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# 韧性构想： 基于社会生态学的菲律宾马尼拉大都会区 城市设计

## RESILIENT IMAGINARIES: SOCIO-ECOLOGICAL URBAN DESIGN IN METRO MANILA, THE PHILIPPINES

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### 1 引言

随着全球人口密集区遭受自然灾害的频率不断上升，生态学者、工程师、经济学家、社会学学者与设计者们对“城市韧性”议题也愈发关注。然而，尽管这一议题有着极强的学科交叉性，但现阶段关于城市韧性的理论研究仍大多局限于各学科范围内。本文以马尼拉大都会区为例，通过引入一种协调人类、自然与空间韧性的社会生态学设计方法，实现韧性理论与实践的桥接。该项目以生态学和社会学视角下的韧性概念为基础，并将城市设计（其本身即是建筑、规划和景观设计协同作用的结果）定位为整合和实施这些概念的独特途径。<sup>[1]</sup>

理论上讲，城市环境中的韧性既与某个单独的系统有关，也会受到多个系统之间动态的相互作用的影响。然而，韧性实践却往往只关注自然系统的生态危机防御，而忽视了具体社区在平等性、可达性、社会正义性与不稳定性等方面的脆弱性，这种现状引发

了两个关键问题：这样的实践不仅会导致我们在谈论城市脆弱性的时候往往将注意力集中于自然灾害防御；还体现在对灾害影响进行预判时，未对不同社区的差异性情况加以充分考量。

与评估一个系统永续发展能力的“可持续性”概念不同，“韧性”关乎价值，这意味着我们必须承认每个未来远景都未必是理想的（或可实现的）。确定什么是正确的、最好的或有意义的，就意味着要从高度整合的跨系统视角出发，厘清诸如“韧性是对谁而言的？”“是什么对什么的韧性？”之类的问题<sup>[2]</sup>。生态学者倾向于使用描述某一场地自然环境的指标来测度韧性，社会学学者则更偏好使用与人相关的具体领域的指标。这两种视角都十分必要且缺一不可，尤其是在自然灾害对社会和经济条件均很脆弱的社区造成直接或严重影响的情况下。

本文所讨论的“韧性”概念立足于以社会生态学为背景的城市设计语境，其定义是：由若干能够在不同时空维度上预测并消

1. 依水而建的非正规规定居点。
1. Informal settlements negotiate the edges between water and land.

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#### 摘要

尽管城市韧性议题日益受到重视，但其理论研究仍大多局限于各学科范围内。本文以马尼拉大都会区为例，通过引入一种协调人类、自然与空间韧性的社会生态学设计方法实现韧性理论与实践的桥接，这里的“韧性”是指：由若干能够在不同时空维度上预测并消解干扰的网络、系统与群体叠加而成的、基于特定场地和具体领域的复合体系，其具有在社会、生态和空间上实现新的平衡态的能力。这一概念包含了自然、人类和空间系统，并以历史研究、田野调查和实地走访等实证研究为依托。菲律宾政府正在实施向城外迁移人口以降低城市脆弱性的计划，对此，研究团队提出了三个城市韧性提升原则，试图通过整合正规和非正规社区来实现社会公平和生态和谐。这些原则包括：设计结合自然，而非抵抗自然；支持共享经济；致力于打破城市开发中的隔离现状。

#### 关键词

韧性；社会生态；城市设计；非正规性；马尼拉大都会区

#### ABSTRACT

Despite broad interest in the subject of urban resilience, the discourse remains largely siloed by discipline. With Metro Manila as a backdrop, this essay addresses gaps in resilience literature and practice by introducing a social-ecological urban design concept of resilience, defined here as: The ability for overlapping place-based and sector-specific networks, systems, and communities that operate across temporal and spatial scales to anticipate and absorb disturbances such that they can transition into more socially, ecologically, and spatially equitable states. This concept bridges natural, human, and spatial systems and is empirically grounded in historical research, field observations, and interviews. In response to programs which emphasize out-of-city relocation to reduce vulnerability, authors propose three principles of urban resilience that instead emphasize social equity and ecological harmony through the spatial integration of formal and informal communities. These principles include: design with nature, not against it; support a shared economy; and break down development silos.

#### KEY WORDS

Resilience; Socio-Ecological; Urban Design; Informality; Metro Manila

#### 整理

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**项目地址：**

菲律宾马尼拉大都会区

**项目面积：**

41.67km<sup>2</sup> (包含蒙廷卢帕市的4个街区)

**项目团队：**

Stephen F. Gray、Mary Anne Ocampo、Fadi Masoud

**调查时间：**

2015年春季

**LOCATION:**

Metro Manila, The Philippines

**AREA (SIZE):**

41.67 km<sup>2</sup> (Four Districts in the City of Muntinlupa)

**PROJECT TEAM:**

Stephen F. Gray, Mary Anne Ocampo, Fadi Masoud

**SURVEY TIME:**

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解干扰的网络、系统与群体叠加而成的、基于特定场地和具体领域的复合体系，其具有在社会、生态和空间上实现新的平衡态的能力。

这一定义是针对马尼拉大都会区进行的一系列历史研究、定向田野调查、政策评价，以及对非正规移民家庭（ISF）的走访结果的经验性总结。这种方法中的“特定领域的脆弱性”指ISF所面临的社会经济压力，主要来自脆弱的人际关系网、无保障的土地、社会与经济隔离等方面。而“特定场地的脆弱性”则是对传统语境下的“生态环境灾害（如地震、火山喷发、台风、海啸与周期性洪涝）”进行了拓展，新增了“空间不利因素”，通常表现为社会与空间上排外的无序发展状态（图2）。

## 2 马尼拉大都会区案例：营造双重城市

菲律宾拥有长达36 289km的海岸线，河湖水网纵横交错。特殊的地理位置使“这个社会结构本就脆弱的群岛国家同时面临极高的自然灾害风险……成为全球四大灾害热点地区之一”<sup>[3]</sup>。在频发的洪灾面前，城市中的贫困人口成了最易受灾却最缺乏抵御能力的群体。在这个案例中，“城市韧性”需要应对不断变化的水陆交接面、社会经济局限，以及正规城市与非正规城市之间的空间差异（图3）。

马尼拉大都会区的城市景观是蔓延式开发的结果，多重矛盾在这里共生：富有与贫穷、贫民窟与住宅小区、正规与非正规、私有与公有——导致穷人在主流的城市生活中

被慢慢边缘化。这种社会空间隔离现象可追溯至西班牙殖民时期——16世纪，西班牙建立马尼拉王城区作为其菲律宾殖民地的首府。尽管当时的非正规居住区的形式与现在不同，但生活在“王城内”的西班牙精英与生活在“王城外”的中国人、日本人和郊区菲律宾人之间在物质环境、社会地位与阶级等方面存在着明显而刻意的差别<sup>[4]</sup>。而在20世纪美国占领时期及近代由菲律宾自己主导的城市建设中，空间上的差别逐渐演变为了社会经济的隔离<sup>[5]</sup>。

尽管菲律宾近年的城市建设较之前更为谨慎，但马尼拉大都会区边缘地带的分化现象却仍然日益严重。第二次世界大战后的私营开发活动造就了一大批封闭式社区，犹如都会区中的一座座阶级化的孤岛。随着

2. 非正规规定居点中的非正规经济活动：临时交通、洗衣服务、建造活动、食物制作与贩卖，以及其他小规模经济活动。图片由2015年麻省理工学院城市研究与规划系开展的“场地规划”课程项目组成员所摄。更多信息请参见注释。
3. 蒙廷卢帕市的4种主要非正式定居点类型：a) 拉古纳湾水岸沿线的沿海或湖滨定居点；b) 菲律宾国家铁路沿线的闲置地与铁路定居点；c) 遍布整个城市的河流与河岸定居点；d) 位于街区内部的定居点。
2. Informal settlers often work within an informal economy that includes: makeshift transport, laundry services, construction, food preparation and vending, and other small-scale economic ventures. Photos by MIT DUSP studio participants (Site Planning Studio, 2015), for more information refer to end notes.
3. Four major informal settlement typologies found in Muntinlupa included: a) Tabing-Dagat, or coastal or lakeshore settlements along Laguna de Bay; b) Vacant land and railway settlements situated along the Philippines National Railway; c) Tabing-Ilog or esteros and riverbank settlements throughout the city; d) Looban or inner block settlements nested within formal development.

对私人住房和专属购物中心的需求超过了公共基础设施和相关配套服务，马尼拉大都会区中逐渐形成了一片“精英阶层专属空间网络”：高档居住办公区和消费场所的数量不断增加，并通过配备了高科技通讯设施的收费高速公路、天桥彼此相连，这些区域同时拥有纵横交错的电力和水利基础设施——这些都是普通民众无法享用的<sup>[6]</sup>。

### 3 边缘化生活

直到20世纪下半叶，绝大多数菲律宾人依然居住在乡村地区；但在1975~2010年间，马尼拉大都会区的人口从500万猛增至近1 200万；人口激增导致今天生活在大都会区的非正规城市人口达到了300万人左右（约60万个ISF）<sup>[7]</sup>。许多务工者抱着提高收入的期望而来，但由于受教育水平低、缺乏职业素养，很难胜任高收入的工作，因此被迫生活在王城区外缘与郊区的接壤地带——虽然这里是洪涝高发区，且连最基本的服务都难以保障<sup>[8]</sup>（图2）。

世界银行将ISF分为三类：1) 居住在公有土地上的家庭；2) 居住在私有土地上且面临被驱逐威胁的家庭；3) 居住在危险地区的家庭。<sup>[8]</sup>2014年，马尼拉大都会区60万个ISF中有近18%居住在非法构筑物内，且大部分处于高危地区（图3）。马尼拉大都会地区有6种典型的非正规规定居点，包括：

- 1) 沿海或湖滨定居点：临水而居，居民主要为稻农或渔民，他们以水为生，经常遭受最严重的洪灾侵袭。
- 2) 河流与河岸定居点：沿河流、河口或河岸而居，这些定居点通常与主水道相距不足10m。暴雨时，由于这些定居点位于行洪通道中，因而居民会频繁遭受洪灾侵袭。<sup>[9]</sup>
- 3) 闲置地与铁路定居点：这些定居点多为无主土地或备用土地，或位于铁路沿线。
- 4) 位于街区内部的定居点：是指那些搭建在城市人口稠密街区内部天井中的定居点。从外部街道上无法发现这些定居点，只能通过狭窄的小巷和过道出入。
- 5) 城郊封闭式居住区附近的定居点（城



中村)：这类定居点出现于20世纪20年代之后，围绕着城郊的精英居住区混杂分布，居民多为向精英人群提供家政服务的务工者。<sup>[9]</sup>

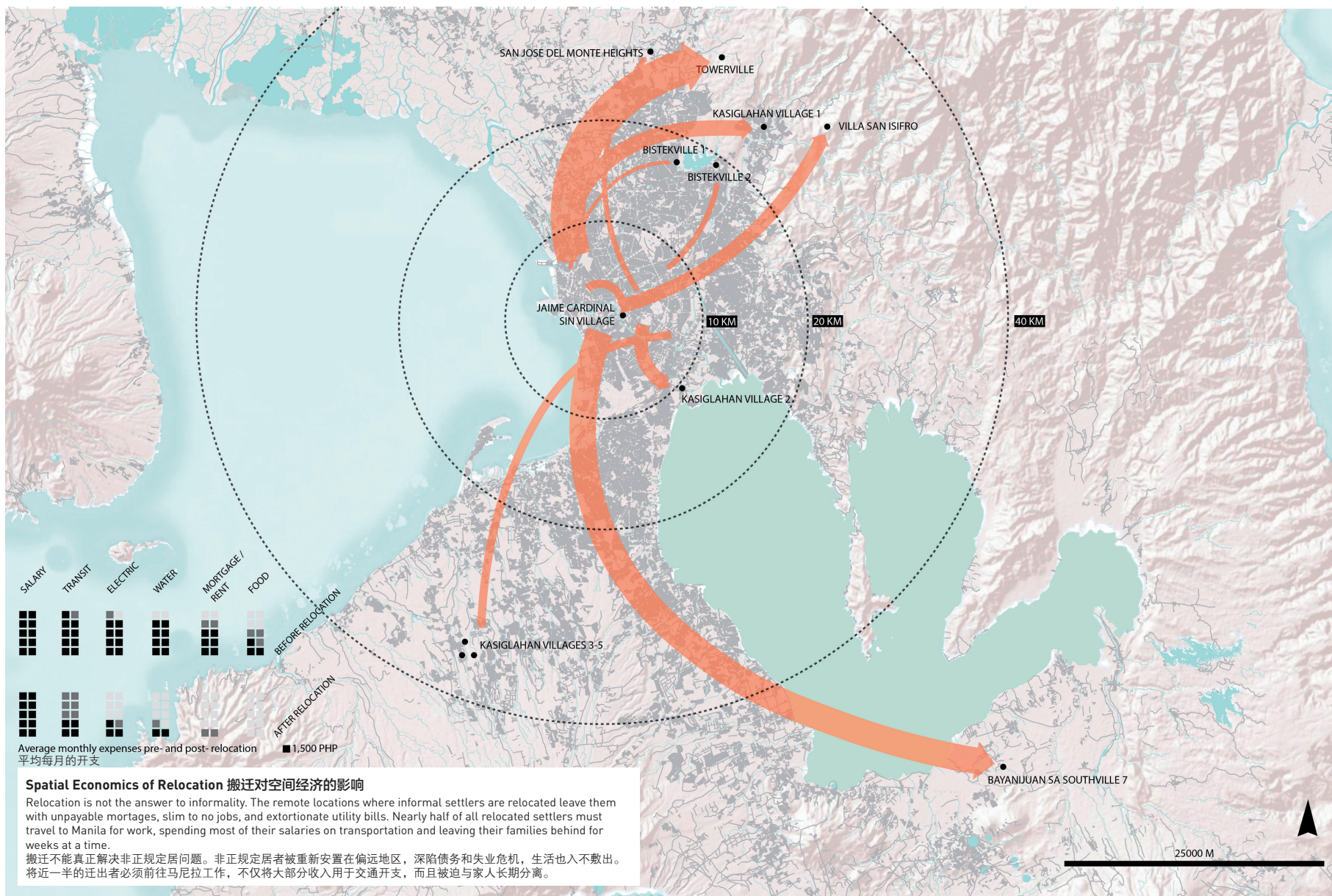
6) 垃圾场附近的定居点：马尼拉大都会区每天产生6 000吨以上的垃圾，垃圾场吸引了大量非正规规定居居民前来翻捡和回收。<sup>[9]</sup>

### 4 移民安置无法解决韧性危机

只有当一个城市中最易受灾的人群也能抵御灾害时，这个城市才是韧性的。对于马尼拉大都会区而言，最易受灾的居民正是那些居住在城市开发地块和基础设施的角落之中，或沿铁路、河床、交界地带和洪涝区而居的、被社会边缘化的城市贫民。<sup>[8]</sup>2009年，菲律宾政府成立了气候变化委员会，并

颁布了《气候变化法》，成为了全球范围内在韧性发展与气候变化政策制定方面的领先国家。<sup>[10]</sup>

尽管已经意识到人类和自然生态系统的相互维系关系，但许多政府项目依然采取人口外迁措施。2011年之前，为了缩减马尼拉大都会区非正规规定居点的规模，政府将居住在城内危险区的贫困人口迁移到土地更便宜、更易得的郊区。这些贫困家庭往往无法参与搬迁决策的制定过程，其中的许多人后来都陷入可以想见的难以负担的抵押债务中，并被迫远距离通勤、蒙受生产损失，原有社会和经济关系网的破裂更使他们的生活雪上加霜（图4）。将非正规规定居家庭外迁出城的做法，非但未能改善这群最易受灾的城市人口的生活，反而破坏了维系他们生存的



关系网络，进一步加剧了空间经济隔离，使他们更加无力抵御气候变化带来的冲击。在个别案例中，强制搬迁措施使许多传统家庭分崩离析，为了养家糊口，人们只能长期离家，居住在工作地点附近。

## 5 韧性实现的阻碍因素

在马尼拉大都会地区的16个地方政府中，蒙廷卢帕市位于最南端。在蒙廷卢帕市的拉古纳海湾地区，项目团队采用雪球抽样

法，采访了来自苏卡特、库旁、布里、阿拉邦4个街区的共计40名非正规城市定居者，以验证一些关于“外迁出城”举措是否提高了ISF抵御灾害的韧性的一般性假设（图5，表1），并对社区组织、政府机构、设计师、开发商以及国际非政府组织的代表进行了访谈（图6）。研究团队借此重点了解了洪涝灾害对ISF的重要性或实际影响程度。

走访与调查结果主要反映出三个问题：

1) 资源网络：居住地点与工作地点、学校、食物来源地和交通设施的距离尤其受到重

4. 马尼拉大都会区ISF外迁计划。出于包括经济差距和社会隔离、交通和基本基础设施匮乏、洪水，以及便利设施使用成本高昂在内的诸多原因，外迁的ISF更倾向于迁回马尼拉大都会区。

4. Map showing nine resettlement programs for ISF out-city relocation. Due to various challenges including distance from economic opportunities and social systems, lack of transportation and basic infrastructure, flooding, and high costs of amenities informal settler families relocated here tended to migrate back to Metro Manila.

视；2) 住房：土地使用权问题不如资源网络问题迫切；3) 洪涝：绝大多数受访者都认为洪涝仅仅是一种滋扰，而非灾害。

调查结果显示，尽管许多人意识到了频发洪灾和住房保障问题的重要性，但这些并非他们选择定居地的决定性因素。很多受访者表示，为了减少通勤时间和成本，他们选择在家中或家附近工作，从而将更多时间花在与家人、朋友相处和社交网络上。然而最令人吃惊的是，相比之下，他们反而不那么重视住房和洪涝问题。虽然受访者认为频发的洪水问题的确令人困扰，但他们普遍认为维系社会关系网络和保障就业的便利性更为重要。

沿水体边缘建立非正规渔业社区的举措虽然为当地人提供了生计和食物来源，但也使他们的生活和生产活动置于洪水频发和污水长期滞留的环境之中——洪水造成的污水淤积需要长达6个月的时间才能完全退去。由于开发建设和人口增长压力，这些湖滨社区的居民也面临着流离失所的威胁。这些定居点存在的韧性阻碍因素包括：1) 劳动技能与就业需求不匹配（主要为农民无法胜任渔业工作）；2) 食物开支高（普遍超过家庭收入的60%）；3) 住房存在安全隐患且费用高昂（面临流离失所的威胁）。

根据2011年菲律宾人口普查对蒙廷卢帕市的保守估计，这里至少有一半居民缺少冰箱、炉灶、清洁水源及其他基本生活物资。其中最贫困的15%的居民还缺乏冲水厕所和充足的垃圾收集设施。通过重组正规和非正规经济模式，使得城市贫困人口能够就近就业、更便利地获得交通设施服务和维持生计的资源网络，从而大大改善生活状况。这些定居点存在的韧性阻碍因素包括：1) 乡村移民不断涌入；2) 导致家庭与社会和经济资源系网脱节的搬迁策略；3) 缺乏基本的家庭公用设施和便利服务设施；4) 公共资源不足加剧了“非正规”的现状问题。

加速的经济增长和城市化步伐导致了长期的空间经济不平等，限制了住房和交通的普及，加剧了环境恶化，并导致非正规定居点不断蔓延。这使得城市环境在物质和社会

层面变得更加割裂，并且更易遭受生态灾害的影响。这些定居点存在的韧性阻碍因素包括：1) 社区在社会、经济和空间上的隔离；2) 区划管理力度不足且无序的开发模式缺乏管控；3) 缺乏协调性的政策决策机制；4) 以牺牲自然环境为代价的开发建设行为。

## 6 韧性构想

针对上述调查结果，研究团队制定了三大城市韧性原则，并提出了一系列涉及多种尺度、时间和学科维度的“韧性构想”（表2）。虽然这些原则是针对这个项目提出的，但我们希望其可以具有更高的普适性，用于提升城市在社会、生态和空间方面的韧性。三大原则如下：

- 1) 生态环境原则：设计结合自然，而非抵抗自然；
- 2) 社会经济原则：支持共享经济；
- 3) 形态原则：应致力于打破城市建设中的隔离现状。

### 6.1 环境分区和非正规性规划

在不断发展的城市区域，可以利用移民的农业技能，探索生态化的土地利用和开发战略。通过重新考虑如何对城市边缘较易受灾但价格更低的土地进行利用，并实施环境分区和有针对性的迁移战略，以形成高密度的住宅群，并在其周围建造可淹没的农场和有利于环境健康的生态走廊。基于共享经济的住宅开发模式可以使城市里的乡村移民远离危险的生活环境，住进以水系和本地及区域食物生产系统为核心的新式居住区，共享繁荣。在这一愿景中，整合了食物系统的城市开发模式将有助于促进经济发展和社会融合（图7）。

### 6.2 景观基础设施和可持续垃圾填埋场

菲律宾政府原计划以私人开发模式建造7座人工岛屿，以此为一条新堤基高速公路建设提供资金。该计划不仅会使渔业社区的居民失去生计来源，还可能导致护城河水质严重污染，甚或有毒有害。可以通过设计新

的基础设施来净化污染的水体，并平衡当地和区域水资源利用。通过将岛屿之间的控制区域与现有的河流出口整合形成软性边缘，原计划中的护城河可以转化为一个区域性的雨水滞留和生物修复系统。阶梯式过滤台地可以提供防洪保护，减少内陆洪涝，成为可容纳露天市场的共享公共空间，并改善现有渔业社区的供水情况。在这一愿景中，原本将被正规居住区取代的边缘地带反而将成为将非正规定居点与正规居住区连接起来的桥梁——既是物质空间上的，也是象征意义上的（图8）。

### 6.3 智能基础设施和打破长期存在的阶级边界

将非正规社区的基本服务正规化是消除正规和非正规群体差别的关键环节。新建的市政基础设施框架将服务于所有城市居民，无论他们的生活状况如何。这种多功能基础设施在提供基本服务的同时，也将与非正规社区现有的空间结构相融合，并引入共享电力、管网系统、制冷和社区便利设施，以提升社区应对洪水的韧性，提高可达性，改善健康和状况，降低基建成本，并逐渐打破非正规社区与城市其他区域之间的边界（图9）。

### 6.4 立足本土、面向未来的综合经济模式

根植于当地文化的土地整治措施（例如稻田堤坝）可为当代韧性开发建设所借鉴。为满足21世纪城市的发展需求，可采用本土建筑技术，建造更有包容性的住房、更具生态和经济效益的开放空间，以及共享交通设施，同时也保留了菲律宾当地文化特色，提升了灾害抵御能力。规划部门无力推动现有法规施行的问题说明需要出台新的经济激励措施，通过水与土地之间的生产关系来推动私人开发建设，并缓和正规和非正规社区之间的隔离现象（图10，11）。

## 7 结论

超城市化、非正规化和日益严重的自然灾害交织在一起，吸引了公众的广泛关注



5-1  
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5-2  
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和大量资本注入，也为重新描绘一个更具联系性、适应性、公平性和韧性的城市蓝图提供了机遇。然而，正如不存在一种一劳永逸的韧性策略一样，提升应对气候变化的韧性也不是项目的唯一目标。城市是一系列复杂而缜密的建设活动的集合，如果不协调发展，那么城市空间和场所将为生活在其中的人们带来种种矛盾和冲突，因为它们既是人们社会生活的平台，也是我们与自然联系的载体。在对城市韧性过于简单化的认知中，总强调某一系统——无论是生态学、社会学

还是形态学层面的——比其他的系统更加重要，这必将导致韧性规划的结果在社会包容性和环境响应性等方面存在缺失。

克劳福德·斯坦利·霍林的研究被认为是当代韧性理论的起源，但其研究对象是昆虫群体<sup>[11]</sup>。而城市社区是由更复杂的社会、经济、政治、文化和空间生态系统组成的；当自然灾害的影响波及人类时，我们考虑的不仅仅是基本生存问题，还包括公平、机会和社会福祉等问题。<sup>[12]-[14]</sup>虽然韧性规划在理论上兼顾了生态、社会经济和物质形态的脆

弱性，但在非正规背景下进行的许多所谓的“韧性规划”实践中，更多的是运用高度工程化的解决方案和采取强制性重新安置措施。

爱西姆·伊纳姆在《有意义的城市设计：目的论、催化剂、相关性》一文中将建筑语境下的城市设计描述为“过于渴望非常规和壮观”，并且经常被引导并发展为一种关于审美及形态的、标新立异且肤浅的运动<sup>[15]</sup>。邬建国在《作为城市设计和可持续性基础的生态韧性》一文中对范·德·瑞安著作《生态设计》进行了引述，并指出设计学科大多与自然脱节，且将环境危机视为设计危机：“无论是事物的制造方式、建筑的建造方式，还是景观的使用方式，”我们所运用的模式“皆源于与自然不相容的设计认识论”<sup>[16]</sup>。

伊纳姆等人文主义者批判城市设计对社会问题的漠视，而范·德·瑞安和邬建国等学者则从生态视角出发，批评城市设计中对自然的刻意刻画。将这两种观点结合起来，则可揭示出城市设计中存在的缺陷——无论是理论层面还是实践层面——即，在应对包含复杂性和多重性社会生态问题的城市韧性时，缺乏有效的学科间合作。

对城市韧性和城市设计的交叉领域的探索有助于相关理论和实施层面的推进，将城市韧性的概念从一种观察过程扩展到一种实践行为，并将城市设计的学科领域从一个主要基于建筑的领域扩展到一种旨在平衡人类、自然和空间系统的考量。设计结合自然，而非抵抗自然；打破城市发展中的隔离现状；在城市脆弱人口不断增长的背景下实现社会经济融合，以增强应对韧性，并最终形成崭新的、令人振奋的城市形态。**LAF**

#### 注释

本项目源自于2015年春季麻省理工学院城市研究与规划系和菲律宾大学的合作课程“场地规划”，参与研究的学生包括：阿德里安娜·阿克斯、沙妮卡·赫廷杰、大卫·伊萨克、奥兹·约翰逊、哈雷·路·乔达尔、艾伦·洛弗勒、莉莉·安·珀金斯-海尔、大卫·维加-巴拉霍维茨、吉诺·阿夫雷拉、丹尼斯·迪亚兹、乔安娜·邓卡、格德斯·勒贾登、迪伦·梅尔加佐、格伦·奥顿、布莱恩·萨比多、里奇·图曼比、安路易斯·吉纳维芙·M·卡斯特罗、弗朗西斯·爱迪生·A·科尔普斯、瑞恩·詹姆斯·尼古拉·L·迪桑、小尼卡西奥·B·埃斯皮纳、安吉丽卡·N·弗朗西斯科、约书亚·O·迈瑞波特、特斯·卡兹·S·拉扎；指导教师：玛丽·安妮·奥坎普与斯蒂芬·F·格雷。

- 5-1. 蒙廷卢帕市位于马尼拉大都会区的最南端，毗邻菲律宾最大的淡水湖拉古纳湾。
- 5-2. 世界银行开展的城市非正规规定居点城市升级研究项目对苏卡特、库旁、布里和阿拉邦这4个街区进行了调查。这些街区位于菲律宾国家铁路和拉古纳湾之间，许多ISF依靠捕鱼和铁路服务为生。
6. 关于非正规规定居社区的走访和调查包括：a) 对40名蒙廷卢帕市非正规城市定居者的采访；b) 对利益相关者的走访；c) 由菲律宾大学生和麻省理工学院的研究人员进行个人和小组访谈。图片由2015年麻省理工学院城市研究与规划系开展的“场地规划”课程项目组成员所摄。更多信息请参见注释。

- 5-1. Muntinlupa is the southernmost city in Metro Manila and is adjacent to Laguna de Bay, the largest freshwater lake in the Philippines.
- 5-2. Four barangays investigated for the World Bank's Citywide Development Approach for Informal Settlement Upgrading include Sucat, Cupang, Buli, and Alabang. Located between the Philippine National Railway and Laguna de Bay, many informal settlements rely on fishing and the railway for their economic wellbeing.
6. Engagement with informal settlement communities included: a) Interviews with forty Muntinlupa residents; b) Creating stakeholder interview surveys; c) Individual and group interviews by University of the Philippines students and researchers from MIT. Photos by MIT DUSP studio participants (Site Planning Studio, 2015), for more information refer to end notes.

表1: 2015年非正规城市定居者调查结果  
Table 1: Summary of the 2015 Surveys with Informal Urban Dwellers

一般性假设 Prevailing assumptions	苏卡特 Sucat	布里 Buli	库旁 Cupang	阿拉邦 Alabang	平均值 Averages
1 我可以在家附近购买到商品和食物 I can buy goods and food near my home	5	4.66	5	4.33	4.75
2 我可以步行、骑自行车或乘坐公交前往重要的目的地 I can walk, bike, or take transit to important destinations	5	4.33	5	4	4.58
3 我的孩子可以就近上学 My children are close to their schools	4.66	4.66	5	4	4.58
4 我的生活开支很低 My cost of living is low	4.33	4.33	4	3	3.92
5 我住在父母、兄弟姐妹和孩子等亲人附近 I live near my parents, siblings, children, etc.	3.33	3.33	5	3.33	3.75
6 我远离洪水的威胁 I am safe from flooding	5	4	3	2.33	3.58
7 我可以生活在一个多元化的社区 I can live in a diverse community	2.66	3.33	4.66	2.33	3.25
8 我家附近有公园 There is a park near my house	3	4.33	2	2.66	3.00
9 我可以在任何我喜欢的地方建造房屋 I can build a house wherever I want	3.33	4.33	1.33	2	2.75
10 社区当前面貌符合我的预期 My community is exactly the way it is today	2.33	-	4	2.33	2.17

研究团队于2015年对苏卡特、布里、库旁和阿拉邦4个街区的非正规城市定居者展开调查，请他们对上述因素的重要性进行了评分：评价等级从1分到5分，分值越高，重要性越高。其中，4-5分表示非常重要；3-4表示一般重要；低于3分表示不太重要。

Summary of the 2015 surveys rating importance of pre-selected answers in barangays Sucat, Buli, Cupang, and Alabang. Ratings are on a scale of 1 to 5 (low importance to high importance). 4 - 5 means a high priority; 3 - 4 means a medium priority; and, less than 3 means a low priority.



## 1 Introduction

With the notable uptick of natural disasters impacting densely-populated areas around the globe, attention to the subject of urban resilience has increased among ecologists, engineers, economists, social scientists, and designers. But despite this extraordinary cross-disciplinary interest in a single subject, the resilience discourse has largely remained siloed by discipline. With Metro Manila as a backdrop, this essay addresses gaps in resilience literature and practice by introducing a balanced approach to human, natural, and spatial resilience through socio-ecological urban design. This perspective builds on concepts of resilience that come from both ecology and social science perspectives, and positions urban design (which itself is rooted in the synthesis of architecture, planning, and landscape architecture) as uniquely situated for integrating and operationalizing them.<sup>[1]</sup>

Theoretically, resilience in the urban context relates as much to any one system as it does to the dynamic interplay of multiple systems. In practice, however, focus has tended towards natural systems protection against ecological hazards but failing to distinguish among community-specific vulnerabilities related to equity, access, social justice, and precarity. This points to two critical concerns: first, it situates natural hazards as the vulnerabilities most worthy of our attention; second, it presumes that pre-hazard conditions are preferred in every community.

Distinct from the concept of sustainability which assesses a system's capacity to persist over time, resilience is a value-based proposition which requires acknowledging that not every future scenario is ideal (or even possible). Deciding what is right, best, or worth sustaining requires asking questions like "resilience for whom and from what to what?" and working with a fully integrated

cross-systems perspective.<sup>[2]</sup> Ecologists tend to measure resilience with place-based metrics related to nature. For social scientists, sector-specific metrics related to people more often take priority. While both considerations are necessary, neither alone is sufficient, especially in contexts where natural hazards directly and disproportionately impact socially and spatio-economically vulnerable communities.

This essay introduces a socio-ecological urban design concept of resilience, defined here as: The ability for overlapping place-based and sector-specific networks, systems, and communities that operate across temporal and spatial scales to anticipate and absorb disturbances such that they can transition into more socially, ecologically, and spatially equitable states.

The concept is empirically grounded in historical research, directed field studies, policy evaluations, and interviews with Informal Settler Families (ISFs) living in Metro Manila. Sector-specific vulnerabilities refer to the socio-economic stressors on ISFs including network fragility, land insecurity, and social and economic isolation. Place-based vulnerabilities which traditionally refer to ecological environmental hazards such as earthquakes, volcanoes, typhoons, tsunamis, and regular flooding, are expanded by this approach to include spatial liabilities often characterized by chaotic patchworks of socially and spatially exclusive developments (Fig. 2).

## 2 The Case for Metro Manila: Making a Dual City

The geographic location of the Philippines places this archipelago nation within one of four “global hotspots for a high disaster risk... [where] a high level of exposure to natural hazards coincides with very vulnerable societies.”<sup>[3]</sup> For those living in a country defined by 36,289 kilometers of coastline and an intricate network of

streams, rivers, and lakes, the urban poor are the most susceptible to, and least protected from the impacts of recurring and intensifying flooding. In this context, urban resilience accounts for dynamic water-land interfaces, socio-economic delineations, and spatial distinctions between the formal and informal city (Fig. 3).

Metro Manila’s urban landscape is defined by scattershot developments, and expressed in dialectics of rich and poor, slum and subdivision, formal and informal, exclusive and accessible — pushing the urban poor to the edges of mainstream urban domestic and civic life. These socio-

spatial separations can be traced back to Spanish colonization — In the 16th century, the Spanish established Intramuros, the colonial capital for the Philippines. Although informal settlements did not exist as they do today, there were still clear and deliberate physical, social, and class distinctions between the Spanish elite living “inside the city walls” and the Chinese, Japanese, and Filipinos of Extramuros (arrabales) living “outside the city walls.”<sup>[4]</sup> Spatial distinctions were replaced by spatio-economic separations that continued during the 20th century American occupation and persist today in more recent Filipino-directed urban

表2: 项目中运用的韧性策略  
Table 2: Resilient Strategies Summary

尺度 Scale	策略 Strategy	社会生态城市设计 Socio-Ecological Urban Design		
		形态环境 Morphological-Environmental	社会经济 Socio-Economic	生态环境 Ecological-Environmental
社区尺度 Neighborhood	策略1: 建设智能基础设施, 打破长期存在的阶级边界 Strategy 1: Intelligent infrastructure addressing permanent temporariness	共享基础设施及便利设施 Shared infrastructure and amenities	ISF可便利地使用现有资源网络 ISFs maintain proximity to existing networks	易于维护且尽量避免污染的集中式防洪基础设施 Centralized flood-resistant infrastructure, easy maintenance, and reduced exposure to pollution
行政区尺度 District	策略2: 连通社区, 将低收入群体迁入地势更高的区域 Strategy 2: Connected communities with higher ground for lower income	由私人开发的临时性紧急疏散区域 Temporary emergency evacuation areas through private sector incentives	ISF可以享用公共交通设施和就地教育/职业培训设施 ISFs maintain access to public transport and on-site educational / vocational facilities	在新城市建设区域的蓄洪区中运用透水铺装 Pervious surfaces policy for stormwater recharge areas in new developments
城市及地域尺度 City, Region	策略3: 景观基础设施和可持续垃圾填埋场 Strategy 3: Landscape infrastructure and sustainable landfill	利用堤基高速公路建立一个生物治理池 A bio-remediation pond is created by the dike expressway	当地渔民可以继续继续在湖边生产作业, 并建立兼容正规与非正规经济的发展模式 Local fisherfolk retain lake access, maintain, and share spaces that connect formal and informal economies	修复健康的水利系统, 引导水流, 减少洪涝与雨洪污染 Restore healthy hydrological systems, align developments to directional water flow, reducing floods and stormwater contamination
城市及地域尺度 City, Region	策略4: 非正规规定居点环境区划与规划 Strategy 4: Environmental zoning and planned informality	建设包容式开发组团, 以降低生态足迹 Inclusive development clusters minimize ecological footprint	鼓励城市中农村移民的农业技能发展, 降低食物和交通成本, 保障当地与地域性需求 Capitalize on agricultural expertise of rural-urban migrants, reducing food production and transport costs and supporting local and regional demands	权利转让, 通过开发整合雨洪管理、开放空间、农业及建成区域的生态敏感性组团来保护未充分利用地区 Assigns value and protects underutilized land through ecologically sensitive development clusters, integrating stormwater, open space, agriculture, and built space
城市及地域尺度 City, Region	策略5: 立足本土、面向未来的综合经济模式 Strategy 5: Integrated economies towards a future vernacular	依照当地水稻种植要求改良土地 Land-making strategy with principles from indigenous rice paddy dike land-making (pitapil)	ISF可以继续继续在湖边生产作业, 并有参与正规经济模式中 ISFs retain lake access, maintain livelihoods, and have opportunities to participate in the formal economy	水敏感性开发格局整合了雨洪管理、开放空间、水产养殖区及建成区域 Hydrologically sensitive development patterns integrate stormwater, open space, aquaculture, and built space

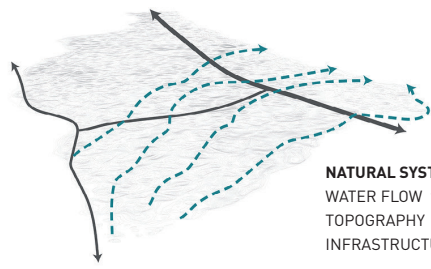
projects.<sup>[5]</sup>

Although they may be more discreet, the divisive edges of contemporary Metro Manila are no less pernicious. Post-World War II private development produced securitized islands in the form of gated communities walled off from the greater metropolis and designed to limit access and flows. With demands for private housing and exclusive malls outpacing the public expansion of infrastructures and services to support them, an increasing area of the city is characterized by a “network of elite spaces, with proliferating citadels linked to spaces of elite consumption through toll-highways and flyovers, equipped with high-technology telecommunications, as well as power and water infrastructures, that hardly extend into the public city”<sup>[6]</sup>.

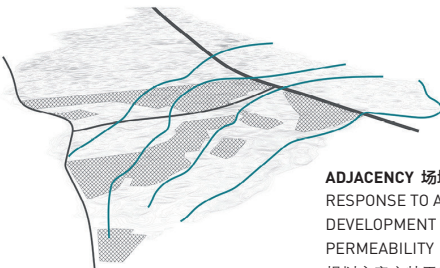
### 3 Living on the Edge

Until the latter half of the 20th century, the vast majority of Filipinos lived in rural areas, but from 1975 to 2010 the population of Metro Manila ballooned from 5 million to nearly 12 million. This dramatic rate of growth contributed to approximately 3 million informal urban dwellers (600,000 ISFs) living in the metropolis today<sup>[7]</sup>. Many of these migrants were attracted by opportunities to make higher-wages, but they arrived with limited education, training or support to transfer their agricultural skills into higher-paying jobs and were relegated to the edges of a geographically sprawling incarnation of the Intramuros-Extramuros dyad with high exposure to flooding and limited access to even basic services<sup>[8]</sup> (Fig. 2).

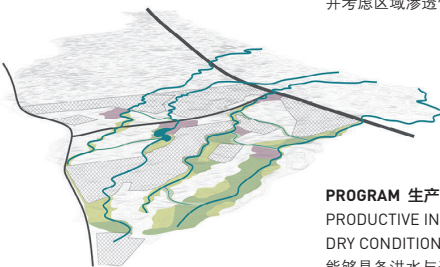
The World Bank classifies ISFs in three categories: 1) those living on government land; 2) those living on private land and in threat of eviction; and 3) those living in danger zones.<sup>[8]</sup> In 2014, approximately 18 percent of the 600,000 ISFs in Metro Manila were living without legal claim and in primarily high-risk areas (Fig. 3). There are



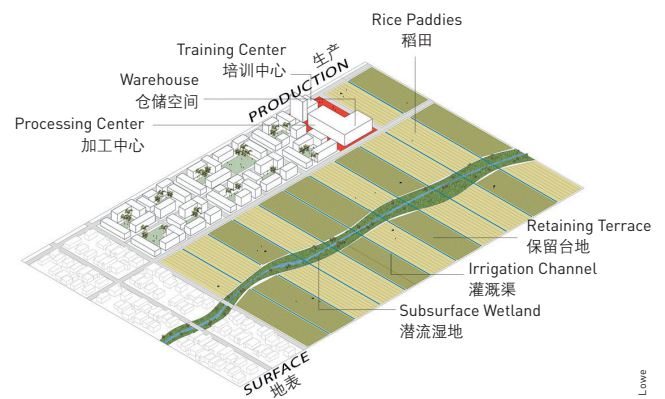
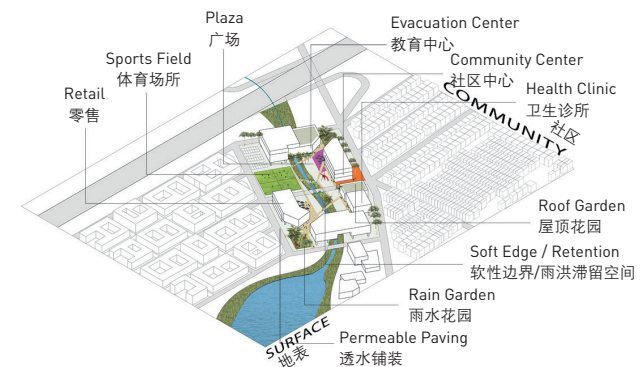
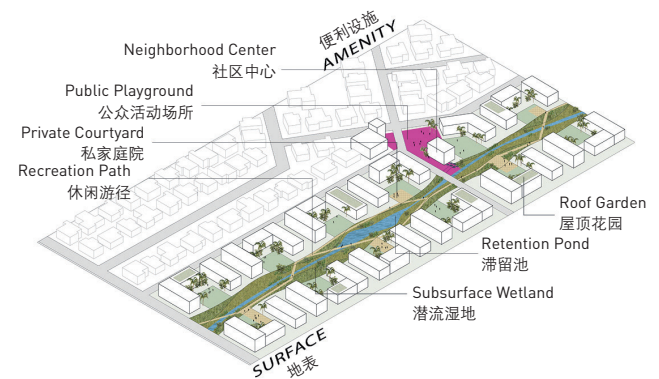
**NATURAL SYSTEMS 自然系统**  
WATER FLOW 河流走向  
TOPOGRAPHY 地形  
INFRASTRUCTURE 基础设施



**ADJACENCY 场地分析**  
RESPONSE TO ADJACENT  
DEVELOPMENT LEVELS +  
PERMEABILITY  
规划方案应基于当地发展水平，  
并考虑区域渗透性

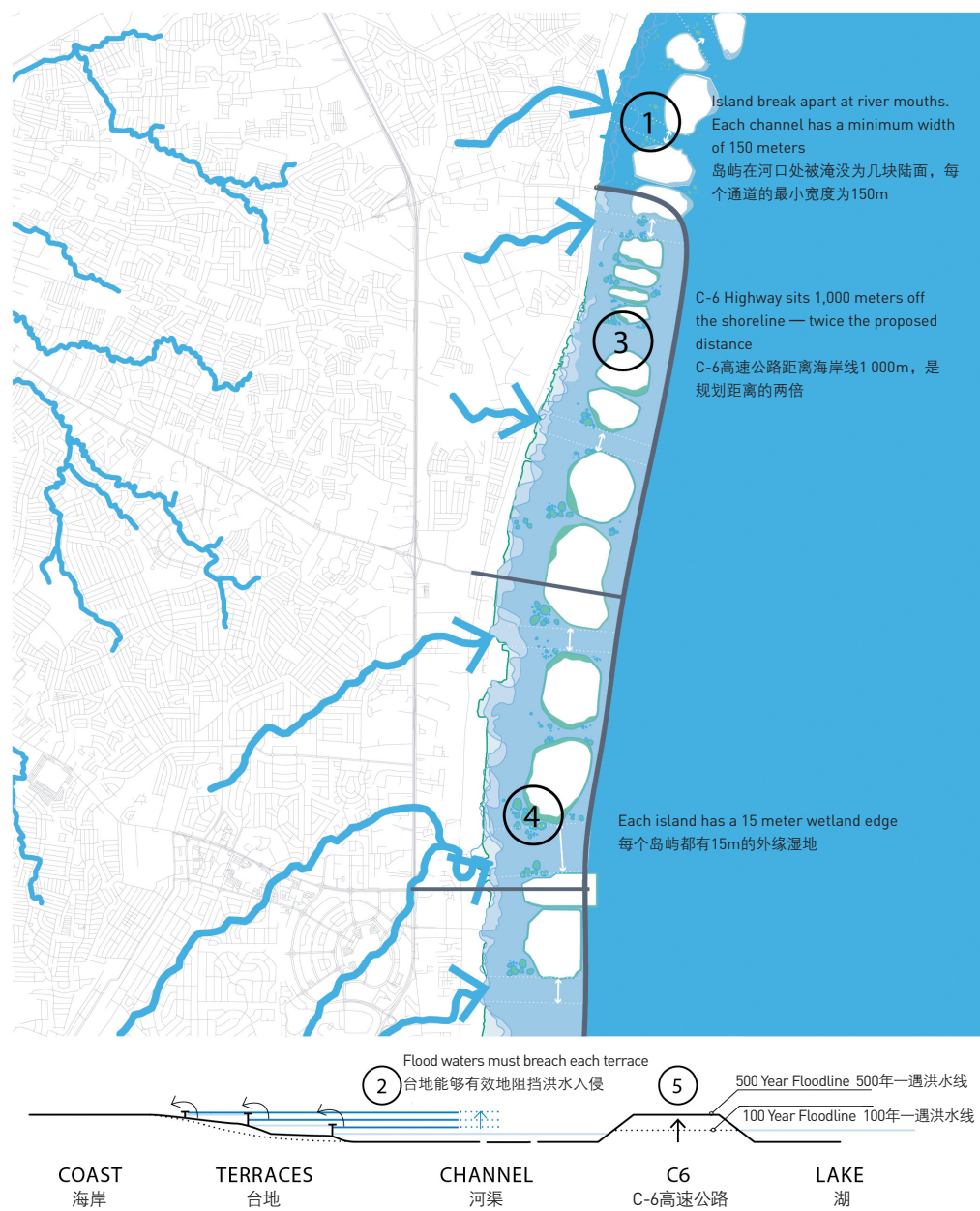


**PROGRAM 生产生活**  
PRODUCTIVE IN BOTH FLOOD +  
DRY CONDITIONS  
能够具备洪水与干旱适应性



- 7. 环境分区与土地利用规划
- 7. Environmental zoning and land use

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six typical informal settlement typologies in Metro Manila, including the following:

- 1) Coastal or lakeshore settlements (Tabing-Dagat): Water-based settlements for rice farmers, fisherfolk, or fish harvesters who rely on water for their livelihoods and are often subject to the most intense flooding.
- 2) Esteros and riverbank settlements

(Tabing-Ilog): Settlements along estereros (estuaries or creeks) and riverbanks occur within the 10 meter easement along major waterways where development can constrain the flow and capacity of water during heavy rains and expose residents to regular flooding.<sup>[9]</sup>

- 3) Vacant land and railway settlements (Along the riles): Settlements on land

that is either held by absentee landlords, earmarked for future uses, or located along rail rights-of-way.

4) Looban or inner block settlements: In dense areas, settlements which crowd in the inner courtyards of urban blocks, invisible from the street and only accessible through narrow lanes and passageways.

5) Gillages or settlements near exclusive villages: After the 1920s, gillages (from the colloquial merger of the words “gilid” meaning “side,” and village) collocated alongside elite suburban villages to provide domestic services.<sup>[9]</sup>

6) Barangay Basur or settlements near the dump: Over 6,000 tons of garbage is produced in Metro Manila every day, attracting informal residents for scavenging and recycling.<sup>[9]</sup>

#### 4 The Challenge of Resilience through Resettlement

Cities are only as resilient as their most vulnerable citizens, and in Metro Manila the most vulnerable citizens are the urban poor who occupy the social and spatial edges of society — living between development and infrastructure, or along rail lines, riverbeds, easements, or flood zones.<sup>[8]</sup> In 2009, the Philippines became a global leader for resilience and climate change policy, establishing the Climate Change Commission and Climate Change Act.<sup>[10]</sup>

Despite acknowledging the interconnectedness of human and natural ecosystems, many government programs continued to emphasize out-of-city relocation. Prior to 2011, programs that aimed to reduce the prevalence of informality in Metro Manila relocated poor communities away from hazardous areas in the city to outskirts where land was cheaper and more readily available. Families were moved, often without meaningful engagement, leading many to experience predictably unsustainable mortgage debt,

8. 景观基础设施和可持续垃圾填埋场
9. 建设智能基础设施，打破长期存在的阶级边界。
8. Landscape infrastructure and sustainable landfill
9. Intelligent infrastructure: addressing permanent temporariness.





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- 10. 将经济模式与规划中的非正规规定居点相结合
- 11. 立足本土、面向未来的综合经济模式
- 10. Integrated economies and planned informality
- 11. Towards a future vernacular

compared to network concerns; 3) Flooding: Very few interviewees described flooding as more than a nuisance.

Findings revealed that while many were affected by regular flooding and issues of housing security, these were not necessarily the deciding factors when determining where to live. Many interviewees said that they worked in or near their homes to reduce travel times and costs, and to spend more of their time close to families, friends, and community networks. Most striking, however, were their relatively understated concerns about housing and flooding. While respondents described regular flooding as a nuisance, they consistently ranked higher the importance of living in proximity to community networks and employment.

Informal fishing communities form along the edges of water bodies, supporting local livelihoods and reducing the cost of food, but increasing exposure to regular and recurring flooding. Polluted water can take as long as six months to completely recede, and lakeshore communities also face ongoing threats of displacement from development pressure and growth. Here, the barriers to resilience are: 1) mismatch of skillsets (often agrarian), 2) high cost of food (often greater than 60 percent of household income), and 3) unsafe and unaffordable housing (with threat of displacement).

Based on conservative 2011 Philippine census estimates for Muntinlupa City, at least half of residents lack refrigerators, stoves, clean water, and other basic household amenities. The poorest 15 percent of residents also lack flushing toilets and adequate trash collection services. Integrating formal and informal economies would dramatically improve the lives of the urban poor who rely on proximity and access to employment, transportations, and support networks for their livelihoods. Here, the barriers to resilience are: 1) continuous influx of rural migrants, 2) relocation strategies that disconnect families from their social

and economic networks, 3) lack of basic household utilities and amenities, and 4) insufficient public resources to address issues related informality.

The accelerating pace of economic growth and urbanization has resulted in protracted spatio-economic inequities, limiting broad access to housing and transportation, increasing exposure to environmental deterioration, and expanding the prevalence of informal settlements. This has created urban environments that are more physically and socially disconnected as well as more susceptible to ecological hazards. Here, the barriers to resilience are: 1) socially, economically, and spatially siloed communities, 2) unenforced zoning regulations and uncontrolled development patterns, 3) uncoordinated political decision-making, and 4) development that ignores nature.

## 6 Resilient Imaginaries

Responding to stakeholder interviews and vulnerabilities assessments, our research team developed and illustrated three principles of urban resilience (“resilient imaginaries”) that operate across scales, time, and disciplinary boundaries (Table 2). While the principles are contextually specific, they are intended to be broadly applicable to achieving more socially, ecologically, spatially, and equitably resilient cities. Principles are as follows:

- 1) Ecological environmental principle: Design with nature, not against it;
- 2) Socio-economic principle: Support a shared economy;
- 3) Morphological principle: Break down development silos.

### 6.1 Environmental Zoning and Planned Informality

Growing urban areas have opportunities to explore ecologically-based land-use and development strategies that take advantage

of the agricultural skills of migrants. By rethinking the use of wetter, cheaper land at the edges of the city, environmental zoning and targeted migration strategies can create dense development clusters surrounded by floodable farms and ecological corridors that support environmental health. A shared economic approach to development can divert rural-urban migrants away from the hazardous living environments and towards new developments with shared prosperity, organized around water flows and local and regional food production. In this scenario, developments with integrated food systems support economic productivity and social inclusion (Fig. 7).

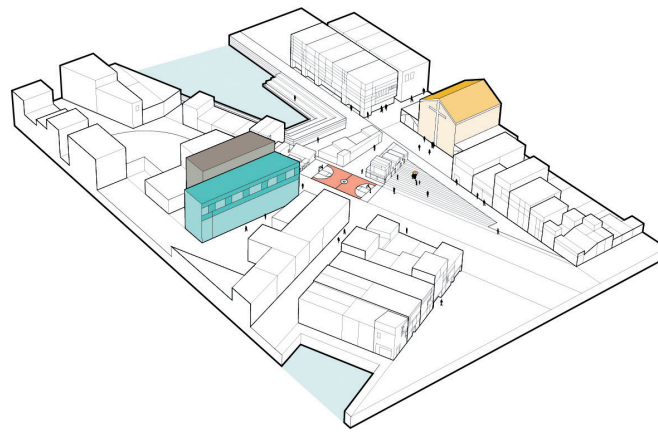
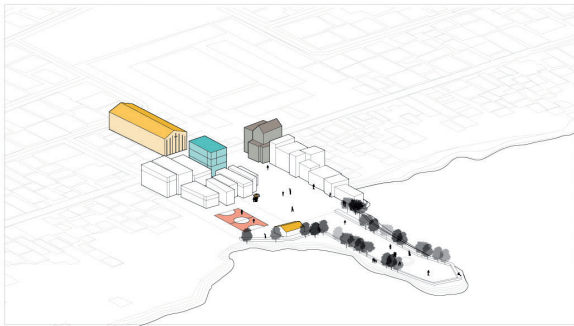
### 6.2 Landscape Infrastructure and Sustainable Landfill

The national government’s plan to finance the construction of a new dike expressway through the private development of seven manmade islands will not only disconnect fishing communities from their livelihoods, but also create a giant moat in an area with toxic water. With a more balanced response to local and regional flows, new infrastructure can be designed to clean up the polluted water. By aligning controlled areas between islands with existing stream outlets and creating “soft” edges, a moat can instead become a regional stormwater retention and bioremediation system. Stepped filtration terraces provide flood protection against breach, reduce inland flooding, become platforms for shared public spaces with open air markets, and improve water access for existing fishing communities. In this scenario, edges become literal and figurative bridges between the informal fishing villages and the formal development which would otherwise displace them (Fig. 8).

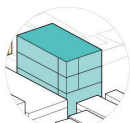
### 6.3 Intelligent Infrastructure and Addressing Permanent Impermanence

Formalizing basic services for informal

PEOPLE'S PARK  
人民公园



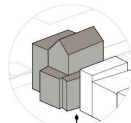
CHURCH  
教堂



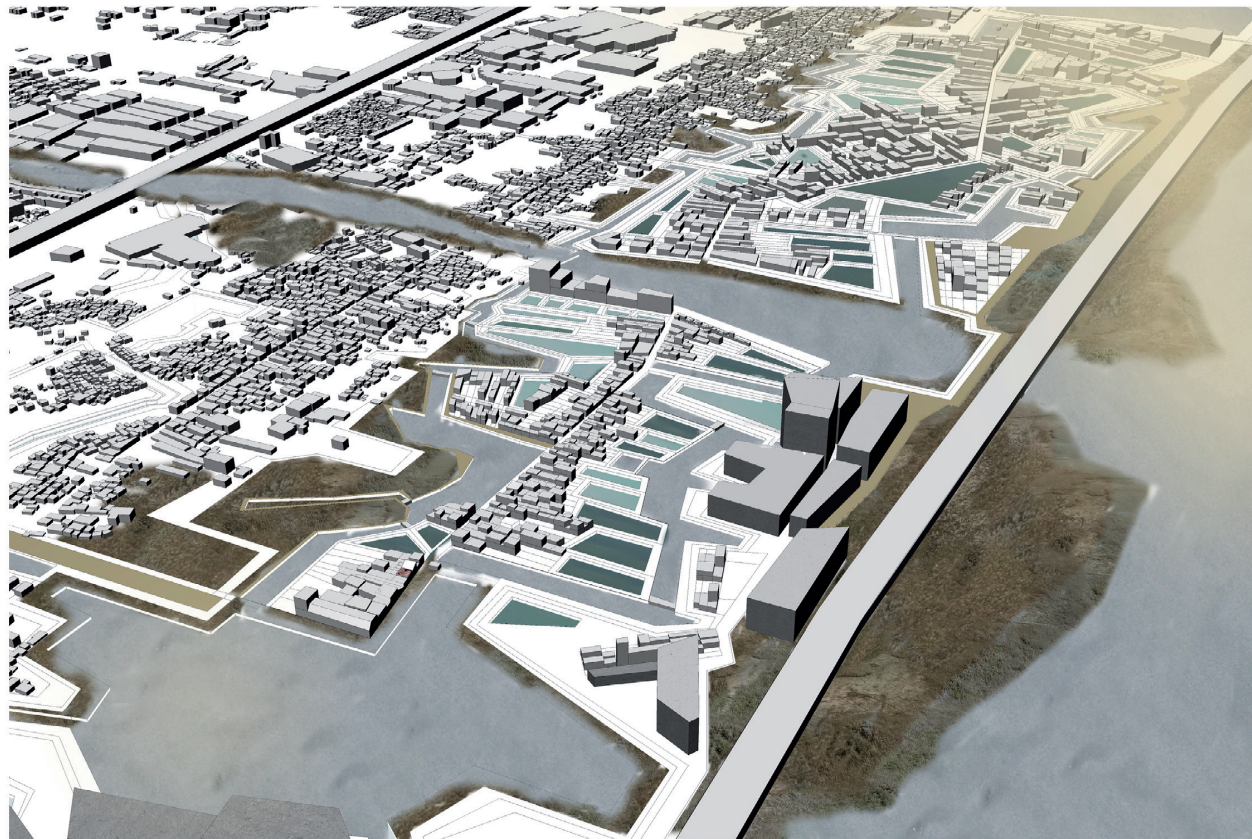
HEALTH CENTER  
健康中心



BASKETBALL COURT  
篮球场



BARANGAY HALL  
村民议事厅



communities is a critical step to blurring distinctions between formal and informal sectors. A new infrastructural civic spine can support a healthy and fulfilling future for all residents, regardless of their living situation. This multifunctional infrastructure introduces basic services, aligning them with existing spatial logics of informal communities and introducing shared power, plumbing, refrigeration, and community amenities that reduce vulnerability to flooding, enhance access, improve health and safety, reduce capital costs, and blur the lines between informal neighborhoods and the rest of the city (Fig. 9).

#### 6.4 Integrated Economies towards a Future Vernacular

Culturally rooted land-making practices such as the pilapil (rice paddy dike) can inform more resilient contemporary developments. Adapting indigenous construction techniques to meet the needs of 21st century cities can create more inclusive housing, ecologically and economically performative open spaces, and shared mobility options, all while remaining authentic to Filipino culture and resilient to Filipino hazards. The inability for planning departments to enforce existing regulations suggests a need for new economic incentives to promote private development with productive relationships between water and land and blur separations between formal and informal communities (Fig. 10, 11).

#### 7 Conclusion

The coincidence of hyper-urbanization, informality, and increasingly severe natural disruptions has drawn broad public attention, triggered the release of large injections of capital, and presents the opportunity (and urgency) to reimagine cities as more connected, adaptive, equitable, and resilient. But just as no single strategy can be a silver bullet for resilience, solving for climate

change-related vulnerabilities cannot be our only measure for success. Cities are assemblages of deliberate, if uncoordinated, spaces and places embedded with the complexities and contradictions of the communities that occupy them. They serve as both platforms for and expressions of the social life of people and our relationship with nature. Overly simplistic definitions of urban resilience which emphasize one system over another — be it ecological, sociological, or morphological — will inevitably fall short of achieving a state of resilience that is both socially inclusive and environmentally responsive.

Crawford Stanley Holling's research is cited as the origin of contemporary resilience theory, but it was developed by observing communities of insects<sup>[11]</sup>. Urban communities are made up of far more complex social, economic, political, cultural, and spatial ecosystems; and when the impacts of natural hazards involve humans, the metrics for success expand beyond basic survival to include issues of equity, opportunity, and general well-being.<sup>[12]-[14]</sup> While resilience planning theoretically balances consideration for ecological, socio-economic, and morphological vulnerabilities, in practice many so-called "resilience planning" efforts in informal contexts more commonly resort to a combination of protection through highly engineered solutions and retreat by mandatory resettlement.

In Aseem Inam's paper "Meaningful Urban Design: Teleological / Catalytic / Relevant," Inam describes urban design in the architectural tradition as having "an over eagerness to be unconventional and spectacular" and that it is often taught and practiced as an aesthetic, morphological, novel, and superficial exercise<sup>[15]</sup>. Wu Jianguo's paper "Ecological Resilience as a Foundation for Urban Design and Sustainability" references Van der Ryn's book *Ecological Design* where he

characterizes the design disciplines as being mostly disconnected from nature, describing the environmental crisis as a design crisis; "a consequence of how things are made, buildings are constructed and landscapes are used"; that our modes of building are "derived from design epistemologies incompatible with nature's own".<sup>[16]</sup>

Humanist critiques of urban design such as Inam's call for greater emphasis on social issues, while ecologically-based critiques such as Van der Ryn's and Wu's argue for a more deliberate foregrounding of nature in the design of cities. When taken together, they expose deficiencies in urban design — as currently understood and practiced — to effectively take on the complex and overlapping socio-ecological challenges of urban resilience discussed by other disciplines.

Exploring the intersectionality of urban resilience and urban design presents an opportunity to intellectually and operationally advance both, extending the concept of urban resilience from one of observation to one of action and expanding the disciplinary domain of urban design from one based primarily in architecture to one that balances considerations for human, natural, and spatial systems. Designing with nature, not against it; breaking down development silos; and supporting the socio-economic integration of growing and increasingly vulnerable urban populations, can reduce vulnerability, increase resilience, and ultimately result in new and exciting forms of urbanity. **LAF**

#### NOTE

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