Forest Restoration as a Nature-based Solution for the Northern Metropolis, Hong Kong

Billy C. H. Hau

with Michael Lau, K.C. Chau, Kay Law and Joyce Siu

HKIA Future City Vision – Northern Metropolis Forum & Workshop 2.0
Day 2 Forum & Workshop at HKIA Premises
25.11.2023

Northern Metropolis
Development Strategy
6 October 2021

Chief Executive (2021)
Northern Metropolis
Development Strategy.
Hong Kong SAR
Government.

31,230 ha

Yuen Long and North Districts

Area of
North District:
About 16 800 ha

Area of
Yuen Long District:
About 14 430 ha

Legend

Northern Metropolis
Conceptual Boundary

Existing Control Points with
Co-location Arrangement

Existing Control Points with
Separate-location Arrangement

Legend:
- Existing New Towns
- I&T Development Project under Construction
- Planned NDAs/ Development Areas
- Proposed NDAs/ New Towns

New Territories North New Town

Man Kam To Development Corridor

HK-SZ I&T Park

Kwu Tung North NDA

Fanling North NDA

San Tin/ Lok Ma Chau Development Node

Fanling/ Sheung Shui New Town

Tin Shui Wai New Town

Hung Shui Kiu/ Ha Tsuen NDA

Yuen Long New Town

Yuen Long South Development Area

Northern Metropolis Development Strategy
6 October 2021
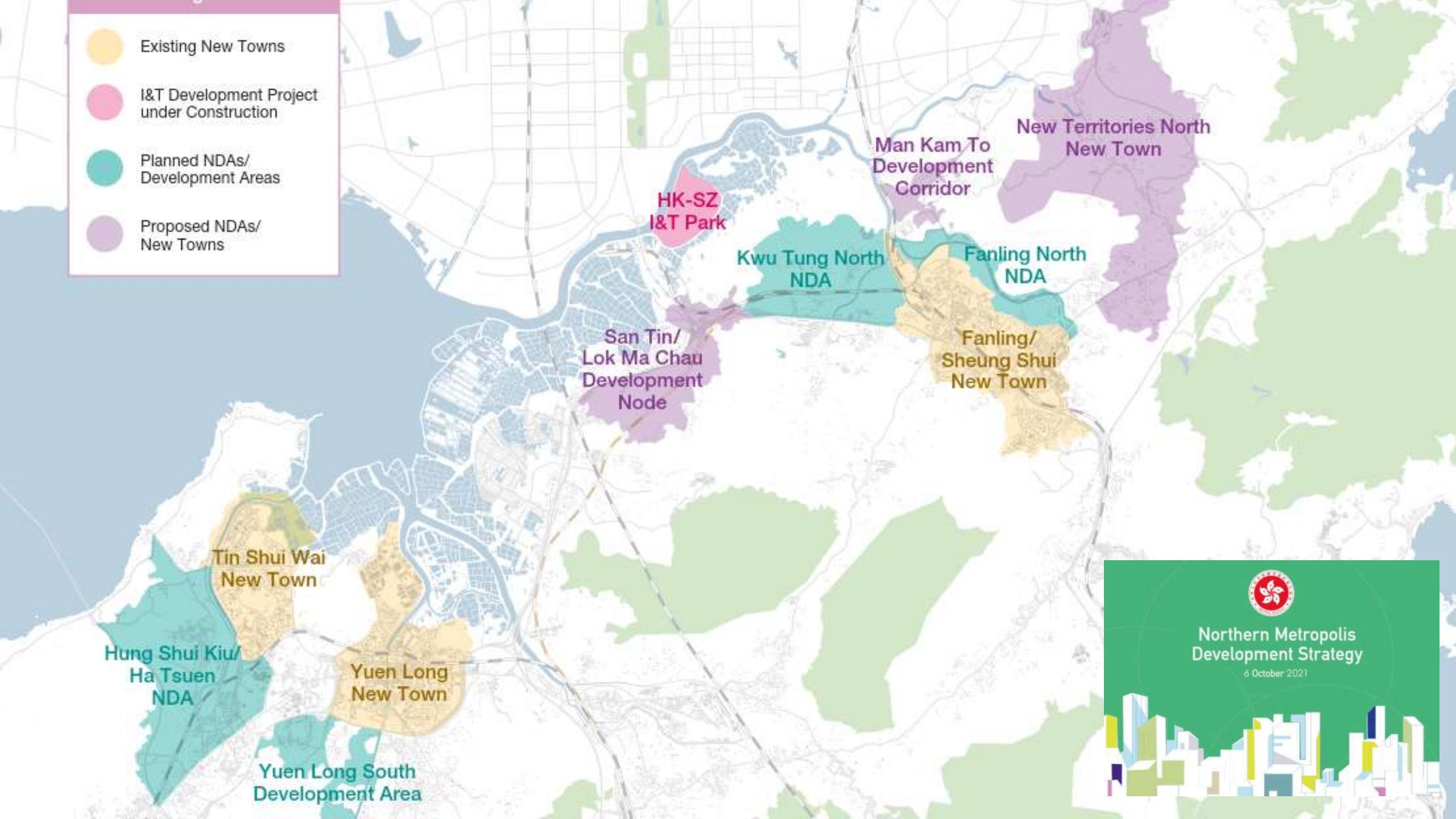
Key Action Direction (5): Proactive Conservation Policy to Create Environmental Capacity

Four wetland conservation parks

One terrestrial nature park

Proposed Action Items

- Hong Kong Wetland Park Extension Area
- Nam Sang Wai Wetland Conservation Park
- Sam Po Shue Wetland Conservation Park
- Hoo Hok Wai Wetland Conservation Park
- Sha Ling/Nam Hang Nature Park
- Tsim Bei Tsui/Lau Fau Shan/Pak Nai Coastal Protection Park and Waterfront Promenade

Legend

- Existing Conservation Areas
- Additional Conservation Areas
- Ramsar Site

Shenzhen Bay

Flight Path of Birds

Mai Po Nature Reserve

HK-SZ I&T Park

Long Valley Nature Park

Hong Kong Wetland Park
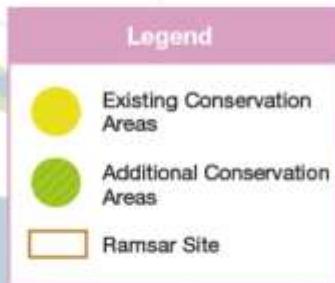
But the focus is on wetland

Northern Metropolis Development Strategy
6 October 2021

The Northern Metropolis is rich in hillside resources

Northern Metropolis Development Strategy
6 October 2021

Key Action Directions

Sponge City

Green Roof

Wetland

River Revitalisation

Water Harvesting

Rain Garden

Retention Lake

Porous Pavement

Bioswale

Retention Tank

Sponge City Concept

What is missing in this Sponge City?

Hillsides in the Northern Metropolis are indeed barren

Shenzhen

Lok Ma Chau Loop

Hill fire
- Repeated burning over years
  > Switching between grasslands and shrublands
  > Natural forest succession not possible

Northern Metropolis Development Strategy
6 October 2021
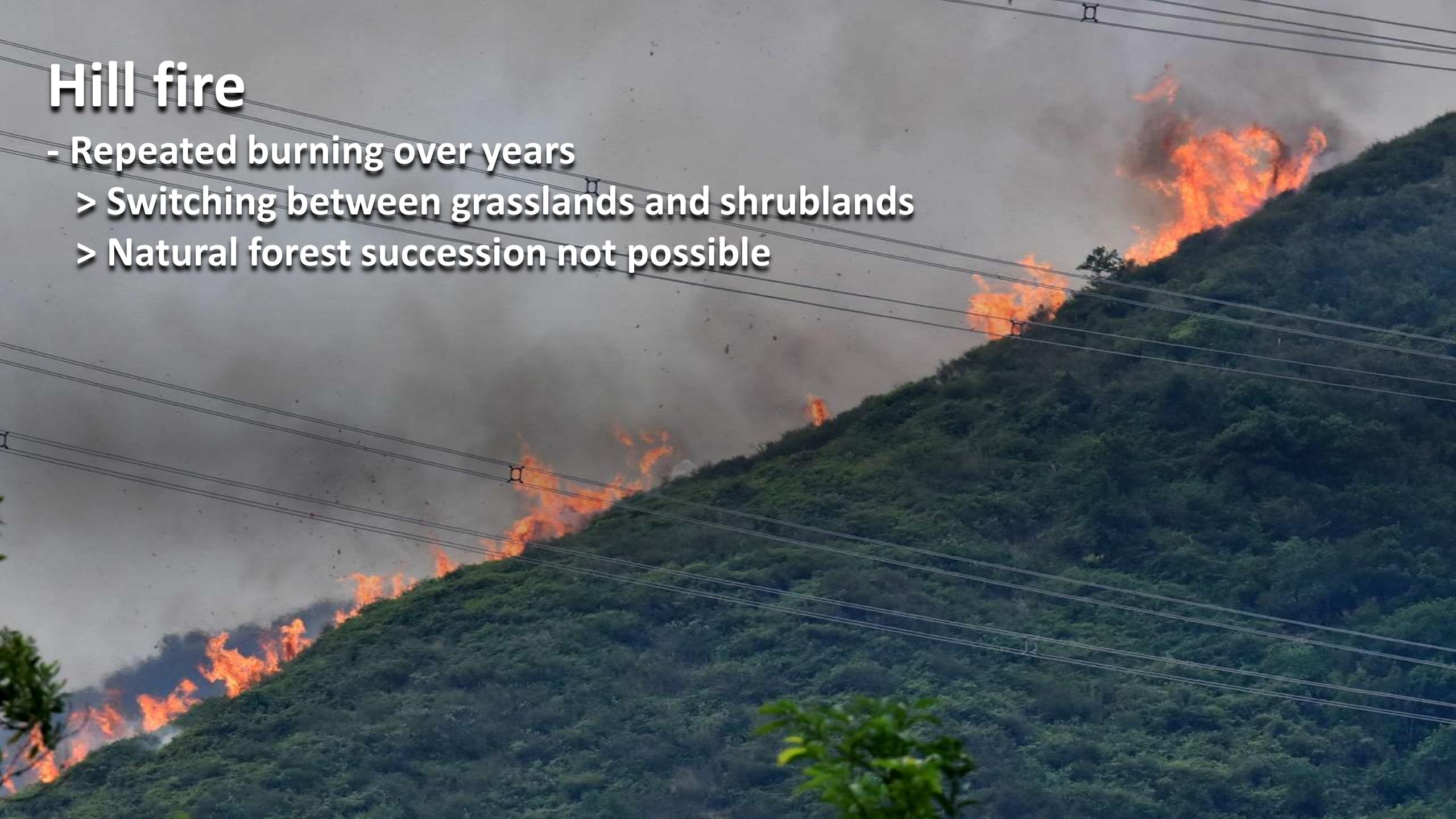
Key Action Directions

Sponge City

If the hillsides are reforested, the sponge city concept is more complete!
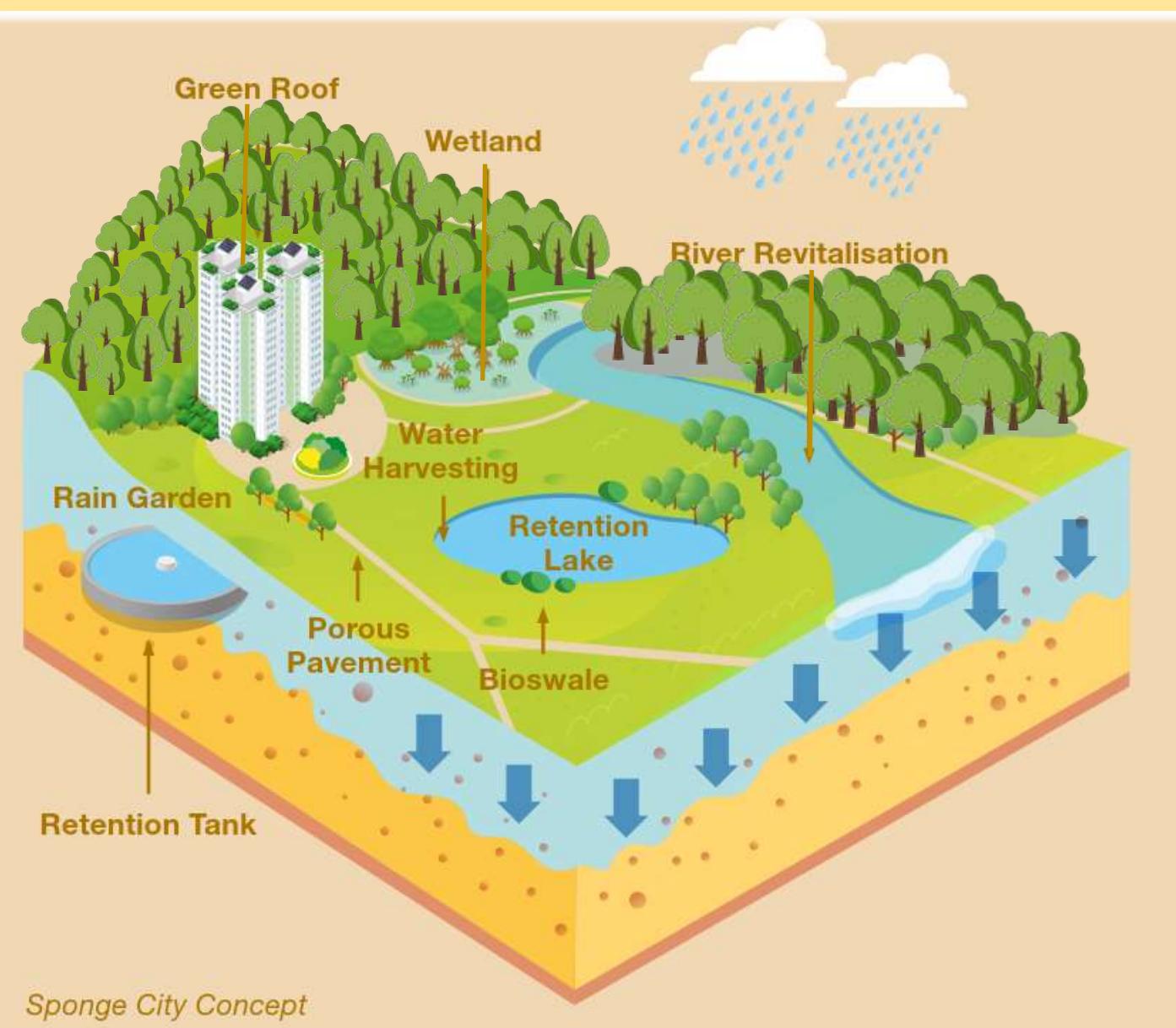
Green Roof

Wetland

River Revitalisation

Water Harvesting

Rain Garden

Retention Lake

Porous Pavement

Bioswale

Retention Tank

Sponge City Concept

Potential Reforestation Sites in the Northern Metropolis

Tai Shek Mo 大石磨

Wa Shan 華山

Robin's Nest 紅花嶺

Tit Hang Shan 鐵坑山

Ki Lun Shan 麒麟山

Ngau Tam Shan 牛潭山

West of Hung Shiu Kiu 洪水橋

Ki Kung Leng 雞公嶺

Northern Metropolis Development Strategy
6 October 2021
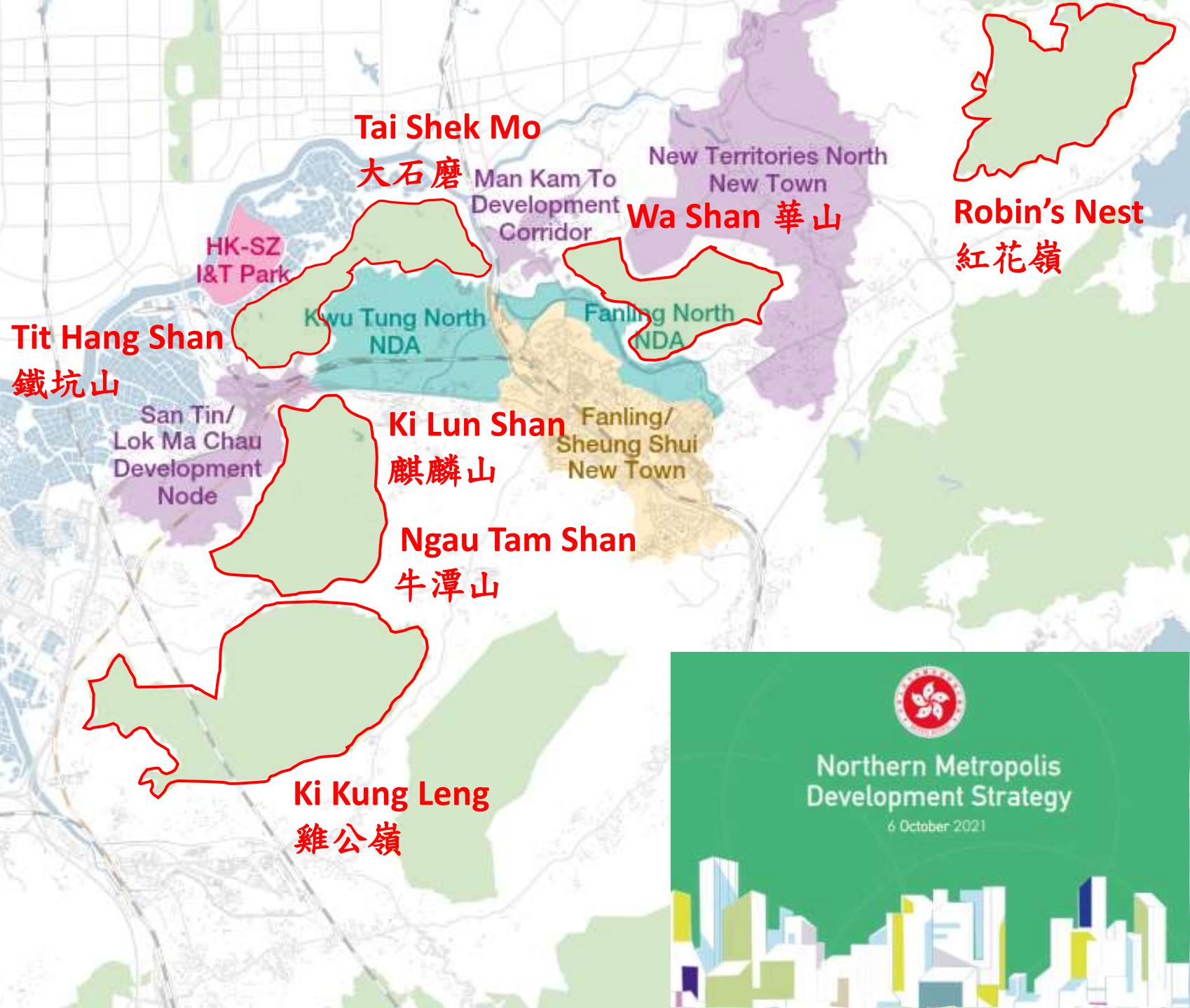
Hung Shui Kiu New Development Area (NDA)

**Potential Reforestation Site:**

Barren Hills to the "West of Hung Shui Kiu" NDA but outside Tsing Shan Firing Range

Not earmarked for development:
- Green Belt (GB)
- Conservation Area (CA)

Fire maintained grassland and shrubland

Google Map

GB

CA

Firing Range

S/YL-HTF/12
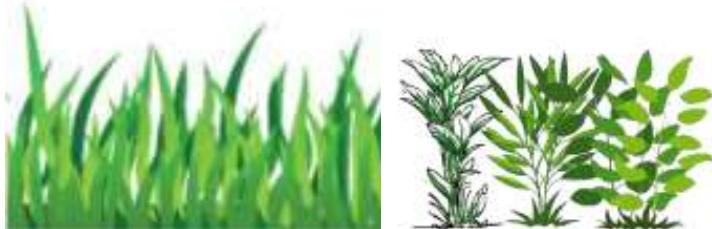
Hung Shui Kiu NDA

Vegetation covers of West of Hung Shui Kiu (428 ha)

17.9, 4% 20.4, 5%
86.7, 20%
87.3, 21%
215.4, 50%

- Forest
- Grassland
- Shrubland
- Tall shrubland
- Badland
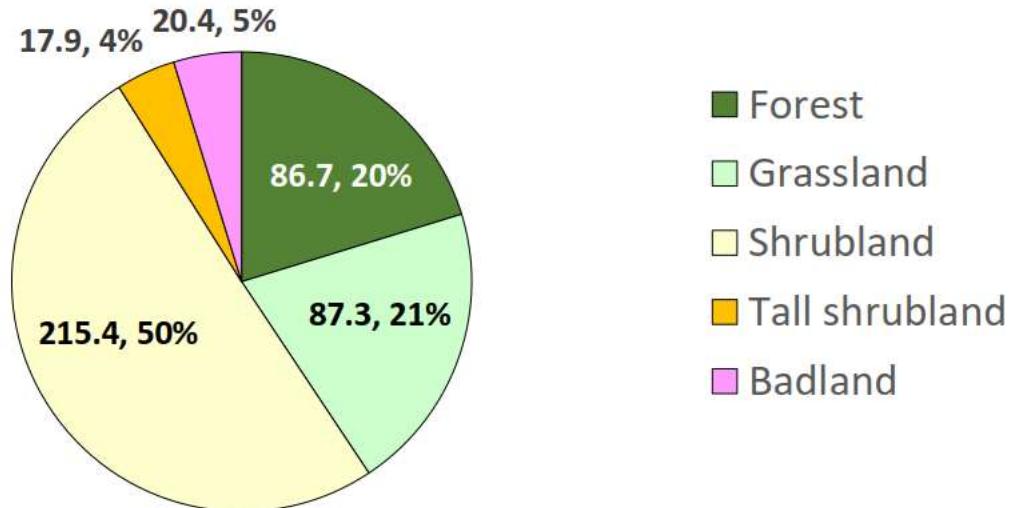
Kwong et al. (2022) A GIS vegetation map of HK
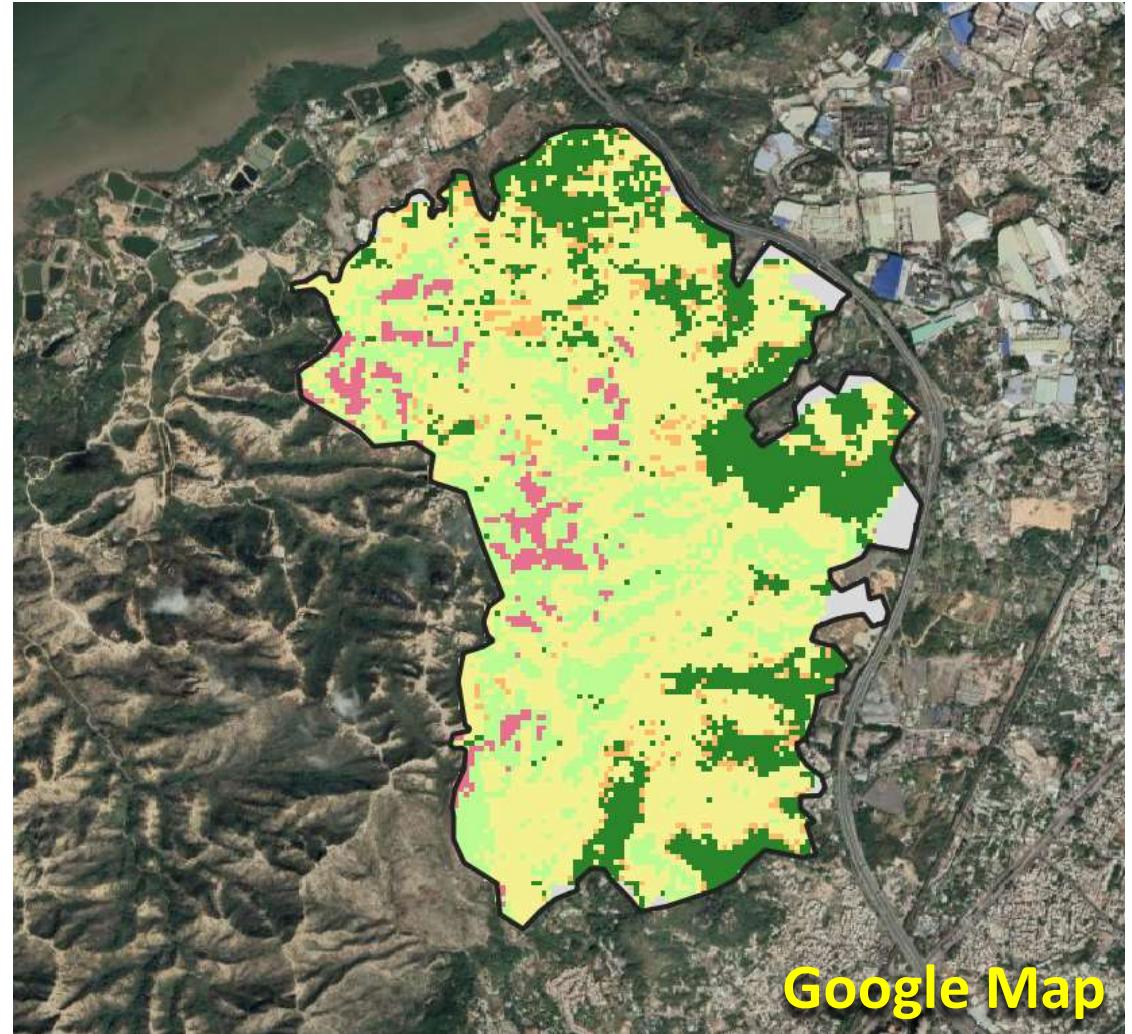
Google Map

Potential reforestation site

Kai Kung Leng (South Facing Slope)

Adjacent to Ngau Tam Mei NDA

Not earmarked for development:
- Lam Tsuen Country Park

Fire maintained grassland and shrubland

Google Map

Kai Kung Leng (South Facing Slope)

The vegetation covers of the proposed reforestation site at Kai Kung Leng (643 ha)

- 13.7, 2%
- 43.3, 7%
- 62.0, 10%
- 182.4, 28%
- 341.2, 53%

- ■ Forest
- ☐ Grassland
- ☐ Shrubland
- ■ Tall shrubland
- ■ Badland
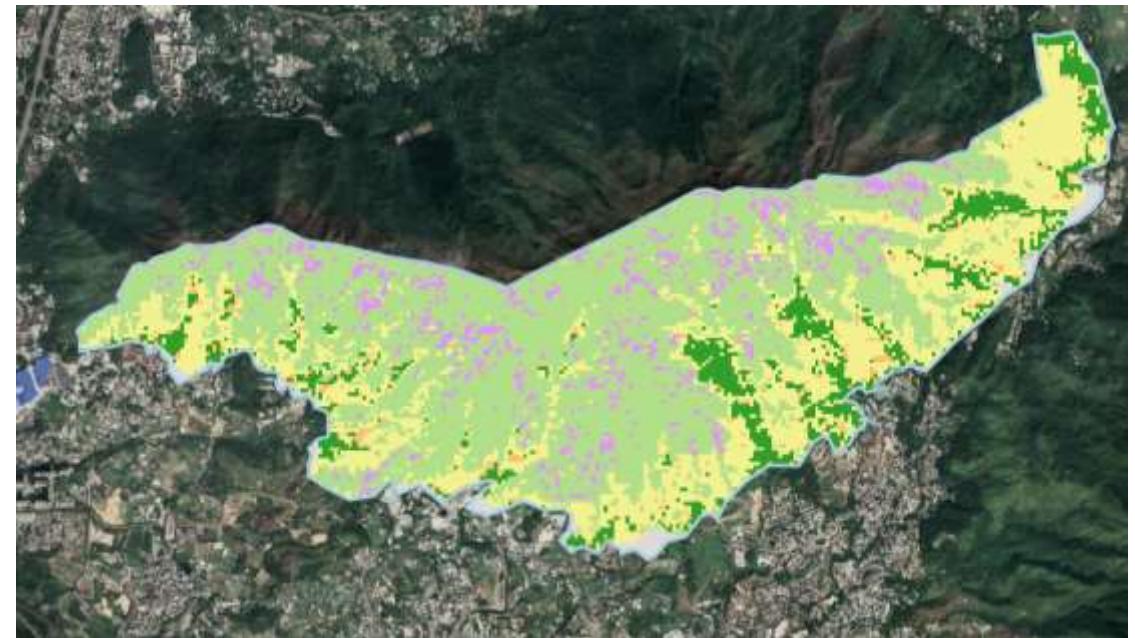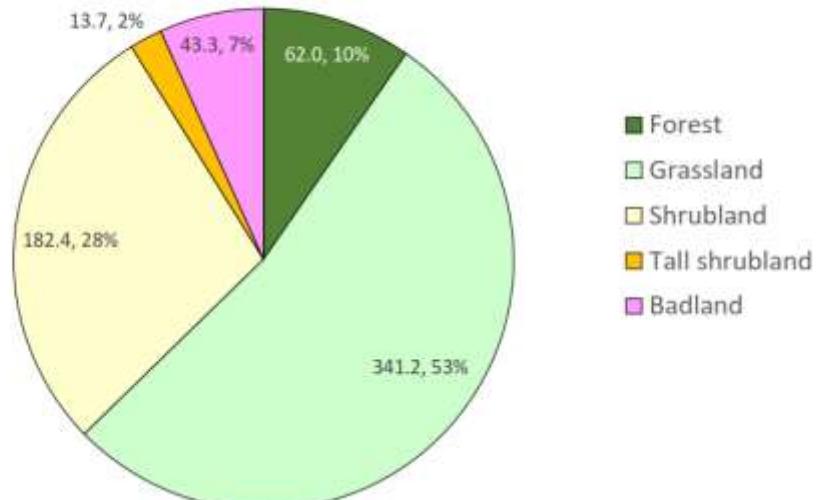
Kwong et al. (2022) A GIS vegetation map of HK

Tit Hang Hill 鐵坑山

Potential Reforestation Site:
Barren Hillsides between Kwu Tung North NDA and LMC Loop

Not earmarked for development:
- Green Belt

Fire maintained grassland and shrubland

Google Map

S/YL-ST8

GB

Tit Hang Hill 鐵坑山

The vegetation covers of Lok Ma Chau hillside (171 ha)

4.4, 3%
7.7, 4%
13.8, 8%
50.5, 30%
94.4, 55%

- Forest
- Grassland
- Shrubland
- Tall shrubland
- Badland

Google Map
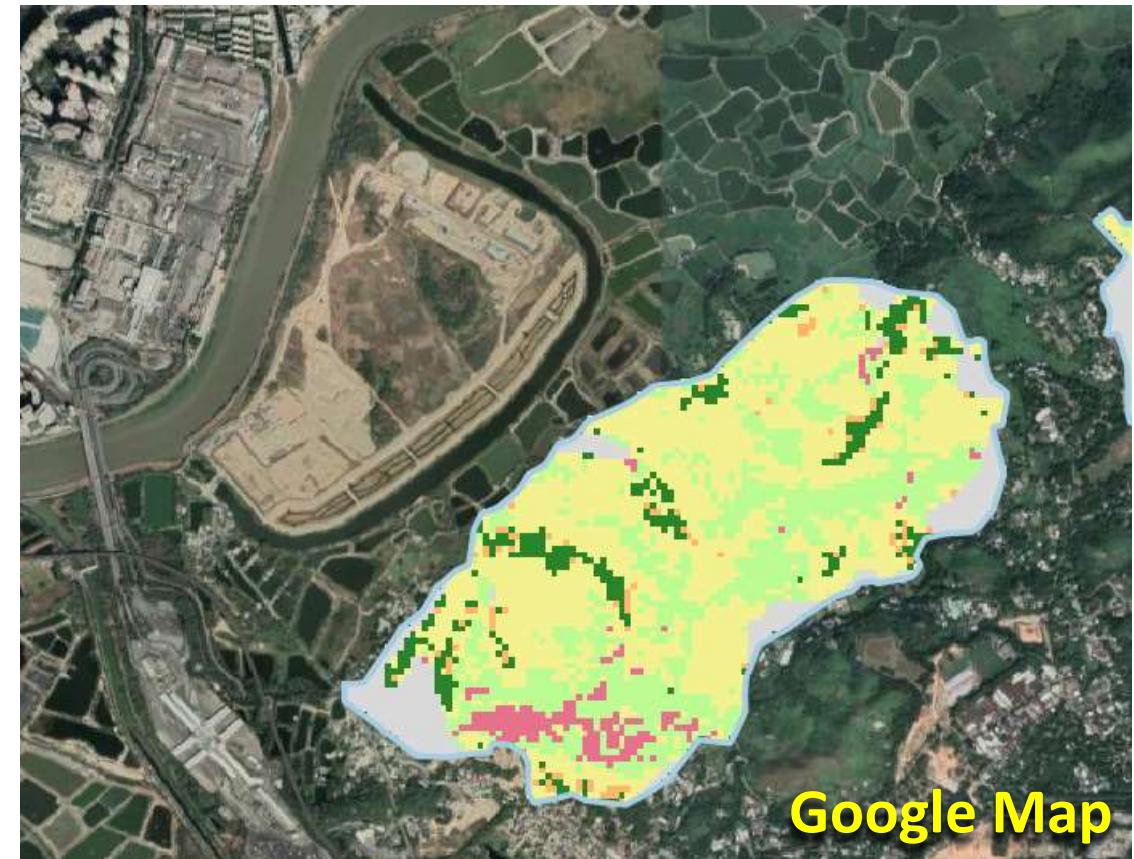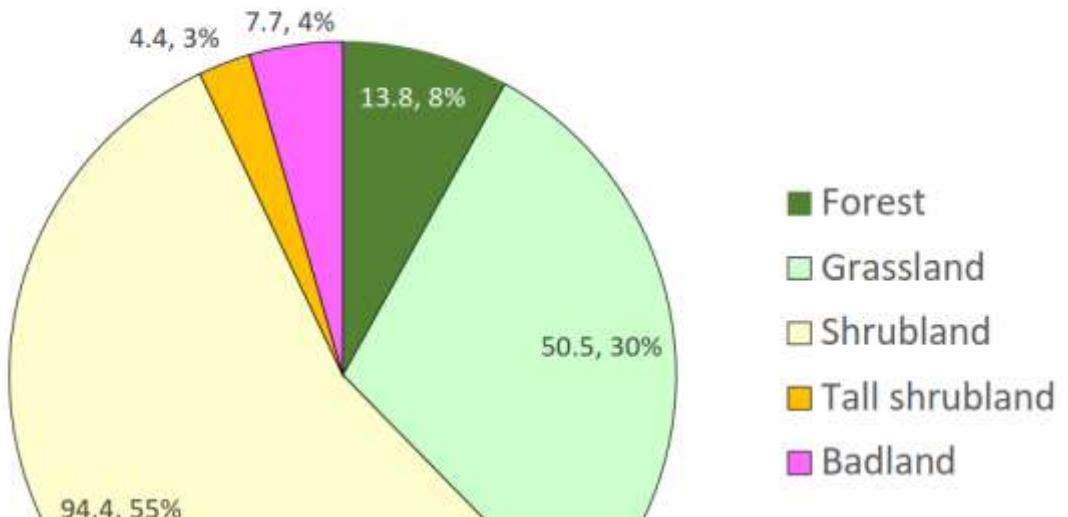
Kwong et al. (2022) A GIS vegetation map of HK

Sum of grassland and shrubland which could be reforested

Site	Calculated Area from pixel size	Forest Area (km²)	%	Grassland Area (km²)	%	Shrubland Area (km²)	%	Tall shrubland Area (km²)	%	Bad land Area (km²)	%
West of Hung Shui Kiu	4.28	0.87	20.26%	0.87	20.41%	2.15	50.36%	0.18	4.19%	0.2	4.77%
Kai Kung Leng	6.43	0.61	9.64%	3.4	53.09%	1.82	28.39%	0.14	2.13%	0.43	6.74%
Tit Hang Hill	1.71	0.14	8.08%	0.5	29.57%	0.94	55.30%	0.04	2.55%	0.07	4.50%
Ngau Tam Shan	3.04	1.39	45.82%	0.35	11.59%	1.06	34.85%	0.23	7.74%	0.0004	0.01%
Ki Lun Shan	1.42	0.15	10.27%	0.25	17.52%	0.95	66.99%	0.07	4.94%	0.004	0.28%
Tai Shek Mo	1.27	0.11	9.02%	0.25	19.93%	0.85	66.80%	0.04	3.14%	0.014	1.10%
Wa Shan	0.86	0.13	14.99%	0.25	28.49%	0.46	53.05%	0.02	2.08%	0.012	1.39%
Robin's Nest	6.48	2.27	35.06%	0.3	4.73%	3.61	55.69%	0.29	4.45%	0.004	0.06%

Sum 6.17 + 11.84 + 1.01 + 0.73 = 19.75 km²

Total: 19.75 km² (or 1975 ha)

Kwong et al. (2022)

A Nature-based Solution (NbS) for NM

- Nature-based Solutions (NbS) are defined by **IUCN** as:

  "actions to protect, sustainably manage and restore natural or modified ecosystems, which address societal challenges effectively and adaptively, while simultaneously providing human well-being and biodiversity benefits."

- NbS is a nature conservation strategy

Cohen-Shacham, E., Walters, G., Janzen, C. and Maginnis, S. (eds.) (2016). Nature-based Solutions to address global societal challenges. Gland, Switzerland: IUCN.

Seven Societal Challenges to Sustainable Development Addressed by NbS
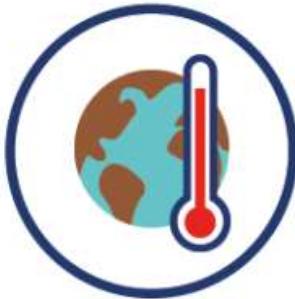
Climate change mitigation and adaptation | Disaster risk reduction | Economic and social development | Human health | Food security | Water security | Environmental degradation and biodiversity loss

Forests address all 7 societal challenges
(probably weaker on food production in HK)

IUCN (2020). Global Standard for Nature-based Solutions. A user-friendly framework for the verification, design and scaling up of NbS. First edition. Gland, Switzerland: IUCN.

- Plant now, assume a 12 m canopy in 2035
- Stored carbon (not annual increment)

Total carbon stored before reforestation	**386,927.5 tC**
Total carbon stored after reforestation	**726,017.0 tC**
Total carbon gain after reforestation	339,089.4 tC

Carbon stock:
Secondary forest **AGB** = 142 tC/ha (Lutz et al. 2018)
Soil carbon (Zhang et al. 2007):
- Secondary forest = 146.1 tC/ha
- Shrubland = 131.1 tC/ha
- Grassland = 85.2 tC/ha
- Badlands = 28.3 tC/ha
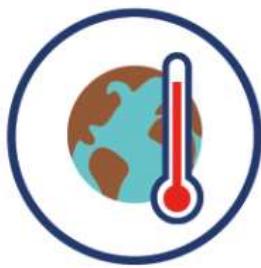
Climate change mitigation and adaptation

- Carbon sequestration

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Sum		**6.17** +		**11.84** +		**1.01** +				**0.73**	**= 19.75 km²**

Hong Kong's Climate Action Plan 2050
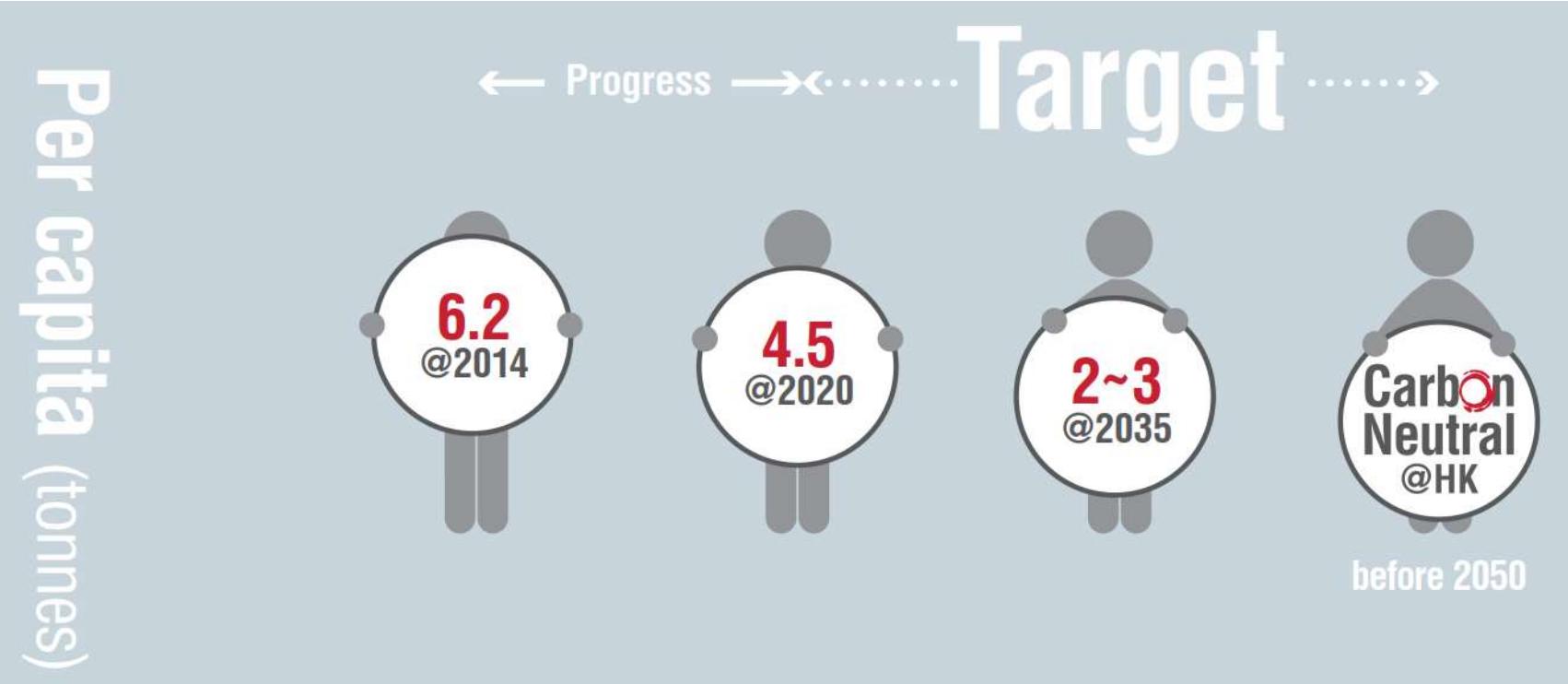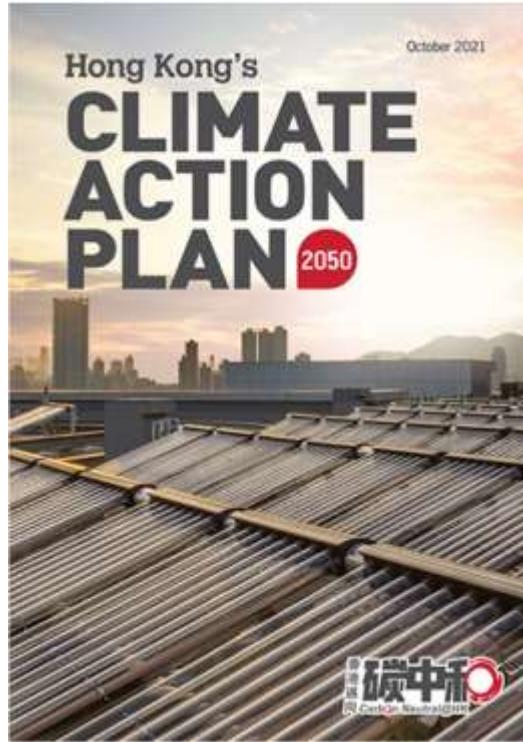
Total gain in AGB in 2035 after reforestation: 339,089.4 tC

= 113,029 to 169,544 people's emission in a year by 2035
Which is about two times the new population of Fanling North NDA

- Reduced flood risk

Soil water storage and permeability of different vegetation types in China

Vegetation type	Water Storage (ton/ha)	Permeability (mm/min.)
Natural forest	628	4-5
Secondary forest	552	3-4.5
Shrubland	447	4
Pine plantation	386	3-4
Grassland	320	2

Liu et al. 2003. Comparative analysis of hydrological functions of major forest ecosystems in China. *Acta Phytoecologia Sinica* 27(1):16-22

Disaster risk reduction

- Reduced flood risk
- Reduced landslides
- Hill fire control

These landslides on Sandy Ridge occurred during the black rainstorm on 7 and 8 September 2023

Degraded hillsides are prone to landslides

Machado et al. (2019) Urban ecological infrastructure: The importance of vegetation cover in the control of floods and landslides in Salvador / Bahia, Brazil. Land Use Policy 89 (2019) 104180. https://doi.org/10.1016/j.landusepol.2019.104180

Disaster risk reduction

- Reduced flood risk
- Reduced landslides
- Hill fire control

Forest with a closed canopy are resistant to fire

Chau, K. L. (1994). The ecology of fire in Hong Kong. (Thesis). University of Hong Kong, Pokfulam, Hong Kong SAR.
http://dx.doi.org/10.5353/th_b3123348

S/KTN/4 - Kwu Tung North Outline Zoning Plan (OZP)

https://www.ozp.tpb.gov.hk/?page=search&searchType=AdvSearch&type=plan&caseNo=S%2FKTN%2F4&layers=ozp-1&lang=en

Grave

Graves

Residential Gp B
- **Max Plot ratio 3.5**
- **95 mpd**

古洞
22.513487, 114.105292
街景服務

Google Map 2023

S/FLN/4 – Fanling North OZP

https://www.ozp.tpb.gov.hk/?page=search&searchType=AdvSearch&type=plan&caseNo=S%2FFLN%2F4&layers=ozp-1&lang=en

Town Planning Board Statutory Planning Portal 3

Map Legend | Map Tools | 繁 簡 Text Size

< S/FLN/4 -Fanling North

S/FLN/4 - Fanling North

Gazetted under Section 9(1)(a) on 29/09/2023

Statutory Plan gazetted under section 9(1)(a) of Town Planning Ordinance

Download | Notes | Map

Latest
Index
Search
Identify
Others

Shek Wu San Tsuen Re-zoned as Public Housing

Statutory Plans

More Information

Amendment Item under S.5/S.7 of TPO

AGR — Agriculture

C/R — Commercial/Residential

CA — Conservation Area

G/IC — Government, Institution or Community

GB — Green Belt

O — Open Space

OU — Other Specified Uses

OU(A) — Other Specified Uses (Amenity Area)

R(A) — Residential (Group A)

R(B) — Residential (Group B)

R(C) — Residential (Group C)

See next page

Graves

Graves

Shek Wu San Tsuen Re-zoned as Public Housing, surrounded by graves on the hillside

Graves

Google Map 2023
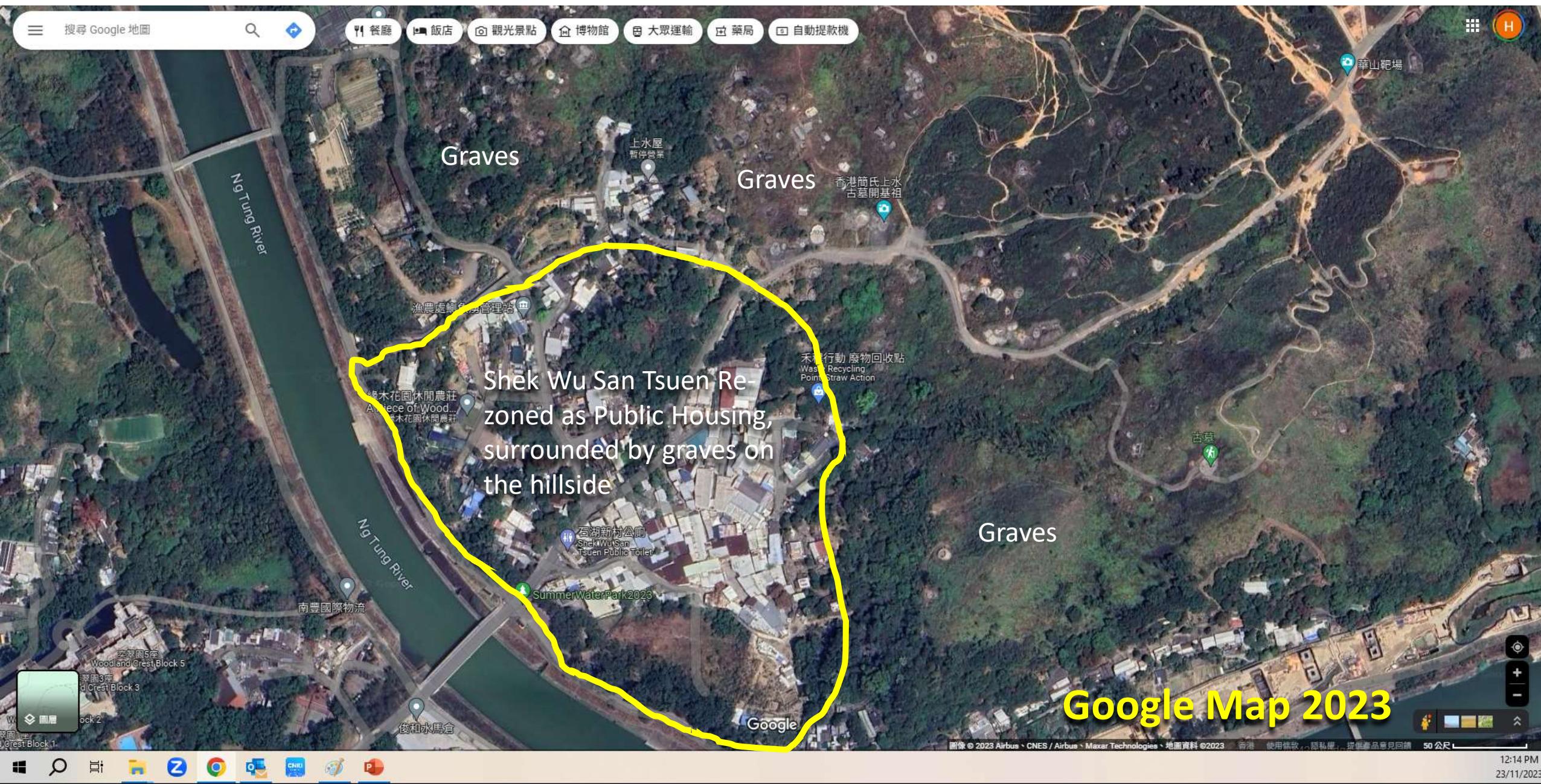
Forest protection and reforestation are important NbS in HK

Climate change mitigation and adaptation
- Carbon sequestration
- Cooling effect

Human health
- Outdoor exercises
- Outdoor activities
- Improved mental health
- Air purification

Environmental degradation and biodiversity loss
- Forest biodiversity
- Air purification

Disaster risk reduction
- Reduced flood
- Reduced landslides
- Hill fire control

Food security
- Food production
- Agroforestry

Economic and social development
- Community forestry
- Community reforestation
- TCFD, TNFD
- Forestry & ecotourism

Water security
- Irrigation water
- Potable water

- **Forests address all 7 societal challenges**
- **Probably weaker on food production in HK**

Secretariat of the Convention on Biological Diversity (2012) Cities and Biodiversity Outlook. Montreal, 64 pages.

Proposed Tree Felling in approved planning applications (Jan 2018 to Feb 2023)
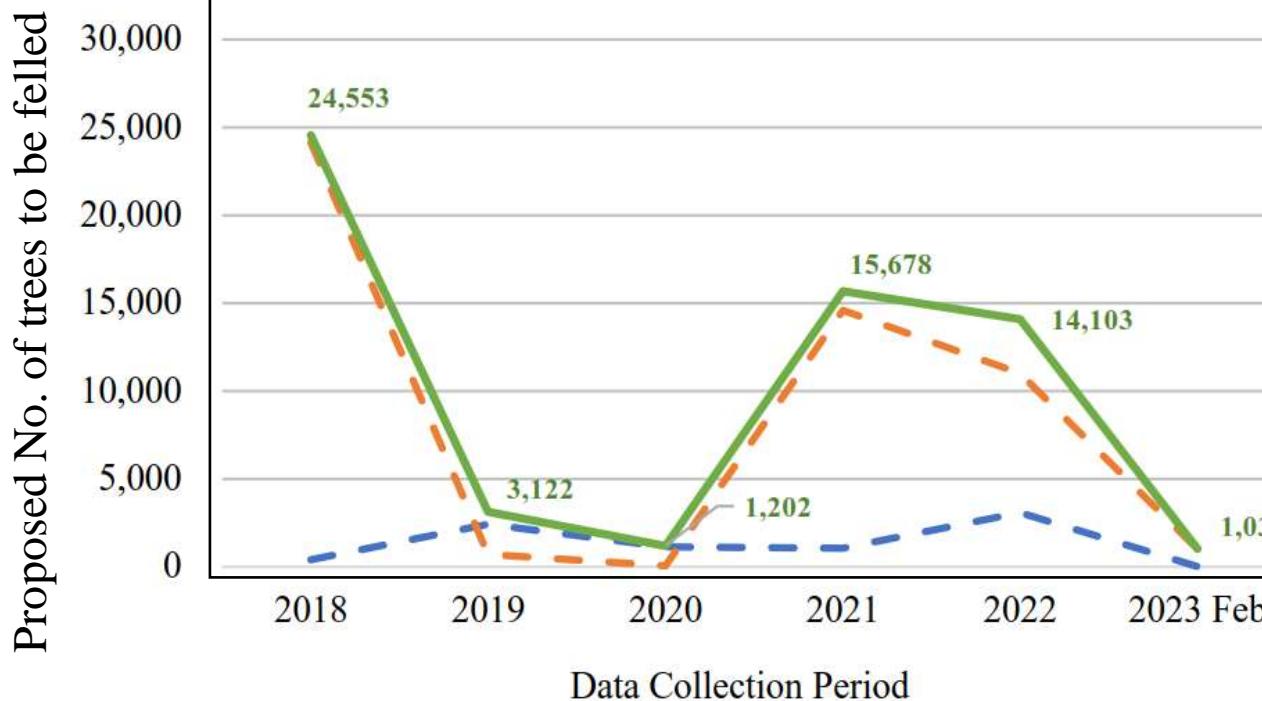
Total: ~ 60,000 trees

Compensation ratio is 1:1 in tree Nos. but...

DBH 40cm

Compensation

Light standard, say 10cm in dbh (only 6% of the losing girth)

Ho, S.Y.Z. (2023) A Review of Tree Compensations in Hong Kong. Unpublished Dissertation, MSc. in Environmental Management, The University of Hong Kong.
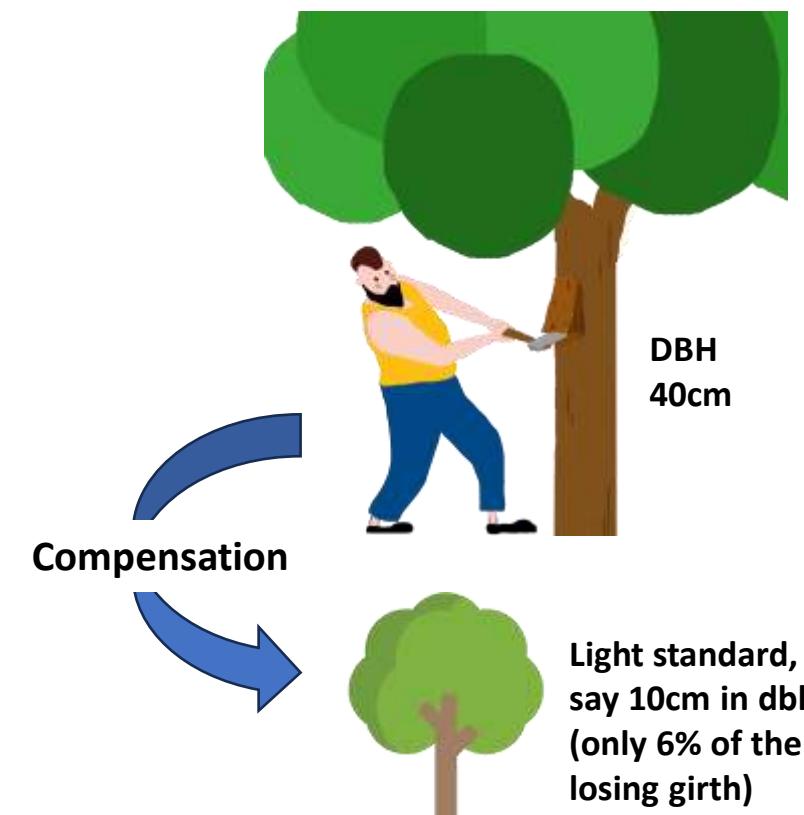
NM could offer reforestation opportunities to corporates

June 5, 2020

Arbor Day Foundation and Bank of America Drive Local Climate Resiliency Initiatives

Bank of America is expanding its commitment to the Arbor Day Foundation through a second ==$250,000== grant to support efforts in four U.S. cities to increase the number of trees planted in low- and moderate-income neighborhoods.

https://newsroom.bankofamerica.com/press-releases/corporate-philanthropy/arbor-day-foundation-and-bank-america-drive-local-climate

May 26, 2020

Amazon Funds Urban Greening Program to Increase Climate-Resilience of German Cities

BERLIN--(BUSINESS WIRE)--May 26, 2020-- Amazon today announced a ==€3.75 million== commitment to The Nature Conservancy in an effort to reduce climate change risks and increase species biodiversity in three German cities.

https://newsroom.bankofamerica.com/press-releases/corporate-philanthropy/arbor-day-foundation-and-bank-america-drive-local-climate

Driving forces:

HKEX 香港交易所

- **App 27 ESG Reporting Guide**
- **Core Climate**

TNFD · **Task Force on Nature-related Financial Disclosure**

TCFD · **Task Force on Climate-related Financial Disclosure**

策略目標 /

Northern Metropolis
Development Strategy

Strategic Objectives /

(1) Integrating into our country's overall development

To foster closer, deeper and more comprehensive co-operation between Hong Kong and Shenzhen and contribute jointly and more effectively to creating a world-class city cluster in the GBA by leveraging the solid foundation of co-operation between the two cities for more than four decades; and to enable Hong Kong to better integrate into our country's overall development and to be more aligned with the related mechanisms supporting the national development.

（一）融入國家發展大局

善用港深兩地過去 40 多年的堅實合作基礎，促進港深更緊密、更深層次和更全面的合作，從而共同為營造大灣區世界級城市群作出更強效的貢獻，藉此讓香港能更好地融入國家發展大局，並完善配合國家發展大局的機制。

5 →

Reforestation sites in NM can be designated as Forest Parks in future to better integrate with cities in GBA

深圳市森林公園Shenzhen City Forest Parks

國家級 (National level)

1. 廣東梧桐山國家森林公園 Wutong Shan National Forest Park

市級 (City level)

1. 深圳羊台山森林公園 Yangtaishan Forest Park
2. 深圳鳳凰山森林公園 Fenghuang Shan Forest Park
3. 深圳觀瀾森林公園 Guanlan Forest Park
4. 深圳羅田森林公園 Luotian Forest Park
5. 深圳梅林山森林公園 Meilin Shan Forest Park
6. 深圳市光明森林公園 Guangming Forest Park
7. 深圳清林徑森林公園 Qinglin Jing Forest Park
8. 深圳松子坑森林公園 Songzikeng Forest Park
9. 深圳排牙山森林公園 Paiya Shan Forest Park
10. 深圳三洲田森林公園 Sanzhoutian Forest Park
11. 深圳田頭山森林公園 Tiantou Shan Forest Park
12. 深圳五指耙森林公園 Wuzhiba Forest Park

Forest Parks Management Measures

Article 2 The term "forest parks" as mentioned in these Measures refers to beautiful forest landscapes, concentrated natural landscapes and cultural landscapes, with a certain scale. A place for people to visit, rest or carry out scientific, cultural and educational activities.

Article 3 The Ministry of Forestry is in charge of national forest parks. The competent forestry department of the local people's government at or above the county level is in charge of the Forest Park within its own administrative area.

http://www.gd.gov.cn/zwgk/wjk/zcfgk/content/post_2527947.html

How?

Reforestation Methods (>two decades of research results)

Hill fire Prevention by firebreaks →

Assisted Natural Regeneration
- Planting seedlings
- Direct seeding

→

- Plant by grids (tree belts and tree islands)
- Use tree guards where necessary
- Direct seeding by hand or by drones
- Enrichment planting in existing woodland patches

Firebreak

Tree Guards
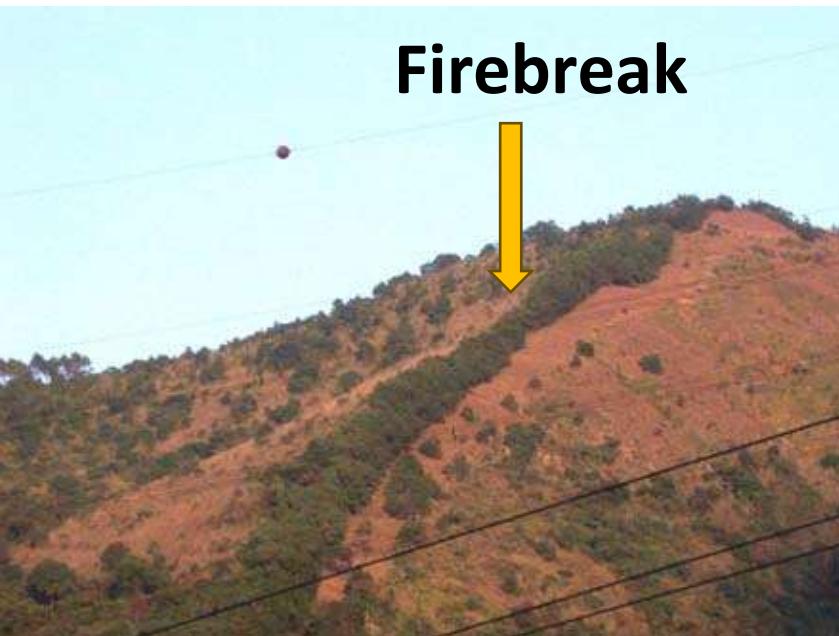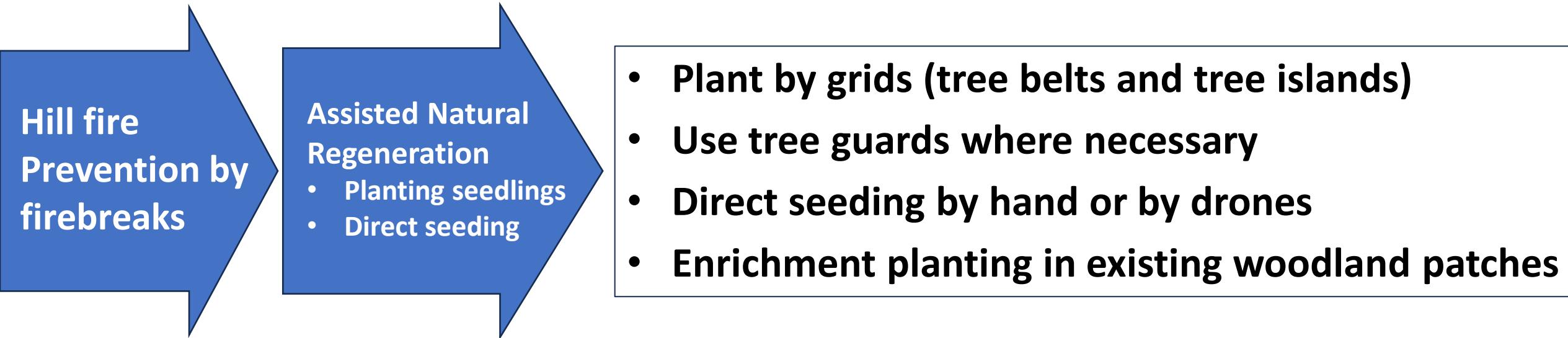
Direct seeding by drones

Case studies – Kadoorie Farm & Botanic Garden (KFBG) – Upland (2 sites)
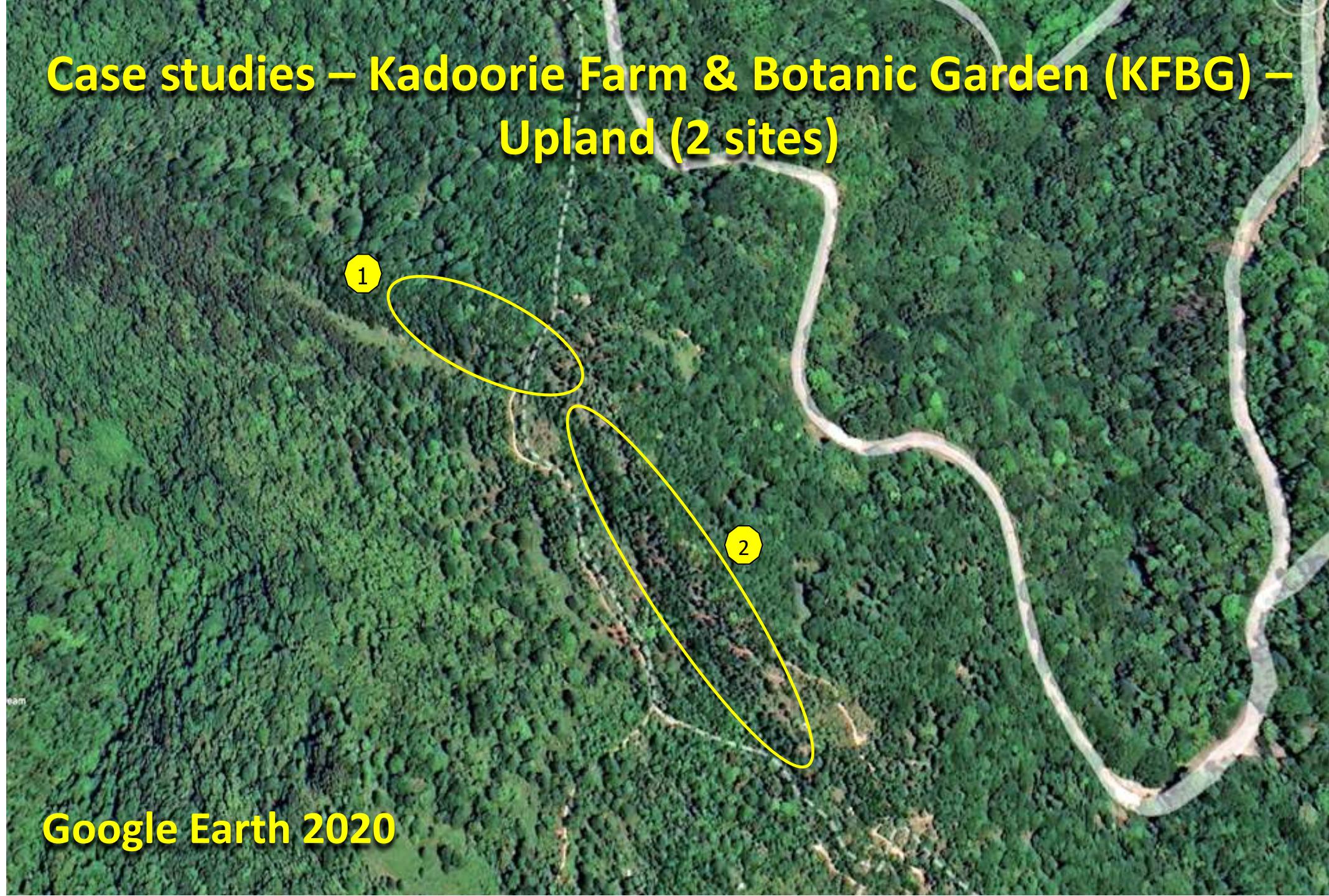
Google Earth 2020

Case studies – Kadoorie Farm & Botanic Garden (KFBG)

Upland ⑧ 1

- Tai Mo Shan KFBG firebreak planting
- Planted 8 native species on Tai Mo Shan in 2001 as a firebreak

14 March 2002   19 March 2004   28 February 2008

Species with good performances:

Pyrenaria spectabilis 石筆木, *Syzygium hancei* 韓氏蒲桃, *Cyclobalanopsis neglecta* 竹葉青岡

Hau & So 2003

Case studies – Kadoorie Farm & Botanic Garden (KFBG)

Tai Mo Shan firebreak: A 10m canopy is formed in 10 years   **Upland** (1)

Feb 2011

- Deliberately planted densely for the firebreak effect.

Case studies – KFBG upland ⑧②

A 7 to 8 m canopy in 10 years

Species with good performances:

- *Cyclobalanopsis championii* 嶺南青岡
- *Cyclobalanopsis edithiae* 華南青岡
- *Cyclobalanopsis myrsinifolia* 小葉青岡
- *Cyclobalanopsis neglecta* 竹葉青岡
- *Lithocarpus glaber* 柯
- *Pyrenaria spectabilis* 石筆木
- *Reevesia thyrsoidea* 梭羅樹
- *Rhodoleia championii* 紅花荷

KFBG Native Tree Planting Scheme for Secondary Schools 2000
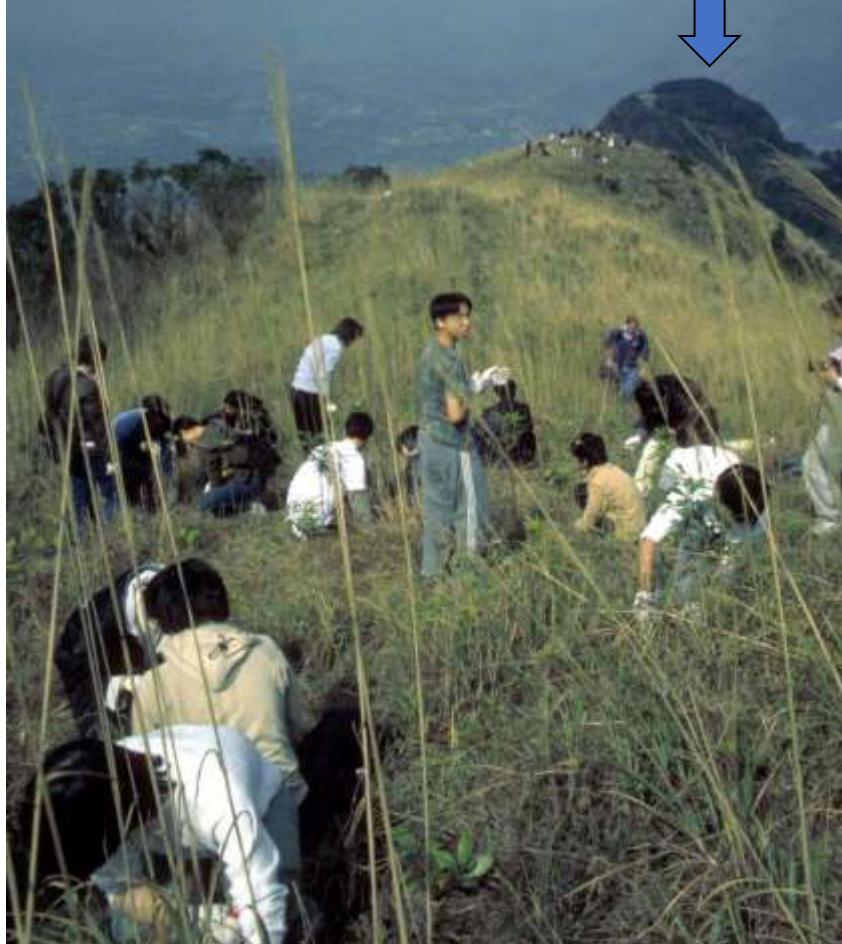
2011

2013

Case studies – Nam Shan, Lantau (Mid-hill, ~ 300 mm asl)

Case studies – Nam Shan, Lantau (Mid-hill, ~ 300 mm asl)

Hau & So 2003

- Planted in 1999 and 2000
- 30,000 seedlings of 40 native tree species (2 naturalised exotics)
- Plus 40,000 seedlings of exotic tree species

May 1999

Species	Plot A-1999
Bischofia javanica	50
Castanopsis fissa	1250
Choerospondias axillaris	300
Cinnamomum camphora	200
Cleistocalyx operculatus	325
Cratoxylum cochinchinense	50
Cyclobalanopsis championii	150
Cyclobalanopsis edithiae	100
Cyclobalanopsis myrsinifolia	50
Cyclobalanopsis neglecta	272
Ficus microcarpa	300
Gordonia axillaris	200
Liquidambar formosana	350
Lithocarpus glaber	630
Machilus breviflora	1330
Mallotus paniculatus	1700
Melia azedarach*	650
Melicope pteleifolia	398
Myrsine seguinii	50
Rauvolfia verticillata	50
Schima superba	400
Sterculia lanceolata	300
Syzygium cumini*	895
Total	10000

Species	Plot B-2000
Antirhoea chinensis	100
Bischofia javanica	300
Bridelia tomentosa	500
Castanopsis fissa	400
Cleistocalyx operculatus	400
Cordia dichotoma	500
Cyclobalanopsis championii	300
Cyclobalanopsis edithiae	500
Cyclobalanopsis myrsinifolia	2000
Cyclobalanopsis neglecta	1500
Diospyros morrisiana	900
Elaeocarpus chinensis	700
Hibiscus tiliaceus	300
Ilex rotunda var. microcarpa	700
Ligustrum amamianum	600
Lithocarpus glaber	500
Machilus breviflora	2500
Mallotus paniculatus	1200
Microcos paniculata	150
Psychotria asiatica	300
Pygeum topengii	1,000
Sapium discolor	350
Schefflera heptaphylla	1,800
Scolopia chinensis	200
Sterculia lanceolata	800
Syzygium cumini*	150
Syzygium hancei	1,000
Xylosma longifolium	100
Zanthoxylum avicennae	250
Total	20000

DEC 2011
- A 12m canopy in 12 years

Case studies – Nam Shan, Lantau

Google Earth
2 January 2021
(Planted in May 1999)

白富田營地
Pak Fu Tin Campsite

微波發射站
Microwave Station

警察通訊站

大牛湖頂
Tai Ngau Wu
Peak(275m)

Case studies – Hung Lung Hang, Da Kwu Ling (Lowland)

Google Earth 2001

¾ ha
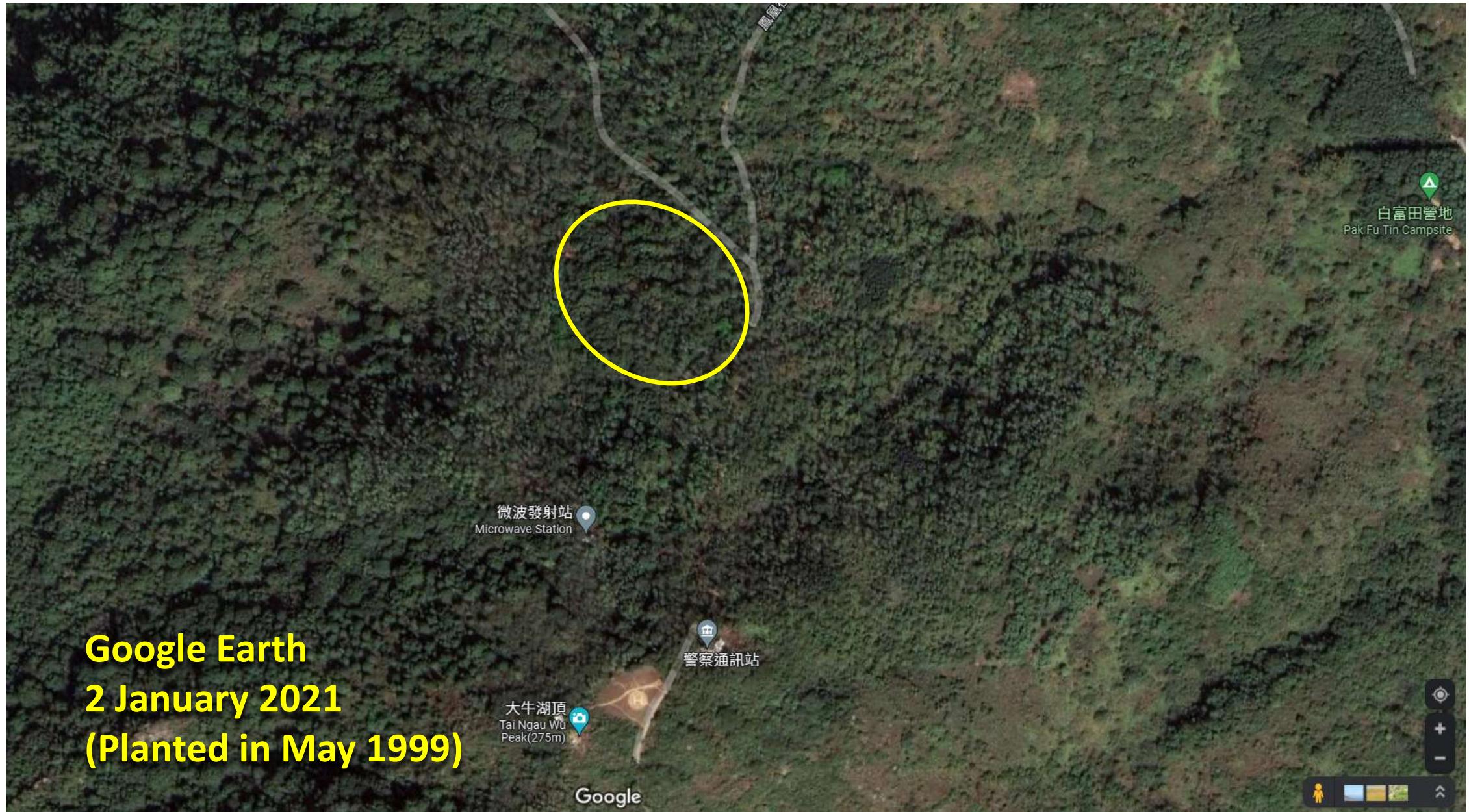
Planting site

Aporosa dioica 銀柴

Mallotus paniculatus 白楸

Styrax suberifolius 紅皮

Case studies – Hung Lung Hang, Da Kwu Ling

- 1500 seedlings of 21 native tree species
- Around 3/4 ha
- Framework species method
- Planted on **19 Jan 2001** (Hau & So 2003)

Case studies – Hung Lung Hang

- **15 August 2002**
- **1.5 years old**
- **Trees reaching 3-5m**

Case studies – Hung Lung Hang

3 Jan 2011 (10 years old)
Canopy height > 15 m

Case studies – Hung Lung Hang, Da Kwu Ling (Lowland)

Google Earth 2023

Hung Lung Hang

Planted on
12-17 Jan 2001

Species	中文名稱	Nos. (2001)	Nos. (2019)	Survival	Mean Height Growth (cm per year)
Antirhea chinensis	毛 茶	6	1	17%	6.7
Aporosa dioica	銀 柴	100	63	63%	14
Aquilaria sinensis	牙香樹	10	4	40%	34
Choerospondias axillaris	酸 棗	140	36	26%	53
Cordia dichotoma	破布木	25	7	28%	50
Cryptocarya concinna	黃果厚殼桂	100	42	42%	31
Cyclobalanopsis edithiae	華南青岡	200	96	48%	43
Cyclobalanopsis neglecta	竹葉青岡	82	27	33%	30
Daphniphyllum oldhamii	交讓木	5	0	0	NA
Diospyros morrisiana	羅浮柿	80	3	3.8%	10
Elaeocarpus chinensis	華杜英	100	12	12%	24
Lithocarpus harlandii	夏蘭稠	50	21	42%	38
Machilus chekiangensis	浙江潤楠	80	33	41%	24
Mallotus paniculatus	白 楸	220	71	32%	62
Myrsine seguinii	密花樹	15	8	53%	35
Pygeum topengii	臀果木	100	2	2%	37
Reevesia thyrsoidea	梭羅樹	30	12	40%	14
Styrax suberifolius	紅 皮	50	19	38%	30
Tutcheria championii	石筆木	20	7	35%	57
Viburnum odoratissimum	珊瑚樹	24	11	46%	30
Xylosma longifolium	長葉柞木	70	1	1.4%	26
Sum (Mean)		**1,507**	**476**	**(31.6%)**	

How to make
it happen?

Kadoorie Farm & Botanic Garden

- **Reforesting this hillside on Tai Mo Shan since 2011**
- **A 12 m canopy in 10 years**
- **The entire KFBG is on short-term tenancy (STT)**

July 2023

Options for NM:

Allocate reforestation sites to NGOs on STT with funding from:
- **Corporates**
- **Carbon credits (Core Climate)**
- **Compensatory planting (EIA/ TPB)**
- **Foundations**
- **Government?**

or

Management Agreement by NGOs with funding from:
- **ECF or CCF**

or

Reforestation by government

Enormous opportunities for forest restoration in NM

Kai Kung Leng 雞公嶺

Thank you

References

Hau, B.C.H. and So, K.K.Y. 2003. Using native tree species to restore degraded hillsides in Hong Kong, China. Pp. 179-190 in Sim, H.C., S. Appanah and P.B. Durst (Eds.), Bring Back the Forests: Policies and Practices for Degraded Lands and Forests. Proceedings of an International Conference, 7-10 October 2002, Kuala Lumpur, Malaysia. FAO, Bangkok, Thailand.

Kwong et al. (2022) A Multi-Stage Approach Combining Very High-Resolution Satellite Image, GIS Database and Post-classification Modification Rules for Habitat Mapping in Hong Kong. Remote Sens. 2022, 14, 67. https://doi.org/10.3390/rs14010067

Lutz et al. 2018. Global importance of large diameter trees. Global Ecology and Biogeography 27(7):849-864.

Zhang et al. 2007. Soil organic carbon storage and changes with reduction in agricultural activities in Hong Kong. Geoderma 139: 412–419. doi:10.1016/j.geoderma.2007.03.003