

The background of the slide is a close-up photograph of several light purple water hyacinth flowers with yellow centers, surrounded by their characteristic rounded, green leaves. The flowers are in various stages of bloom, and the leaves are vibrant and glossy.

*Water Hyacinth (Eichhornia crassipes) as
Environment Cleansing Agent and economic resources
for Community around Lake Tondano, North
Sulawesi, Indonesia*

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MAP of Indonesia, Sulawesi, North Sulawesi, and Tondano Lake



Researchers Team

1. Drs. P.H. Abram Ph.D, (major, Catalyst Chemistry) studied construct wetlands at the Institute of Limnology and Wetland Mondsee, Austria, do the research of fermentation of fish waste to be used as organic fertilizer and Absorption of heavy metals by water hyacinth. Teaching/researcher in Department of Education Chemistry, Tadulako University, Indonesia.



2. Dra. Vanny M.A.Tiwow MSc. Ph.D (major, syntheses molecule) has experience managing biogas and waste disposal (Collaboration between University of Tadulako and Boras University, Sweden) and do the research of fermentation of fish waste to make liquid and solid fertilizers and absorption of heavy metals using water spinach in Gold mining. Teaching/researcher in Departement of Education Chemistry, Tadulako University Indonesia



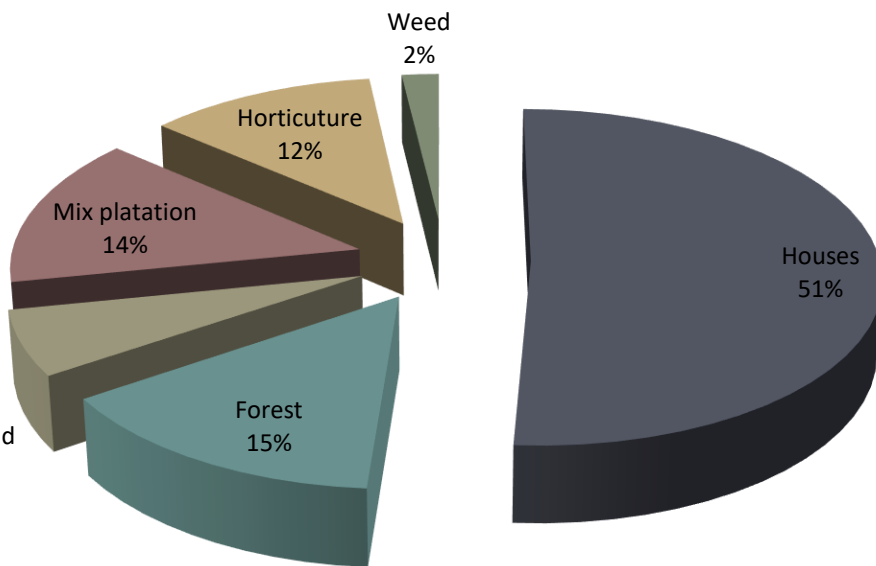
3. Prof.Dr. Anatje Lihiang MSi. from State University of Manado, North Sulawesi Indonesia have been done the research about Spatial distribution of water hyacinth (*Eichhornia Crassipes*) in Lake Tondano.



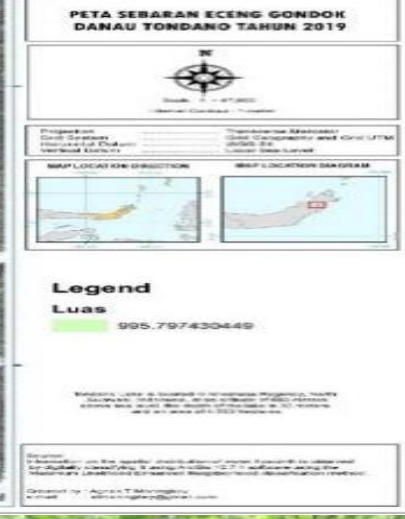
INTRODUCTION

Watershed Lake Tondano = 56,371 Ha, water catchment area =25,925 Ha and lake water body 4438 Ha,2010.

Water Catchement Area of Lake Tondano



Map of the distribution of water hyacinth in Lake Tondano 2020, 996 ha



Water hyacinth (WH) in Lake Tondano has nearly 1000 ha in 2023



At least 100 tourist destinations and a lot of restaurants, motorized vehicles of guests and residents

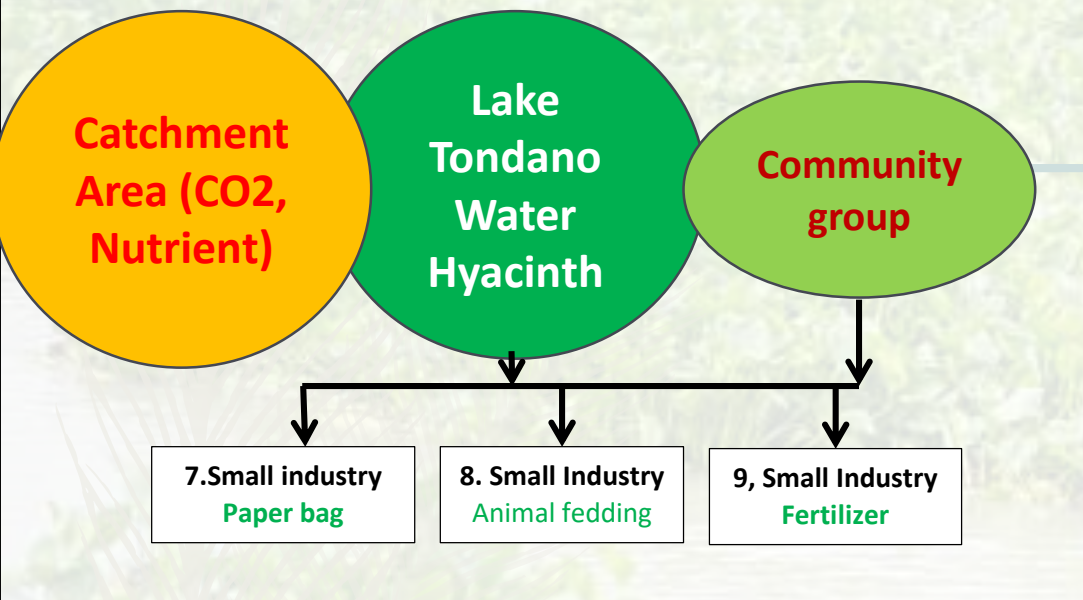
Catchment Area



Houses and fish cage

Project Plan and Propose

1. Sustainable Centre of Lake Tondano (Researcher)



1. To form organization of Sustainable Center of Tonadono.
2. To develop the floating farming water hyacinth:
3. To calculate the carbon capture capacity of water hyacinth for 600 -900 ha:
4. To models the distribution of growth of water hyacinth in Lake Tondano: requires statistical calculations.
5. To calculated concentration of nutrient absorbed from Lake Tondano by water hyacinth regularly,
7. **Water hyacinth to be paper bag: Water hyacinth is source to make paper: consist of 60% onecellulose, 8 % hemicellulose and 17% lignin. One kg of dried water hyacinth produces 262 sheets of paper, x Rp. 1000 = Rp. 262,000-Rp. 76,938 = Rp. 185,062. If 1 ha has 16,800 kg x Rp. 185,062= Rp. 3,109,041.6. If harvested 3 times a week. There are around Rp 9.000.000 million per week. (Sahwalita,2008, Jurnal Pembangunan Manusia edisi 5)**

8. Animal feed: In WH have content energy 1891,04 Kcal/kg, protein 15,21%, fiber 17,82%, fat 3,34%, calcium 0,54%, phosphorous 0,45%. Fresh of 60 kg WH are made for animal feeding, after processes left 50 Kg x Rp. 3000/kg = Rp.150,000. Fresh of WH are taking from lake Tondano about 250,000 kg/ha/day: 60 kg x Rp.150,000 = Rp.625,000,000. (Mekar Ria Pangaribuan at. al. 2020. <http://jurnal.umj.ac.id/index.php/semnaskat> E-ISSN: 2714-6286).

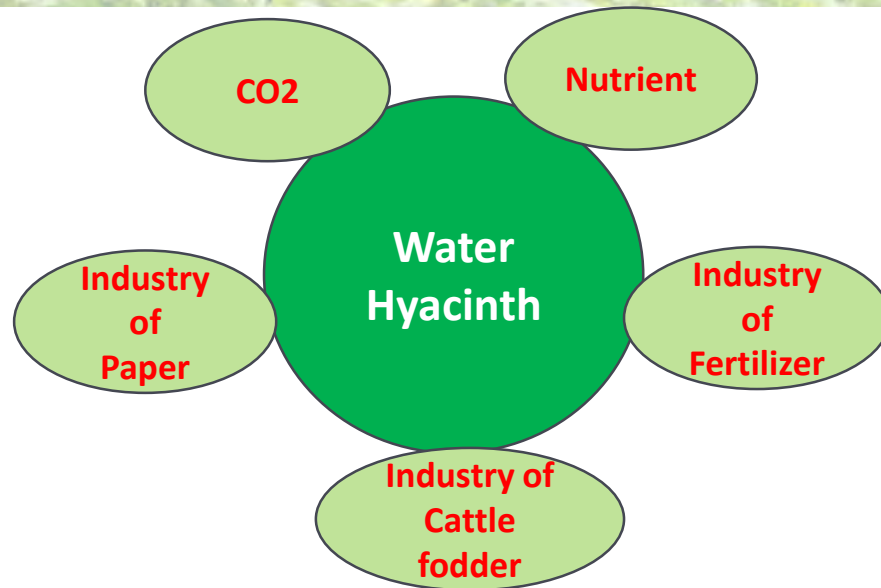
9. Organic fertilizer: content of water hyacinth have C organic 31-35%; Nitrogen of 1.5- 2.2%; P2O5 of 0.47-0.72%; K2O of 2.2-5.5 % ; water content of 14.9-29%; and pH ranges from 6.4 -6.8. (Wulandari, D.A, Linda, R., & Turnip, M. (2016). Journal, Vol.5, No.2). If mixing fertilizer can replace inorganic fertilizer. One hectare field for one season requires 300 kg of Urea (N) Rp.4.200.000, 100 kg SP (P) Rp.1.575.000 and 100 kg KCl = 1.400.000. Total = Rp. 7.175.000.

For making fermented liquid fertilizer are 3 Kg WH + 1 Kg brown sugar + 10 L of water. Mixed 10 mL/L water x 3 applying =30mL/m2 can fertilize 1 m2. For one season, 1 Ha needed=10.000 m2 x 30 mL/m2= 300.000 mL: 1000 ml/L = 300 L, its need 9 Kg equivalent with Rp 7.175.000. If 250 ton/ha fresh WH can make 250.000 Kg: 9 Kg x Rp.7.175.000 = Rp.199.305.555.555. Roughly.

10. To models economic value of unitizing water hyacinth from Tondano Lake: 1-9 it is just approximately value, the real value will be calculating in this project. Thanks.

Project Concern

Change Community paradigm: water hyacinth as weeds to become a Water Cleansing Agent and carbon capture and storage as well as a agriculture field to help the household economically. We need help to convince community WH are useful for cleaning lakes and can be a source of income economically. To do so we need support funding and expert with experience working with kind of project



*Thanks
and
God Bless You*

