

# River Restoration in the Context of Hong Kong: Challenges and Prospects



Ng Cho Nam 吳祖南

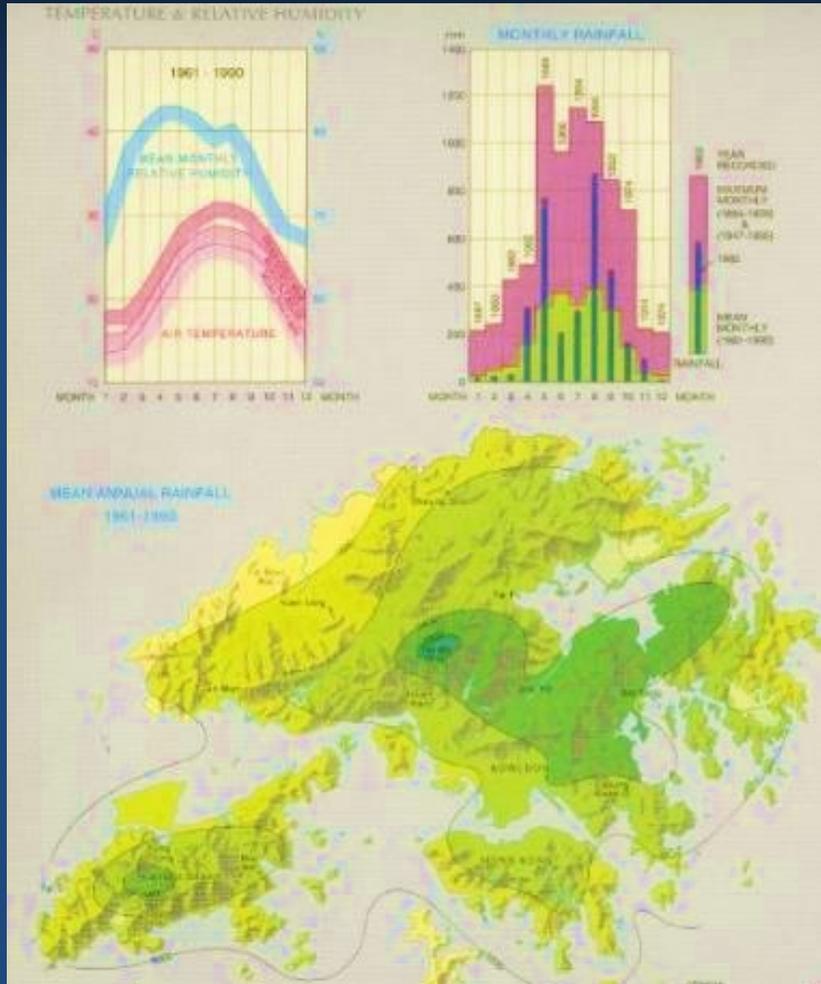
Dept of Geography

The University of Hong Kong

# rivers in HK

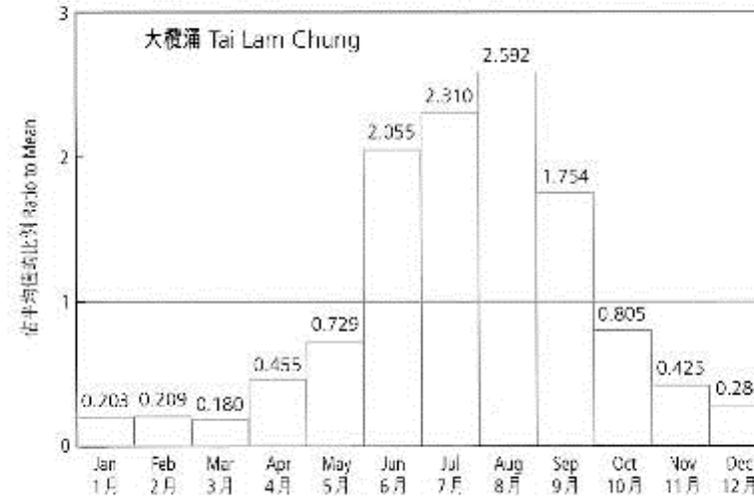


# precipitation and river runoff

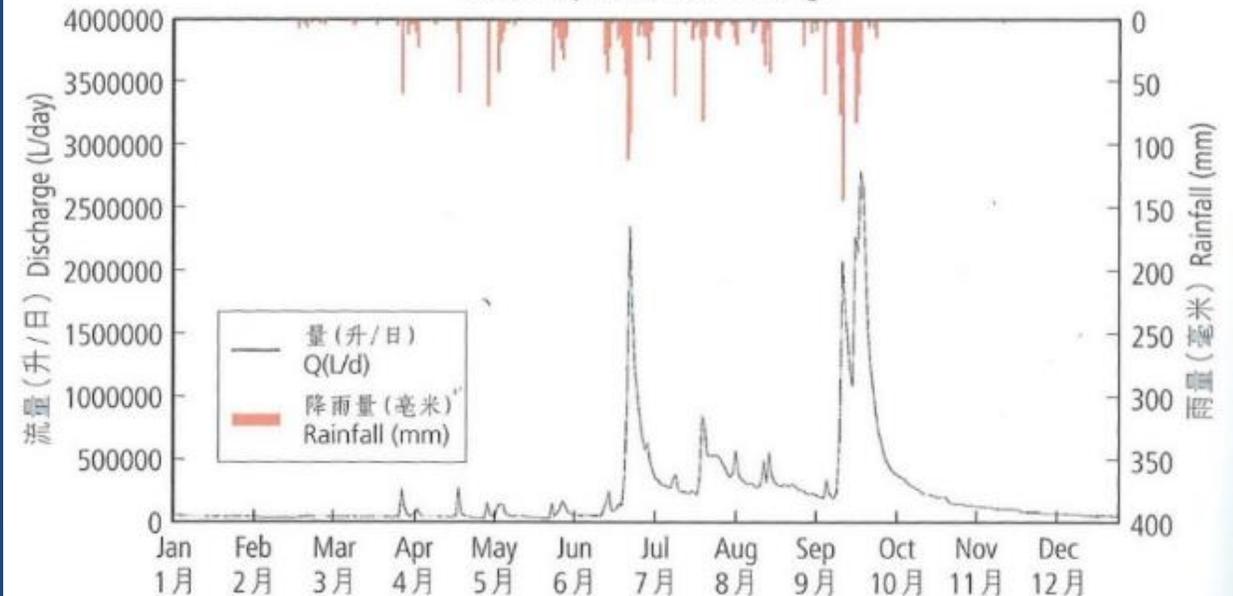


The mean annual rainfall ranges from about 1400 mm at Ping Chau to **>3000 mm** in the vicinity of Tai Mo Shan. About 80 percent of the rain falls betw May and Sept.

圖 3(b)： 大欖涌河盆的徑流水流狀況  
Figure 3(b): Runoff regime for the Tai Lam Chung basin



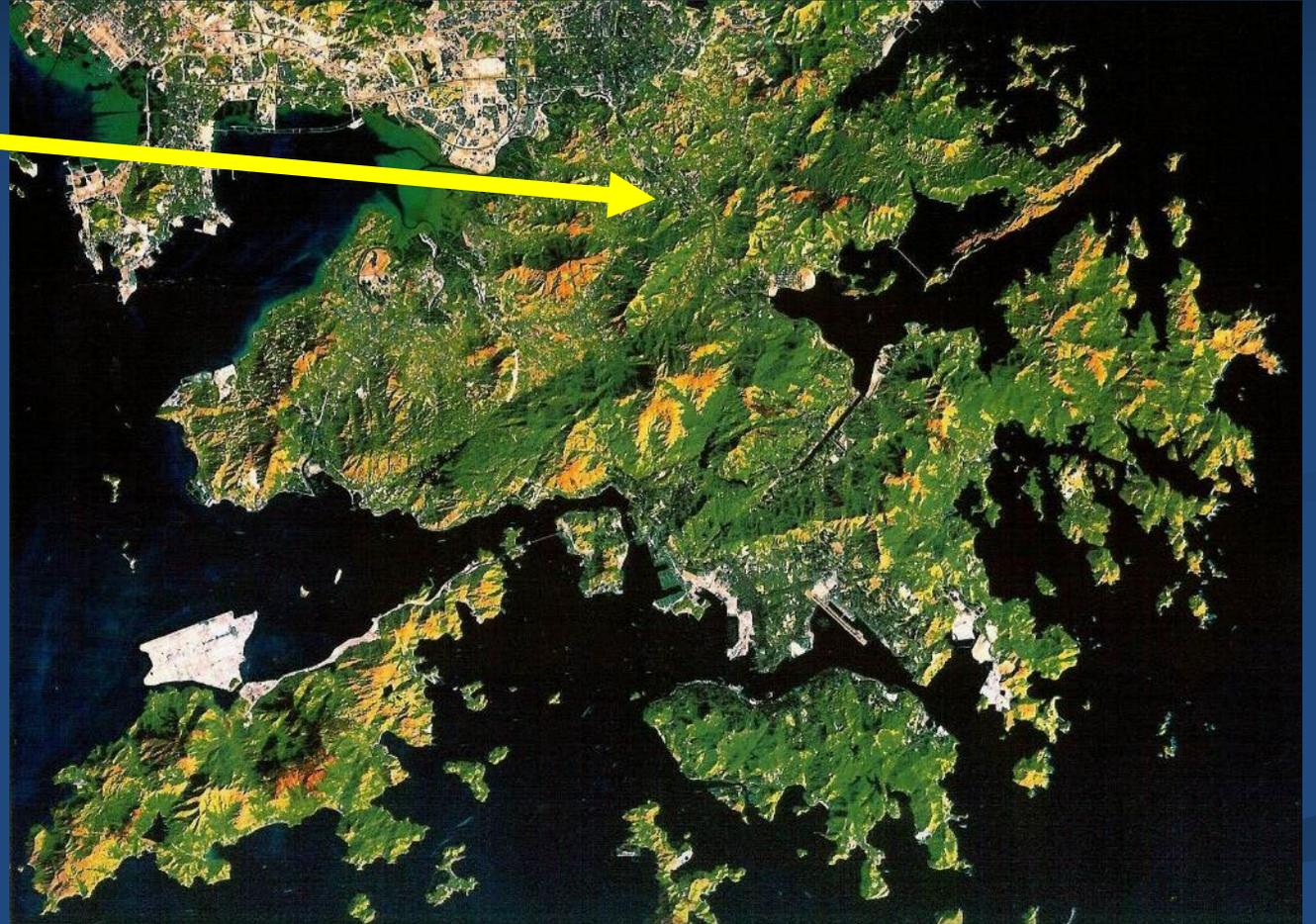
嘉道理農業研究所的每日雨量及流量  
KARC Daily Rainfall and Discharge



Villagers in uproar after homes swamped for second time



flooding events before 2000



重要新聞版 一九九六年六月二十五日 星期二 天天日報 Tin Tin Daily News 丙子年五月廿十日

# 今年最大豪雨五小時雨量百五毫米 新界北區大水浸成澤國

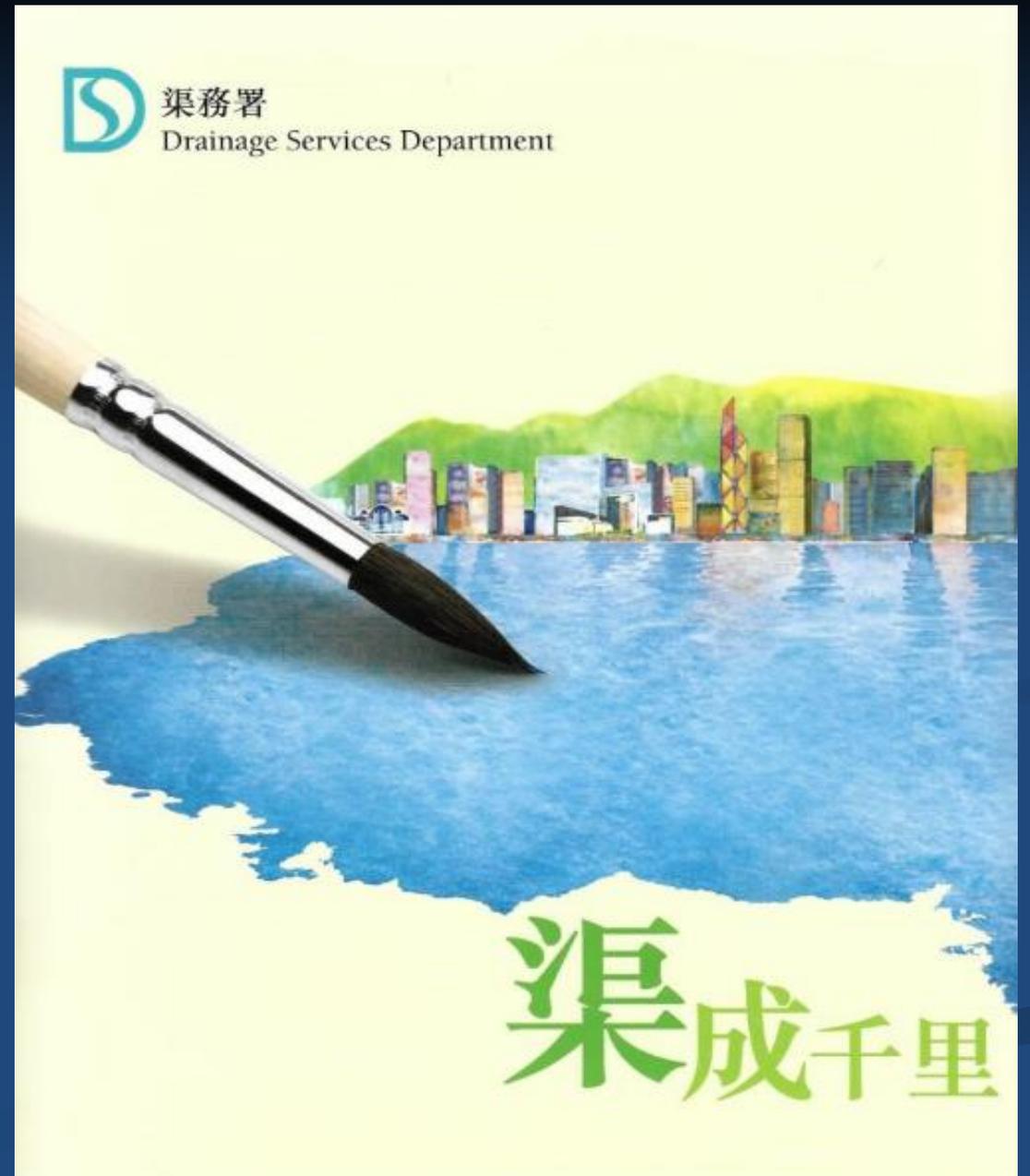


上水天平山村  
三十八人被困者

【本報記者陳志強攝】新界北區在六月二十四日午夜至二十五日清晨，受到一場罕見的豪雨襲擊。這場雨在短短五小時內，累積雨量達一百五十五毫米，打破了一九九六年六月二十四日創下的九十九毫米紀錄。受災地區包括上水、天平山、沙頭角及大埔等區。由於雨量過大，多處低窪地區及山麓地帶出現嚴重水浸，部分地區水深及腰。上水天平山村有約三十八人被困，消防及救護人員正全力營救人及搬運物資。目前，上水天平山村及沙頭角部分地區仍被水浸，居民生活受到嚴重影響。氣象局表示，這場雨是由於一個低壓槽移入本港，加上季風增強所致。預計未來幾天仍會有較多雨，市民應密切留意天氣預報，並做好防範措施。

## River management since 1990s

- mainly for flood prevention

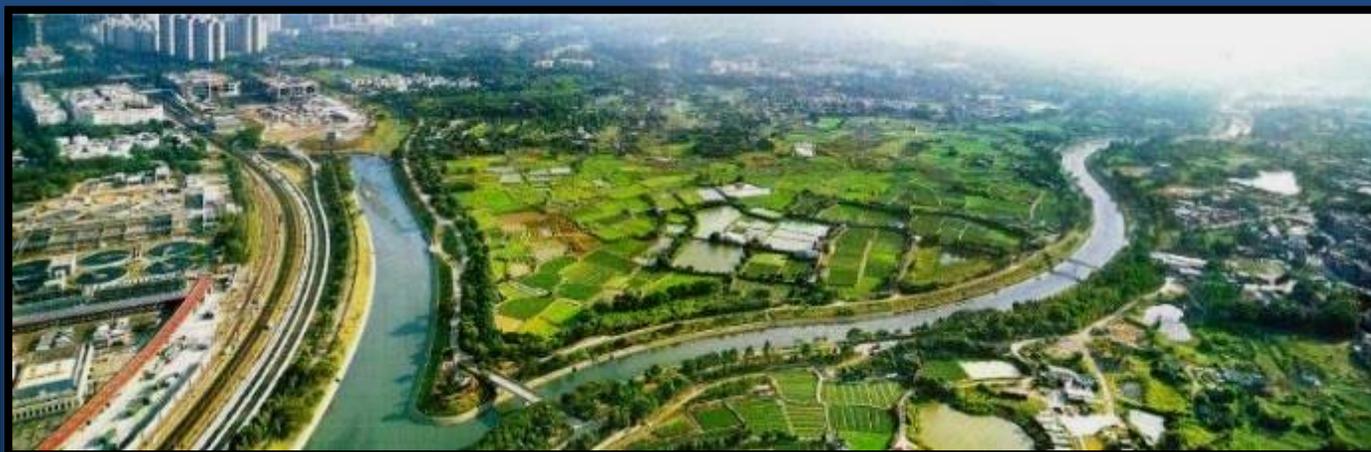
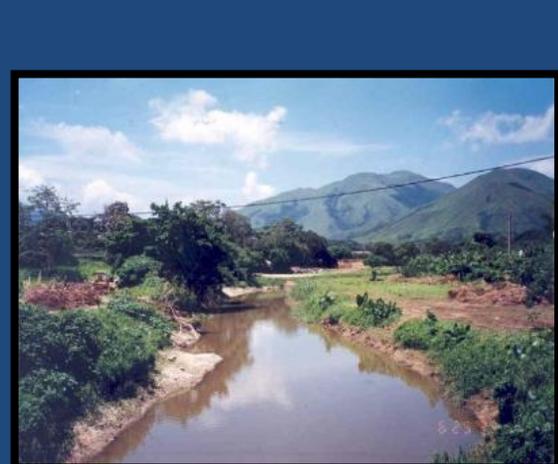


# flood prevention

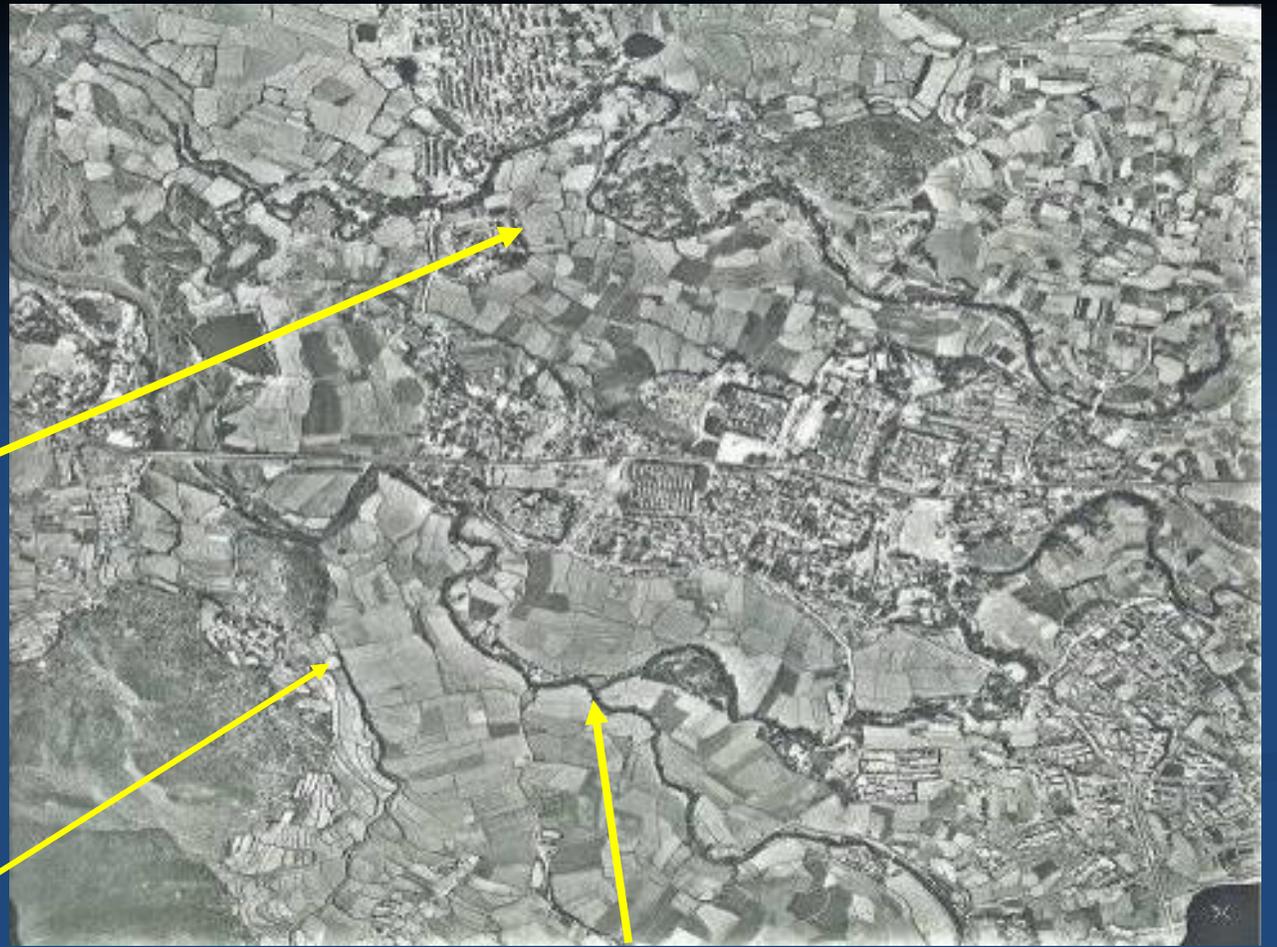
表4： 香港的防洪標準

Table 4: Flood protection standards for Hong Kong

排水設施類型 Types of Drainage	再現時段 (年) Recurrence Interval (Years)
市區主幹排水系統 Urban drainage trunk systems	200
市區分支排水系統 Urban drainage branch systems	50
主要鄉郊集水區排水渠 Main rural catchment drainage channels	50
鄉村排水設施 Village drainage	10
密集使用的農地 Intensively used agricultural land	2-5



# Kam Tin River: 1963 vs present



What have we done to our rivers due to needs for drainage and flood prevention?

- straightened
- level
- deepened
- over-widened
- lined with foreign materials
- diverted
- altered in a manner to decrease their natural function and stability



# Impacts

The image features a solid dark blue background. In the upper center, the word "Impacts" is written in a white, serif font. In the lower right quadrant, there are several overlapping, wavy, light blue lines that create a sense of motion or depth, resembling ripples on water or stylized waves.

# Impacts of channelization on wild birds

Loss of native riparian vegetation for roosting



Change in water quality → change in composition of invertebrates → affects foraging

Loss of ecological linkage to adjacent natural habitats – separated by access road and associated handrail



# Impacts of channelization on wild birds

Increased human disturbances from maintenance works and pedestrian traffic

Reduction of foraging area, limited to the size of the low-flow channel

Loss of natural bottom substrate, resulting in the loss of benthic invertebrates for foraging



# Impacts



‘Stay Away from Rivers Culture’

It is under this context that our river/drainage channels are being restored.





## Environmentally Friendly Designs

With a view to harmonizing the works with the surrounding and to preserve the natural habitat, we have incorporated various environmentally friendly designs, including:

- Grasscreting and extensive vegetation along channel embankment to enhance aesthetic value and diversity of micro-habitats;
- Using gabions and geo-fabric reinforced grass lining to stabilize side slopes;
- Utilizing unlined channel beds to enable colonization of flora and fauna;
- Creating unlined embankment, if possible, to facilitate vegetation; Retaining meanders;
- Creating shallow ponds as aquatic planting bays to allow freshwater fish, amphibians and water birds to thrive; and
- Creating wetland habitats and reed beds to flourish diversified wildlife.
- Providing flow deflector, in-stream refugia and fish ladder to enhance the habitat complexity and thus ecology of the river

These efforts have culminated into large tracts of green banks, rich reed ponds, preserved meanders, and mangrove habitat over years.

eco-restoration at  
Lam Tsuen River 林村河



early 1990s



Hong Kong Newt



present



late 1990s

To restore rivers, we  
need to re-affirming  
the value of our  
rivers



## Re-affirming the value of our rivers

Rivers have multiple functions

- water resource – drinking, farming
- drainage
- ecological
- aesthetic
- landscape
- cultural
- recreation
- micro-climate adjustment
- sustainability
- ...



# The designated Long Valley Nature Park relies on the irrigation system to deliver water from the Beas River



315 wild bird spp. recorded, incl. 21 spp with IUCN conservation status

## 塋原自然生態公園

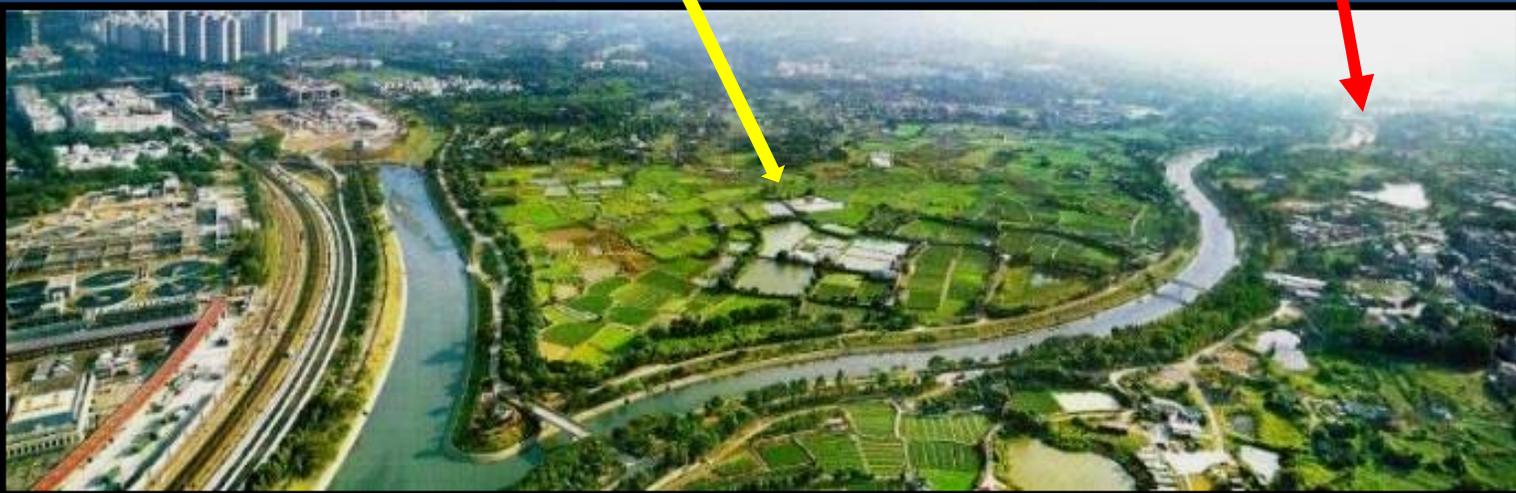
LEGEND 圖例

- BOUNDARY OF PROPOSED LONG VALLEY NATURE PARK 擬議塋原自然生態公園範圍
- BIODIVERSITY ZONE (ABOUT 20.5HA) 生物多樣性區域 (約20.5公頃)
- AGRICULTURE ZONE (ABOUT 11.0HA) 農業區域 (約11.0公頃)
- VISITOR ZONE (ABOUT 4.8HA) 遊客區域 (約4.8公頃)



KEY FEATURES 主要特點	APPROX. GROSS FLOOR AREA (sqm) 大約總樓面面積 (平方米)	FUNCTIONS 用途
1 RECREATIVE USE (約1.9HA) 休閒用途 (約1.9公頃)	65	FOR BIRD-WATCHING 觀鳥用途
2 TREATMENT WETLAND (約1.3HA) 淨化濕地 (約1.3公頃)	3 290	SERVE AS EXHIBITION WETLAND AND TREATMENT OF POLLUTED WATER QUALITY FOR URBIC ON USE 提供展示濕地及展示城市污水淨化用途
3 FARMERS' FORUM 農家論壇	2 050	YOUNG FRESH AND MARKET FOR LOCAL PRODUCTS 推廣本地新鮮農產品及市場
4 LOOKING FACILITIES FOR VISITORS (約1.6HA) 觀摩設施 (約1.6公頃)	15 (每畝約100)	POST LOOKUP FOR FARMERS TO FACILITATE FIELD OPERATIONS AND CROP MANAGEMENT IN LAND 提供農家查詢及協助農家進行田間操作及作物管理

遊客區域主要特點



# Major challenges

The background of the slide is a solid dark blue. In the bottom right corner, there are several decorative, overlapping wavy lines in a lighter shade of blue, creating a sense of movement and depth.

## Challenge I

Not the same river

梧桐河 => ‘唔同’河

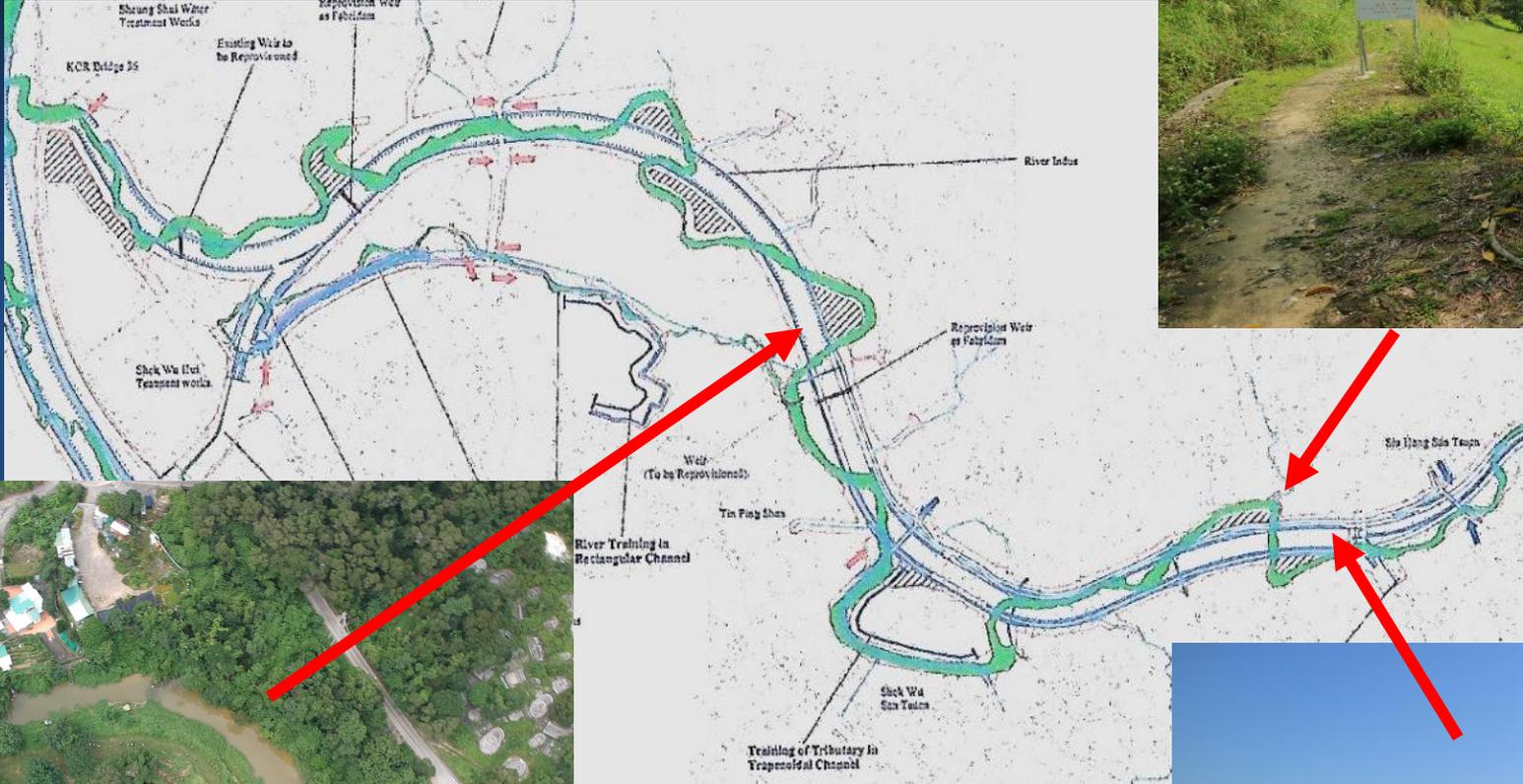


original channel (in early 1990s)



present channel

The landscape, hydrology and geometry of the channels have substantially altered



Ng Tung River



## Challenge II What does it mean by River Restoration?

Restoration?

Innovation?

Invention?

Restoration + Innovation + Invention



There wasn't any river here before

# Restoration + Innovation



eco-restoration at  
Lam Tsuen River 林村河

# Restoring a river or restoring a pond?



# Challenge III 'One River, Two Systems' (一河兩制)



upper stream

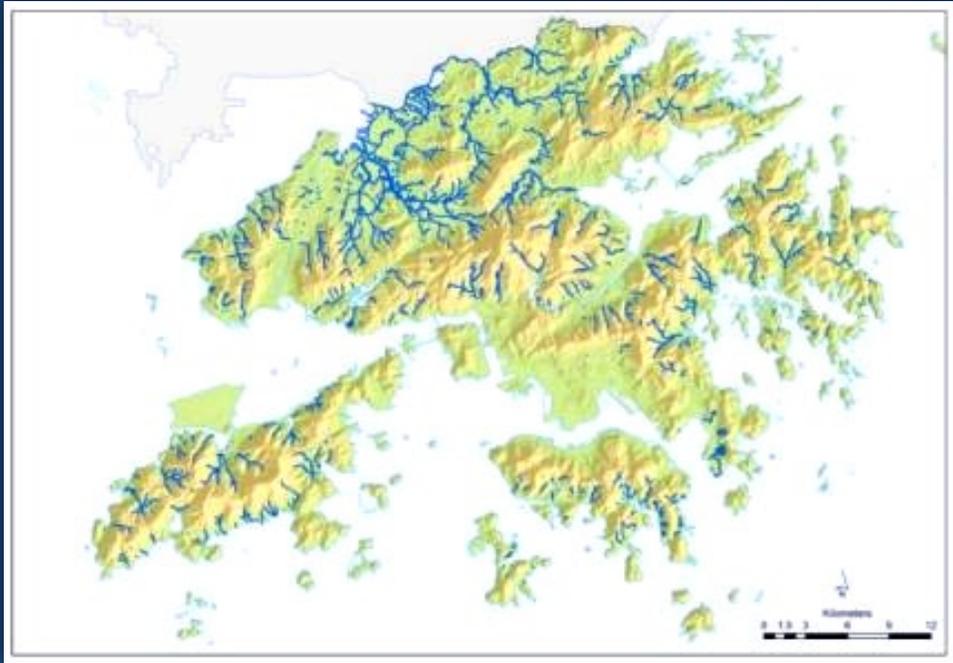


Tung Chung River 東涌河

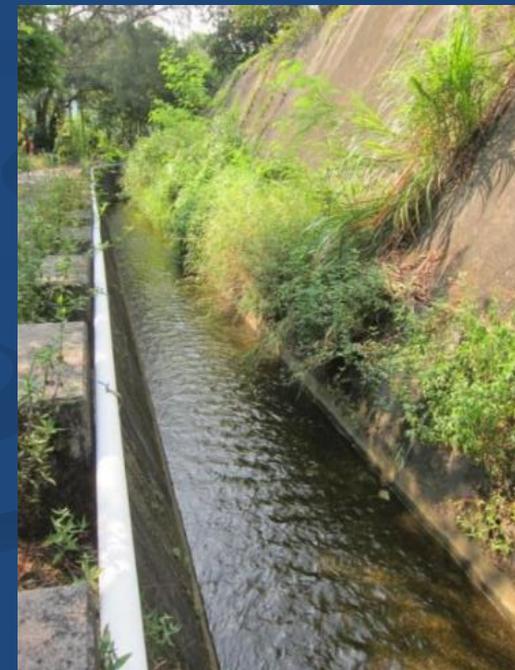
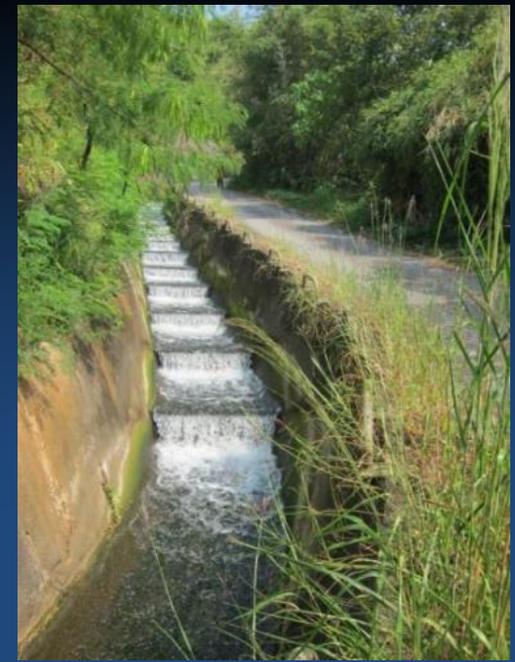


lower stream

one river => two rivers 一河 => 兩河  
one catchment => two catchments 一個流域 => 兩個流域



water gathering ground





No Water,  
No Ecology

# Prospect for improvement

## 4 河渠活化 屯門河或可划艇

料2019年立項 佐敦谷明渠先行 13.11.2017

活化 屯門河



渠務署表示，屯門河全長約2500米，中游闊度達50至80米，水質亦較適合水上活動，故會研究活化中游約200米河段，市民可在岸邊散步，甚至划艇。

(渠務署提供電腦模擬圖)

活化 大圍明渠



大圍明渠全長1.9公里，渠務署計劃活化該條明渠，除了綠化，亦會加入生態元素，包括在河底鋪設石塊，形成「魚梯」，讓有洄游習性魚類可逆流而上，到上游產卵。

(渠務署提供電腦模擬圖)

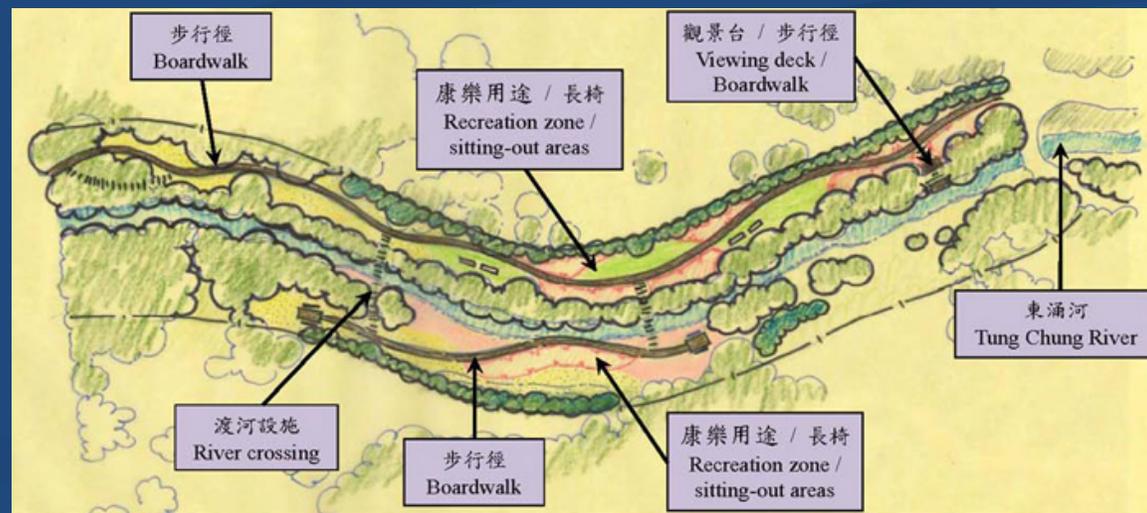
復修 老化渠管



渠務署表示，不少地區的渠管正逐漸老化及耗損，渠管外露(上圖)，有塌陷風險；該署計劃全道，其中會以內套喉管法，在原有管道內套上一道壽命(下圖)。



Shenzhen River Phase IV



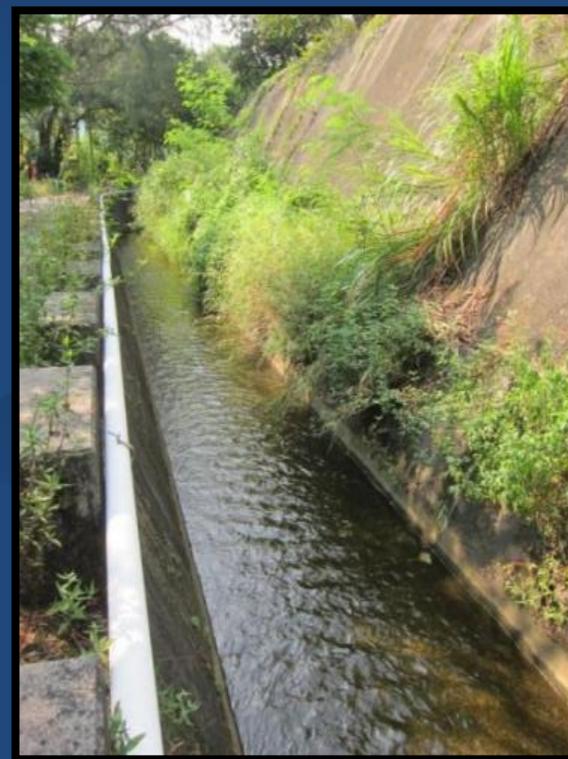
river park at Tung Chung River

**Improvement I:** 'Environmental Flow' for ecological sensitive/eco-design channels



Environmental Flow refers to the quality, quantity, and timing of water flows required to maintain the components, functions, processes, and resilience of aquatic ecosystems that provide goods and services to people.

**Improvement II:** Eco-design reservoir & catchwater  
Reservoir Nature Reserves



Hok Tau Reservoir 鶴藪水塘

One river, Two systems  
一河兩制

Eco-design reservoir  
Eco-design catchwater

Eco-design river



What are needed?



## Support I: Policy

### *Policy Address 2015*

#### Water-friendly Culture and Activities

181. We will adopt the concept of revitalizing water bodies in large-scale drainage improvement works and planning drainage networks for NDAs so as to build a better environment for the public. In the completed widening works of Ho Chung River in Sai Kung, ecological features were also included to beautify the river and enhance river biodiversity.

## 2015 Policy Address

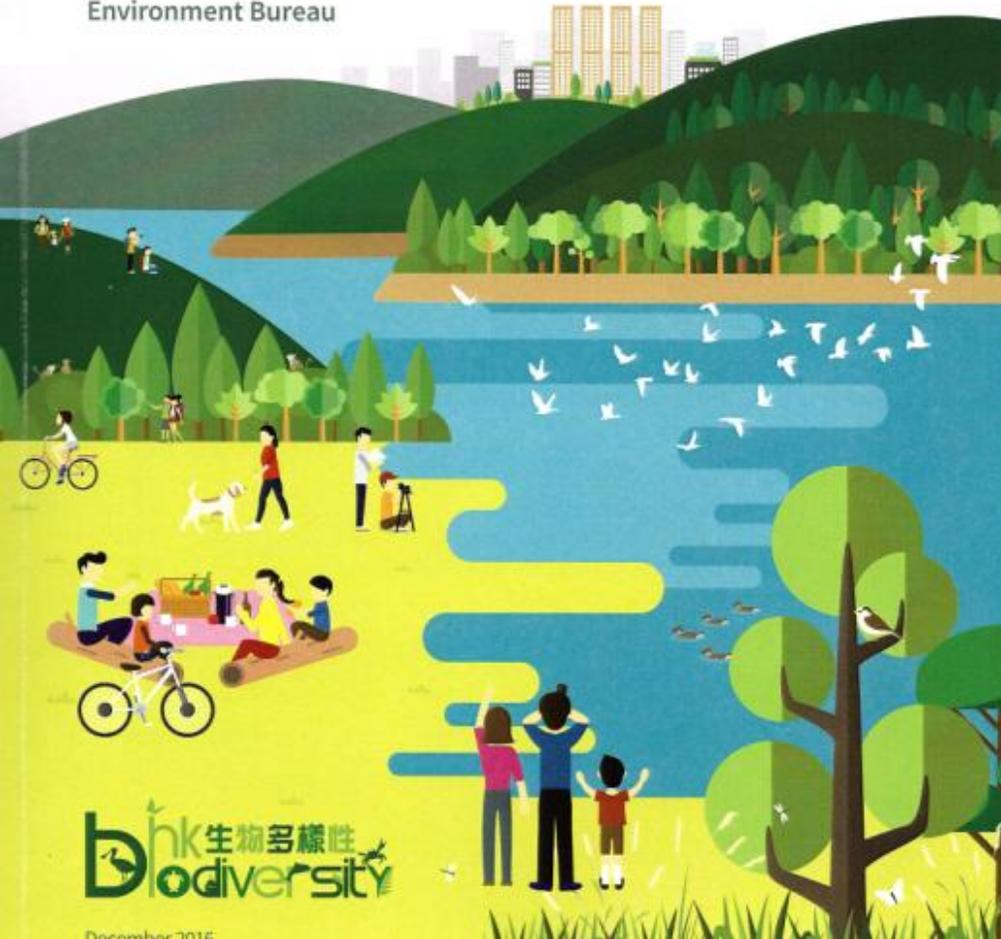
**Uphold the Rule of Law  
Seize the Opportunities  
Make the Right Choices**

**Pursue Democracy  
Boost the Economy  
Improve People's Livelihood**



# Hong Kong Biodiversity Strategy and Action Plan 2016-2021

Environment Bureau



bhk 生物多样性  
Biodiversity

December 2015



HONG KONG  
香港 2030+

跨越2030年的規劃遠景與策略 公眾參與



發展局



規劃署

Hong Kong 2030+  
Building Block 3: Create Capacity for Sustainable Growth

# Support II: Institutions

 水務署  
WATER SUPPLIES DEPARTMENT

Annual Report  
2017/18

[Vision, Mission & Values](#)  
[Corporate Profile](#)  
[WSD Organisation Chart](#)  
[Events in Brief](#)  
[Director's Statement](#)  
[Key Performance Indicators](#)  
[Water Supply Management](#)  
[Fostering a Water Conservation Culture](#)  
[Water Quality](#)  
[Waterworks Infrastructure](#)  
[Finance and Water Charges](#)  
[Sustainable Operations](#)  
[Focusing on Customer Service](#)  
[Enhancing Our Competencies](#)  
[Appendices](#)  
[Annexes](#)

穩健供水 優創未來  
Enhancing Water Security  
for a **BETTER FUTURE**



Play pause

 渠務署  
Drainage Services Department

2017-18  
可持續發展報告  
Sustainability Report



上善若水

活化河道 上善若水  
River Revitalisation  
for the Good of Water

Support III: the public and market

*boosting land value, flat price*



Upper 尚·肆湓  
RiverBank  
啟德河畔國際尊尚名宅

LONGFOR 龙湖  
港交所股票代碼：960

KWGI 合景泰富集團  
KWG GROUP HOLDINGS  
香港聯交所上市編號 — SEHK Code : 1813 —

# a paradigm shift

Stay Away From River Culture

⇒ River Friendly Culture

⇒ Water Friendly Culture





Thank You