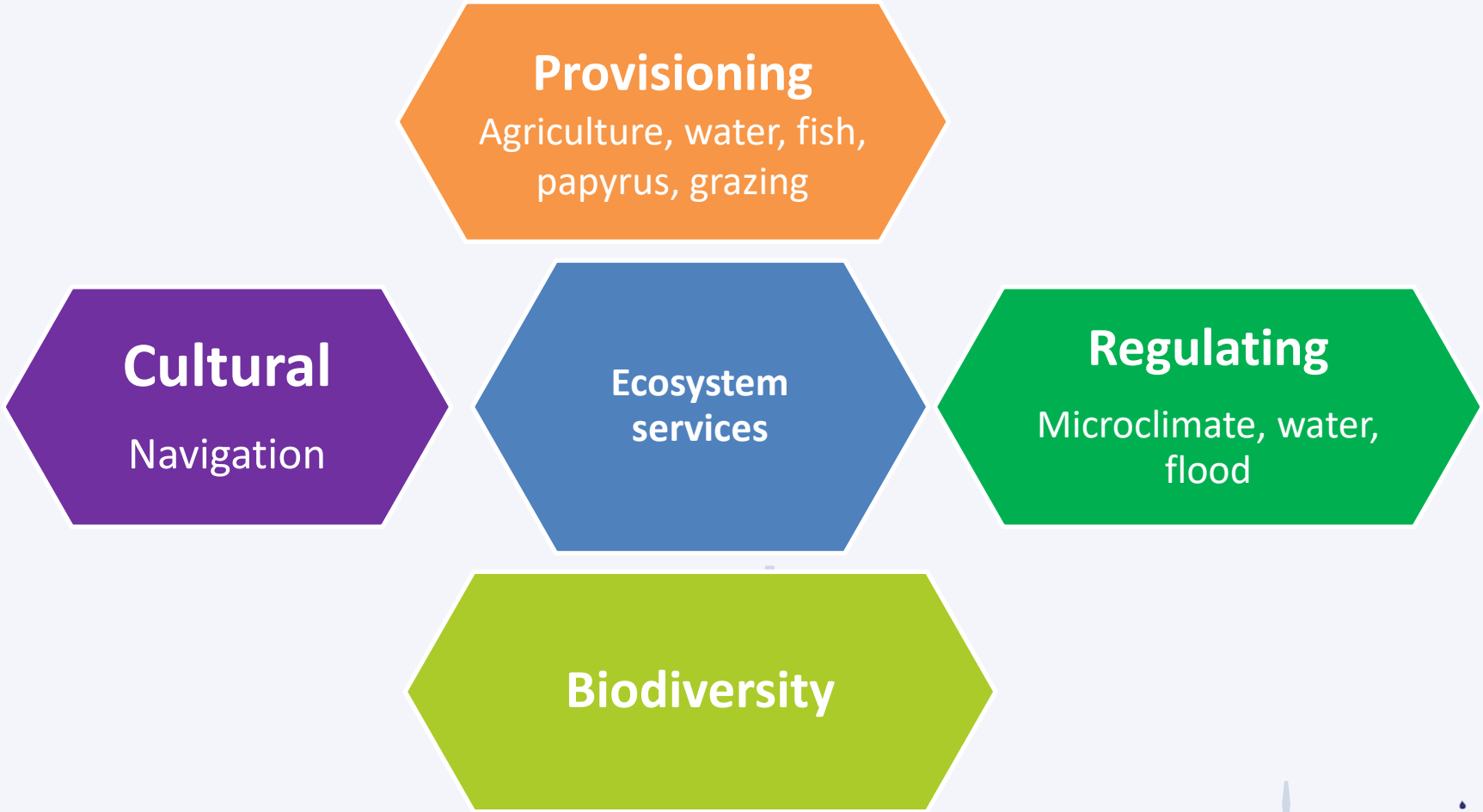
- Primary Sources – Consultative meetings in Kampala & Juba

Kampala

Juba

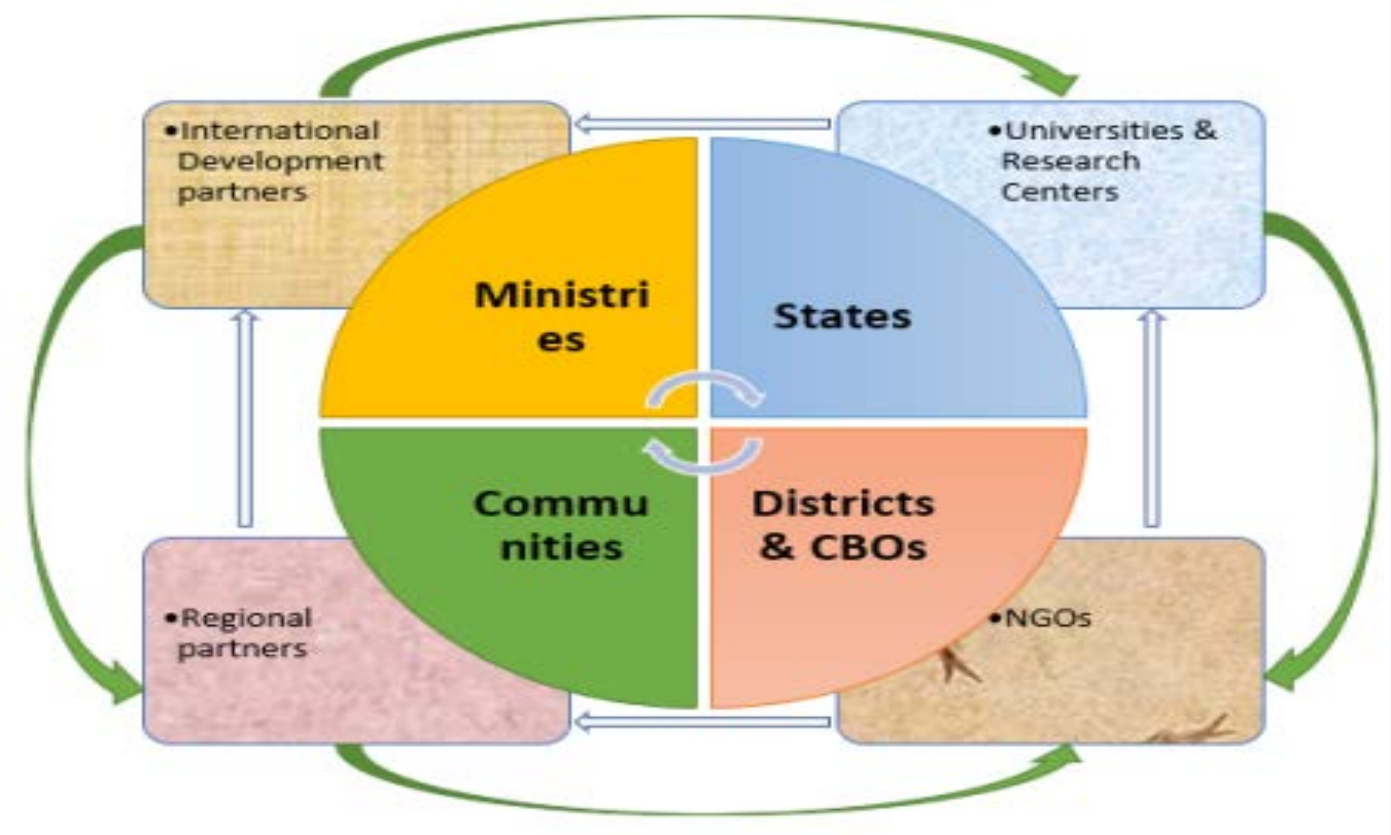
- Secondary sources – published & unpublished materials
- Market price & unit value transfer

Methodology



Results and Discussion

- Stakeholder identification and mapping



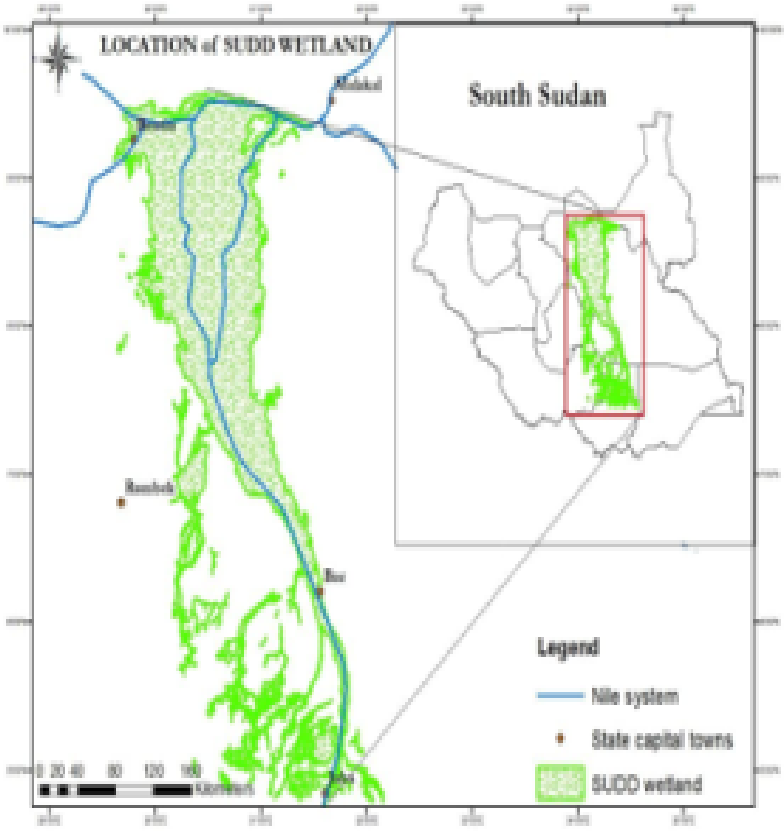
Ministries – policies, regulations, projects, interventions – forwarded to states

Districts & CBOs – community mobilization

Results and Discussion

- Land Use and Land Cover of the Wetland

Land cover	2015
Cropland	1311.12
Herbaceous cover	1382.94
Tree cover areas	1117.08
Mosaic tree and shrub	209.79
Shrub cover areas	8770.95
Grassland	169.2
Tree cover flooded	1314.81
Shrubland herbaceous cover flooded	16892.73
Built-up areas	1.71
Bare areas	0.45
Water Bodies	893.52
Total Areas(km2)	32064.3



Results and Discussion

- TEV of provisioning services

Ecosystem services	Size (ha) or population	Unit value $ (ha) or per capita value	Total Value[5]	Source of data and explanation
Crop	131,112	299	35,793,576	WB (2012)
Fish	89,352	77.8	6,347,100	Unit value: ($77.8 $ha^{-1}yr^{-1}$) based on Schuijt (2002)
Papyrus	480,965	19.5	8,563,269	Unit value: ($19.47 $ha^{-1}yr^{-1}$) based on Kakuru et al. (2013); 15 percent of the wetland is assumed to be covered by Papyrus
Papyrus crafts	480,965	47.95	21,056,857	Unit value: ($47.95 $ha^{-1}yr^{-1}$) based on Kakuru et al. (2013)
Domestic water supply	160,000	35.3	5,156,870	Unit value: ($35.3.2$hh^{-1}yr^{-1}$) based on Kakuru et al. (2013); from FGD an estimated 200000 HHs in the wetland; 80% assumed to depend on the wetland
Livestock watering	1,786,336	2	47,625,271	Unit value: (2 jerrican (20 liter) $livestock^{-1}day^{-1}$) and ($0.04 price $jerican^{-1}$) based on Kakuru et al. (2013); WB (2012): 17,863,360 livestock in the five states; 10% assumed to depend on the wetland
Livestock grazing	1,786,336	0.2	119,063,178	Unit value: ($0.2 $livestock^{-1}day^{-1}$) based on Kakuru et al. (2013); WB (2012); WB (2012): 17,863,360 livestock in the five states; 10% assumed to depend on the wetland
Fuelwood	264,168	4.58	1,104,681	Unit value: ($4.58 $ha^{-1}yr^{-1}$) based on Schuijt (2002)
Natural medicine	2,985,750	0.91	2,480,769	Unit value: ($0.91 $ha^{-1}yr^{-1}$) based on Schuijt (2002)
Charcoal	5,000	0.3	3,560,870	Group discussion: 5,000 households involved in charcoal production; Barbelet et al. (2012): 50kg hh^{-1} $week^{-1}$ and 52 weeks in a year
Vegetation	1,141,263	0.56	583,532	Unit value: ($0.56 $ha^{-1}yr^{-1}$) based on Schuijt (2002)
Mulch	16,920	140	2,162,817	Unit value: ($140.0 $ha^{-1}yr^{-1}$) based on Kakuru et al. (2013)
Total provisioning services				**253,498,790**

Livestock grazing, livestock watering, and crop production

In Juba, participants stated livestock grazing and fishing are major activities .

Results and Discussion

Ecosystem service	Size (ha) or population	Unit value $ (ha) or per capita value	Total Value[6]	Source of data and explanation
Transport	89,352	1.82	162,621	Unit value: ($1.82 ha^{-1}yr^{-1}) based on Schuijt (2002)
Total cultural service				**148,480**

Ecosystem service	Size (ha) or population	Unit value $ (ha) or per capita value	Total Value[7]	Source of data and explanation
Microclimate regulation	3,075,102	265	744,040,984	Unit value: ($265.00 ha^{-1}yr^{-1}) based on Kakuru et al. (2013)
Flood control	3,075,102	723.89	971,519,357	Unit value: ($723.89 ha^{-1}yr^{-1}) based on Kakuru et al. (2013); based on literature, South Sudane's infrastructure coverage (drinking water, sanitation, and roads) stood to be about 48 percent of that of Uganda.
Water regulation	3,075,102	30	84,231,055	Unit value: ($30.00 ha^{-1}yr^{-1}) based on Kakuru et al. (2013)
Total regulating services				**1,799,791396**

Ecosystem service	Size (ha) or population	Unit value $ (ha) or per capita value	Total Value[8]	Source of data and explanation
Biodiversity	3,075,102	439	1,232,581,102	Unit value: ($439.00 ha^{-1}yr^{-1}) based on Kakuru et al. (2013)
Total biodiversity service				**1,232,581,102**

Accounting for per capita income difference, TEV $3.3 billion.

Regulating (55%), biodiversity (37%), previsioning (8%).

Results and Discussion

- **Alternative development options for the wetland**
- Wise utilization scenario and green development options Vs the status quo situation
- Based on consultation held in Kampala and each scenario in turn has further activities

- **The Status Quo**
- The valuation was conducted based on the status quo situation & most of the value was due to regulation and biodiversity services that doesn't have immediate benefit to local communities in particular.

Results and Discussion

- **Wise Utilization and Management**
- The aim is to restore, rehabilitate and conserve the biodiversity and ecosystem services while ensuring sustainable livelihoods.

- Development of integrated land use planning, landscape restoration and rehabilitation, species and habitat conservation, ecosystem based adaptation, sustainable livestock production, sustainable and climate resilient livelihoods, community water sanitation and hygiene.

Results and Discussion

- **Green Development Path**
- The country needs to balance its ecosystem conservation and development needs and the best way to achieve this is to rely on green development approach which is getting wider acceptance throughout the globe.

- Building institutions, capacity and conservation awareness; and green infrastructure development.

Conclusions

- Sudd is one of the largest wetlands in the world and as a result it affects different stakeholders; local to global actors.
- Local communities are both the immediate beneficiaries as well as conservation actors of the wetland.
- The TEV was estimated at about USD 3.3 billion.
- Most of the benefit emanates from the regulation service followed by the biodiversity services and provisioning services.
- Unless a mechanism is set to increase the benefits from the provisioning services, the status quo may not be sustainable.

Conclusions

- Regulating and biodiversity services have a public good character which may not be the immediate reasons for protection.
- Wise use of the wetland requires the development of integrated land use planning, landscape restoration and rehabilitation, species and habitat conservation, ecosystem-based adaptation, and sustainable livestock production.
- The country has to balance between its development aspiration and its natural resources in general and that of Sudd in particular.
- Building institutions and their capacity as well as awareness creation on conservation practices is crucial for the sustainable development of the country.

Recommendations

- Strong institutions are very crucial in efficiently conserving and managing the wetland – capacity and budget
- The government should also take the initiative to solicit finance from foreign sources aimed at conservation of the wetland.
- Balance the development needs of the country with the protection and conservation of its ecosystem.
- The best approach is to follow green the development path where economic growth is should not be against the resource endowment of the country.
- Promote tourism using the Sudd wetland.
- The polluter pay principle should be applied.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THANK YOU!