Be a beautiful resilience city
-Kaohsiung’s green corridor with Wetlands and Flood Detention Basins-

Lee-Shing Fang, Dr., Prof.
Kaohsiung City Government
Sustainable Development and Climate Change Adaptation Committee
2019.06.25
Outline

- Challenges of climate change in Kaohsiung
- Wetlands initiatives
- Transform to Flood Detention Basins
- Conclusion: green ecological corridor
Challenges of climate change in Kaohsiung
Extreme Precipitation and Drought

- Population: 2.77 millions
- Area: 2,951 Km²
- Climate: Tropical Monsoon
- Ave. Temp: 25.9°C

Kaohsiung's annual rainfall: 1884mm
Taiwan's annual rainfall: 2510mm
Global annual rainfall: 973mm

Population: 2.77 millions
Area: 2,951 Km²
Climate: Tropical Monsoon
Ave. Temp: 25.9°C
Widely constructed wetlands-21 Wetlands in Kaohsiung

An **Blue belt** eco-system water management

- 21 wetlands in the city
- Over 1,000 hectares
How to do it?

Jhouzai Wetland  
(Home of the Pheasant-tailed Jacana)

*Hydrophasisanuschirurgus*
Wetlands in Kaohsiung

Landscape before 2002

Jhouzai Wetland
水雉的故鄉 Home of the Pheasant-tailed Jacana

water chestnut
The change

Recycle of one-site waste materials

石材

竹樁

枕木

洲仔濕地 Jhouzai Wetland
水雉的故鄉 Home of the Pheasant-tailed Jacana
2003 Ford Envir. Prot.  First Price

>100 bird spp.  
>400 plant spp.

>run by NGO with support from city government
Estuary wetland

- Area: 12.6 Hectare
- Built on: 2011/04/24

Jhondou Wetlands Park
Lumber storage site

plywood factories

中都濕地 Jhongdou Wetland
保存產業歷史、還原盎然生態
Preserving the remains of an industry and restoring a vivacious ecosystem
Jhondou Wetlands

Jhondou Wetlands Park

Love river

Eco island

Aim to restore mangrove ecosystem
Restoration of mangroves ecosystem, accessible by residents
Urban wetland--- Benhe District Flood Detention Wetland (Basin)
Flood Detention Basin for river flood control

Flood Prone Areas on Dian-Bao stream Catchment

- **Main stem**: Catchment area is 106km²; Length: 34.7km; Ave. slope is about 25%; Height difference: 250 m; Time of Concentration: 11.15 hours.
- **Largest tributary**: Da-Liao drainage 12.91km · height difference 54m; Time of Concentration: 3.92 hours.
Dianbao River Flood Detention Basin

<table>
<thead>
<tr>
<th>Typhoons</th>
<th>2009 Morakot</th>
<th>2010 Fanapi</th>
<th>2013 Kong Rey</th>
<th>2015 Soudelor</th>
<th>2016 Megi</th>
</tr>
</thead>
<tbody>
<tr>
<td>24hr Rainfall</td>
<td>301</td>
<td>935</td>
<td>240</td>
<td>219.5</td>
<td>336</td>
</tr>
<tr>
<td>Flooding Area (m²)</td>
<td>300</td>
<td>3,872</td>
<td>-</td>
<td>-</td>
<td>47</td>
</tr>
<tr>
<td>Flooding Depth (m)</td>
<td>0.3~1</td>
<td>0.3~2.2</td>
<td>-</td>
<td>-</td>
<td>0.3</td>
</tr>
<tr>
<td>Flooding Duration (hr)</td>
<td>3~36</td>
<td>3~24</td>
<td>-</td>
<td>-</td>
<td>12</td>
</tr>
<tr>
<td>Flooding Household</td>
<td>2,000</td>
<td>25,200</td>
<td>-</td>
<td>-</td>
<td>170</td>
</tr>
</tbody>
</table>

Map showing Detention basins and flooding areas.

Flooding Areas:
- Catchment
- 2016 Megi
- 2013 Kong Rey
- 2010 Fanapi Typhoon
- 2009 Morakot
Dianbao River Flood Detention Basin
Creating an Eco-friendly and Recreational Area

Water Ecological Park

3.8 km Bike path

Ecological Education

Protected Species:
- Pheasant-tailed Jacana
- Moorhen
- Night Heron
13 Flood Detention Basins in Kaohsiung City

- Yong'an Flood Detention Basin, Yong'an District
- Chaišan Detention Basin, Gushan District
- Bagua Flood Detention Basin, Renwu District
- Benhe Flood Detention Basin, Sanmin District
- Shihcyuan Flood Detention Basin, Sanmin District
- Bao-Ye Flood Detention Basin, Sanmin District
- Shanziding Flood Detention Basin, Daliao District
- Fongshan Flood Detention Basin, Niaosong District
- Beiwu Flood Detention Basin, Renwu District
- Benan Flood Detention Basin, Sanmin District
- Dianbao River Zone A Flood Detention Basin, Gangshan District
- Dianbao River Zone B Flood Detention Basin, Gangshan District
- Shilong River Flood Detention Basin, Renwu District
- Dianbao River Zone B Flood Detention Basin, Gangshan District
- Dianbao River Zone A Flood Detention Basin, Gangshan District
- Shilong River Flood Detention Basin, Renwu District
- Benhe Flood Detention Basin, Sanmin District
Overcome climate change through friendly adaptive actions.

The green ecological corridor restores biodiversity, improve the city landscape, and supports a resilient city.

Conclusions

Kaohsiung a beautiful and sustainable city invites you to visit!
Thank you for your Attention