

## 在水体中/截获水分： 在中国山西省的采矿景观中创造雨

# IN-BETWEEN WATERS / INTERCEPTING WETNESS: INVENTING RAIN IN THE MINING LANDSCAPE OF SHANXI PROVINCE, CHINA

### 1 两个看似截然不同的采矿景观中的共通性

整个项目起源于笔者对两种看似截然不同的景观——印度西高止山脉和中国山西省皆因采矿作业而导致的旱涝问题的关注。印度西高止山脉绵延1 500km，每当夏季来临、地表升温时，山上的水便开始奔流不息。由于季风带来的剧烈降雨和大量地表开采造成的森林覆被缺失，西高止山面临着“水量过剩”和洪涝的挑战。与此同时，中国山西省却因地下采矿作业而面临着“水量短缺”的干旱困境。这引发了笔者对山西省的可持续城镇化和发展模式多元化的思考。

虽然西高止山脉和山西省这两种景观的条件看似完全不同，但实际上它们具有两点共通之处。

其一，两个地区都通过建造大型水利基础设施来进行洪涝和旱灾防控，但事实上，这些设施也在源源不断地为采矿作业供水。例如，自“十二五”规划发布以来，山西斥巨资建设的一项跨流域输水基础设施工程——“两纵十横”大水网。然而项目研究发现，这种工程化基础设施在治理自然灾害时稍显不足，也无法充分利用生态修复来进行可持续水管理。

笔者认为，无论是为满足人类所需的电力和自然资源而利用水的方式，还是为预防因人类发展所造成的旱涝问题而治理水的方式（如筑堤坝、修水库），看似清晰地说明了怎样“处理”水，但实则这两种解决“问题”的方式本身即存在问题。

其二，虽然存在地理分隔，但这两个地区隔着喜马拉雅山脉和青藏高原通过季风雨紧密相联。这一发现构建起了关于水文地理的新的

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#### 摘要

在利用各种大型工程手段（如建立水库和跨流域输水基础设施工程）来解决中国山西省和印度西高止山脉分别因开采煤矿和有色金属而导致的干旱和洪涝问题的背景下，作者对雨洪问题的产生进行了全面的分析思考，并提倡“雨”先于“洪”、“流”后于“域”的水资源管理方法。多数大型工程类基础设施在解决水问题时的基本理念是将水从其所在的自然环境中抽离，因而水成为了各种被管道、水渠和水库限制住的流体。为了补偿现有水利基础设施的不足，笔者建议汇聚整个地域的景观潜力来塑造具有韧性的“水分”以应对极端“水”问题。这是一种从将水作为单一孤立问题去解决的工程方法，向以探索更多机遇为目标的景观方法的根本性转变。

本文介绍的景观研究和设计项目意在为看似“干旱”和发展模式单一的山西省构建另一种可能的未来。项目的研究设计跨越4个嵌套的尺度，以一种用于截获水分的新的景观基础设施作为脉络基底，促发了生态、活动、时间、物质等事物演变的轨迹。值得一提的是，项目还展现了研究、表达、设计和规划如何互相引导。设计改善了环境，且其自身也在不断接受和适应环境的变化。

#### 关键词

采矿景观；干旱；流域管理；景观基础设施；水分；剖面表达

#### ABSTRACT

Under the background of imposing engineered structures, including reservoirs and inter-basin water transfer infrastructures, being applied to solve drought caused by coal mining in Shanxi Province of China and floods caused by mineral mining in Western Ghats of India, the author reviews the intrinsic reason of water problems and recommends a water management solution that is design on "rain before floods" and "fields of wetness before flows of water." Most magnificent engineered infrastructures are designed upon an idea of separating water from its milieu, thus becoming contained flows in pipes, channels, and reservoirs to solve water problems. To compensate for the shortage of existing water infrastructures, the author suggests gathering a regional-level landscape capacity for building "wetness" of resilience when facing problems of "water" in extremities. This is a radical shift compared with a problem-solving approach, as engineering does, to one that is grounded in landscape and uncovers opportunities.

The landscape research and design project introduced in this article aims to provide an alternative future for Shanxi Province, China, which seems arid and is challenged by mono-development mode. The research and design within the project are across four nested scales. A landscape infrastructure of intercepting wetness is taken as an underlying thread which initiates intertwined ecological, programmatic, temporal and material trajectories. On the other hand, the project demonstrates research, representation, design, and planning can actually inform one another, and the design remains open and adaptive to its changing environments.

#### KEYWORDS

Mining Landscape; Drought; Watershed Management; Landscape Infrastructure; Wetness; Sectional Representation

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想象——任何一种物质都含有一定水分。雨为西高止山脉赋予更多水分，却在山西有所减少。受这一共通点的启发，笔者认为，与其简单地用“干旱”（水的一种极端）定义山西、“潮湿”（水的另一种极端）定义西高止山脉，更应设计另一种抗旱排涝的水利基础设施，这种基础设施将两个不同的地域视作一个水分有所不同的连续的景观。因此，项目建议汇聚整个地域的景观潜力来塑造具有韧性的“水分”以应对极端“水”问题。这是一种从将水作为单一孤立问题去解决的工程方法，向以探索更多机遇为目标的景观方法的根本性转变。

作为一项长达一年半的景观研究和设计项目的最后一部分，“在水体中/截获水分：在中国山西省的采矿景观中创造雨”项目提出了一个关键性的问题：如何在水被水库、筑堤河道、城市排水管网和采矿井限制在固定空间之前，依托自然降雨创造水分。因此，项目以山西

复杂的采矿景观为背景，在那些仅看到水匮乏/干旱或水过剩/洪涝的表象的地方截获和创造水分，并期待以此为景观设计解决方案贡献思路。

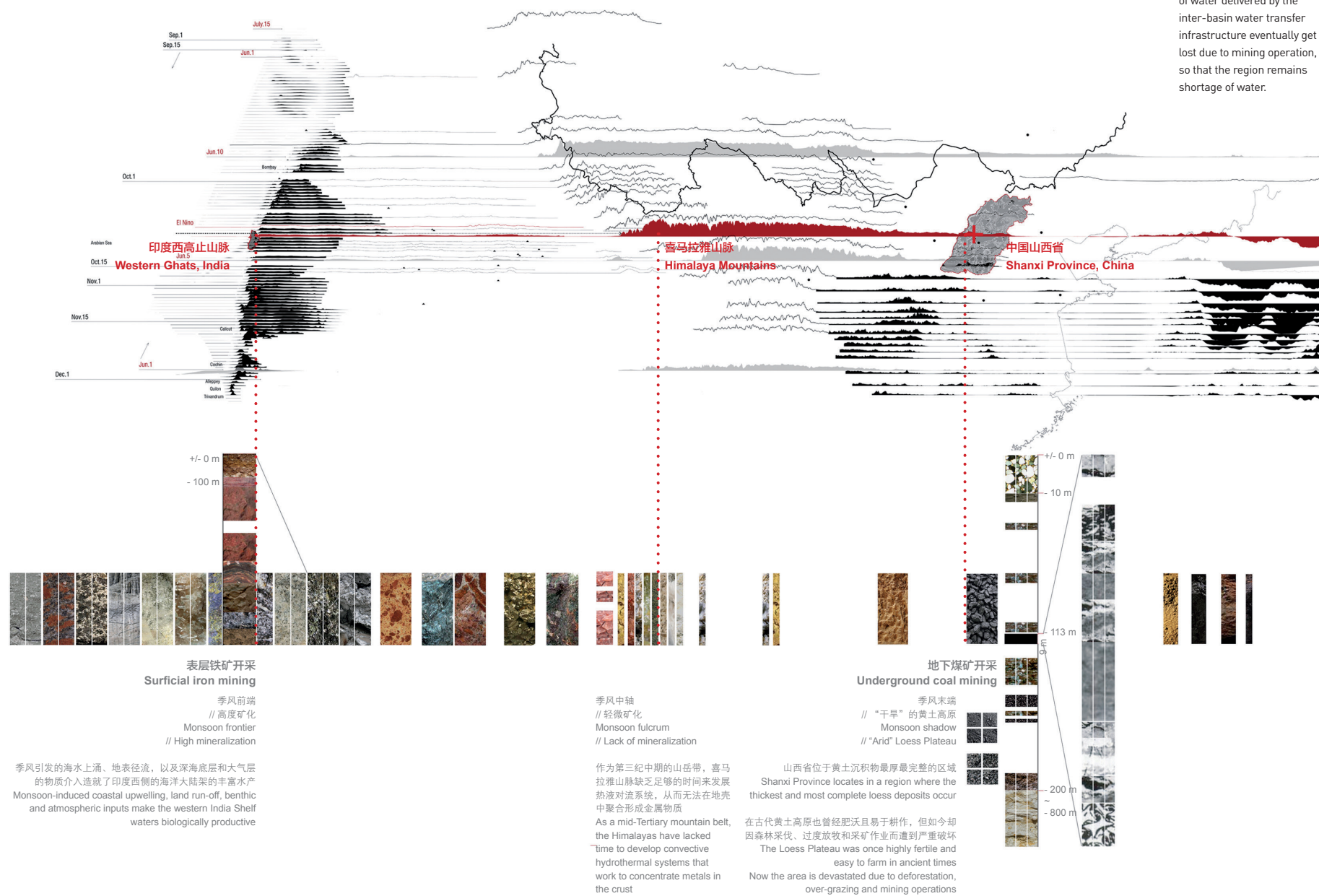
## 2 4个嵌套的尺度

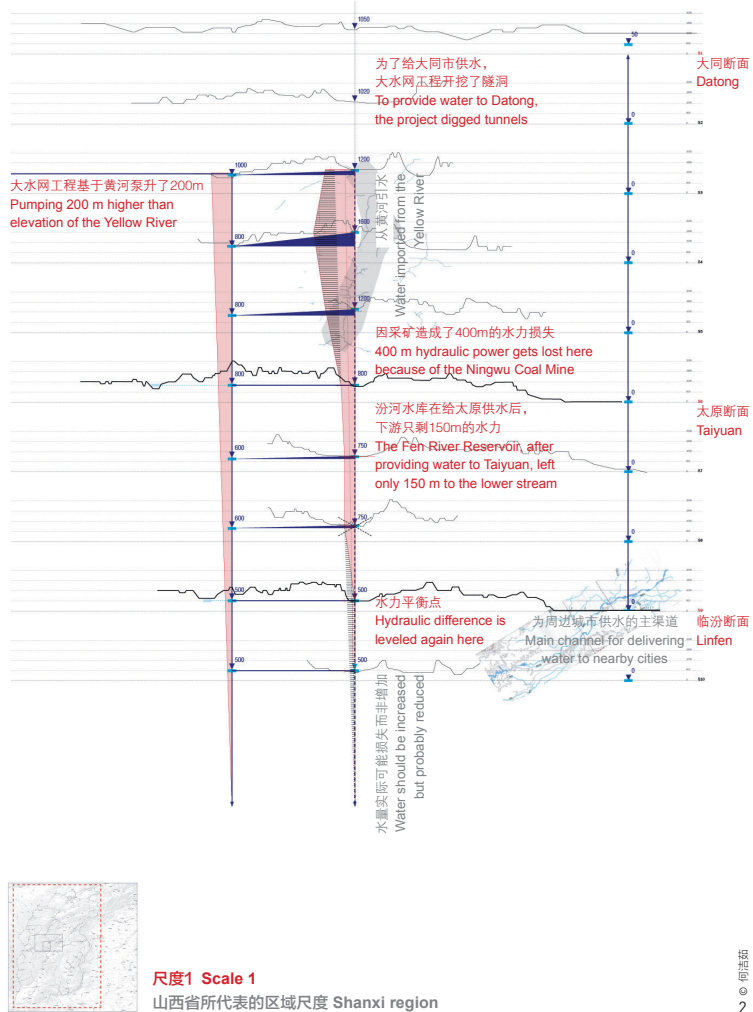
遵循水分变化这一逻辑，笔者在中国的实地考察沿着汾河从北至南跨越山西省，并陆续通过了大同断面、太原—古交断面以及临汾—黄河断面。实地考察促进了连续的策略性剖面的构建，并为选择设计介入的位置提供了建议。

基于实地考察和循序渐进的研究，项目探索和检验了4个尺度来介入干预策略——山西省所代表的区域尺度、太原市-古交市所代表的市域尺度、原平河所代表的景观基础设施尺度和现有采矿区所代表的场

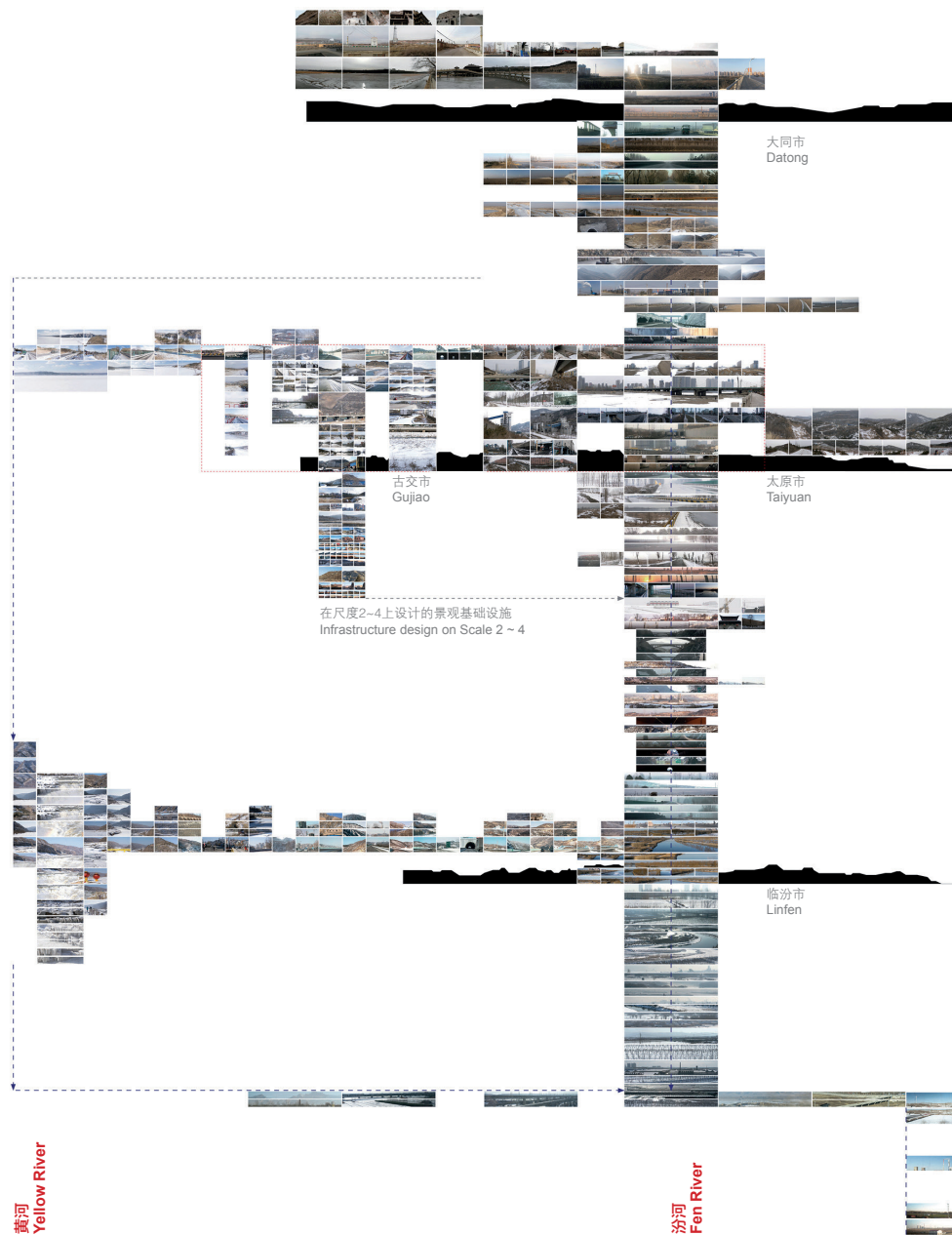
1. 西高止山脉和山西的对比研究为山西未来的水资源设计指明了出路——即刻利用景观基础设施维持山西的湿度水平以减缓干旱。
2. 跨区域剖面图：采矿作业使得跨流域输水基础设施工程中传输的水体大量损失，因此整个区域仍面临着缺水的困境。

1. The Western Ghats-Shanxi comparative study sheds light on the design of an alternative "water" future of Shanxi, namely the immediate deployment of a landscape infrastructure to sustain a preferred level of wetness for drought mitigation.
2. The sectional diagram of the region: large amounts of water delivered by the inter-basin water transfer infrastructure eventually get lost due to mining operation, so that the region remains shortage of water.





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- 以汾河为南北向纵轴并切入三个横轴的照片实地拍摄及整理工作展现了区域内潜藏的水分。
- Photowork depicting embedded wetness is structured as the Fen River on vertical north-south direction as the major spine and three transects on horizontal west-east direction.

地尺度。不同于任意选择一个边界来进行设计，这4个尺度呈现层层嵌套的紧密关联。通过调查和绘制出不同功用的集中水源及区域实际潜藏的水分，可以准确发现问题所在，从而推导出下一个需要设计的尺度。也就是说，由于在项目伊始就奠定了这种内在关系，因此在任何一个尺度上的设计都将充分反馈到其他尺度。

### 3 剖面研究

项目基于笔者在科学、工程、艺术、设计等不同领域进行的广泛的综合性探索。在该项目中，笔者没有采用线性单一的调研及干预过

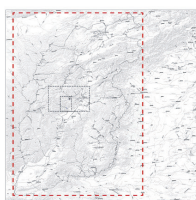
程，而是展示了实地考察、已有的数据资料、研究、绘图表达、设计和规划如何协同发挥作用。

作为研究的主要工具，多个连续剖面在研究与设计之间架设起新的桥梁，并由此揭示出地下与地上系统之间、基础设施与其环境之间的联系。不同于仅通过一条剖切线分隔出地下和地上的常规的剖面图绘制方法，项目展示了另类的绘制方法——阴影法和颠倒填充法。该项目应用这些方法来表现水分，不仅仅是为了提高图面的美观度，也是为了推动研究和设计决策的进行。

在研究阶段，通过构建以一条特定河流为基准的多个连续剖面，并将剖面 and 已有的科学数据进行综合考量，笔者发现高海拔山地的地

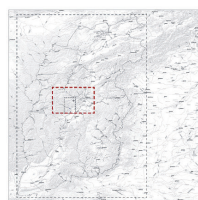
尺度1  
Scale 1

山西省所代表的区域尺度  
Shanxi region



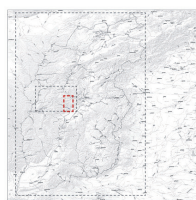
尺度2  
Scale 2

太原市-古交市所代表的市域尺度  
Taiyuan-Gujiao city



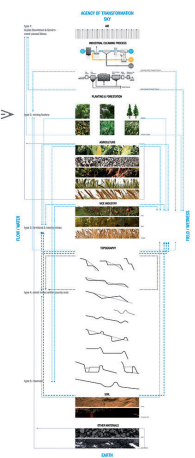
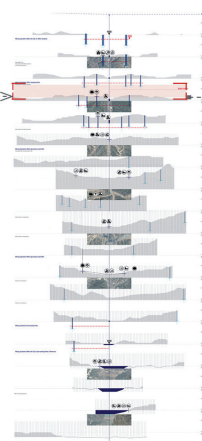
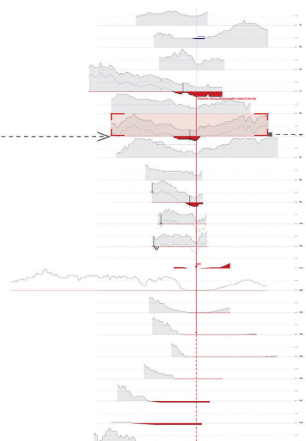
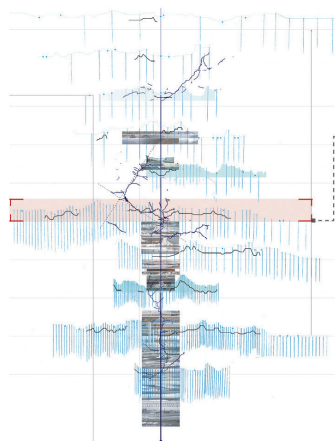
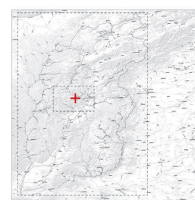
尺度3  
Scale 3

原平河所代表的协同性景观基础设施尺度  
Synergized landscape infrastructure  
along the Yuanping River



尺度4  
Scale 4

现有采矿区所代表的场地尺度  
Small interventions on existing mining area



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4. 嵌套尺度关系图：研究和表达成为了寻找下一设计尺度的方式，同时项目展现了研究、表达、设计和规划的内在联结。
5. 因采矿作业导致的水患而相互关联：当采矿作业导致上游地下水层缺水时，下游的城市和乡镇将面临洪涝和干旱的双重威胁。
4. Scalar relationship of the project: research and representation as a way of finding next project and there is interconnectivity between research, representation, design, and planning decision.
5. Combined water problems resulted from mining operation: while mining operation causes underground water recession in the upper stream, counties and cities along the lower stream are facing challenges of both droughts and floods.

下采矿工程导致了上游地区的干旱问题，同时也为下游地区的城市带去了洪涝灾害。具体而言，当位于汾河上游的古交市采煤达到一定深度后，位于下游的太原市的水平衡将直接受到影响。所以，笔者将第三尺度的设计定位于毗邻古交市的原平河沿线，以处理大量因采煤产生的污水，从而补给水资源。

## 4 截获山西采矿景观中的水分

参照阿奴拉德哈·马图尔和迪利普·达·库尼亚的水文循环示意图，项目得到了在山—城背景设定下的水文循环图解，其以（可见但被限制的）水所在的“流”和（潜在但更具包容性的）水分代表的“域”划分出4个象限。从太原市到山上的古交市再到汾河水库的断面准确地指出了现有水利基础设施普遍存在的问题——它们的基本理念都是将水从其所在的自然环境中抽离，因而水成为了各种被限制住的流体。相反地，该项目引入了一种多层的包容地域水分的“域”，从自然的雨到植被到层层地质材料，这为景观的积极介入打开了无限的设计可能性。

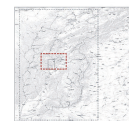
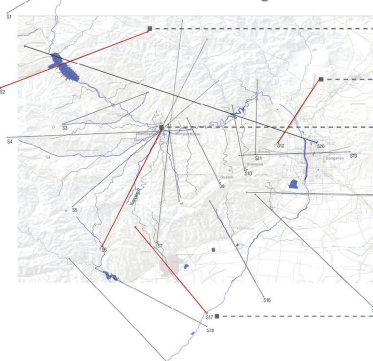
### 4.1 将水体转化为水分

基于对太原—古交—汾河水库断面的绘图表达，研究最终得出了两种在“干旱”的山西截获水分的途径。第一种是将采矿作业中的污

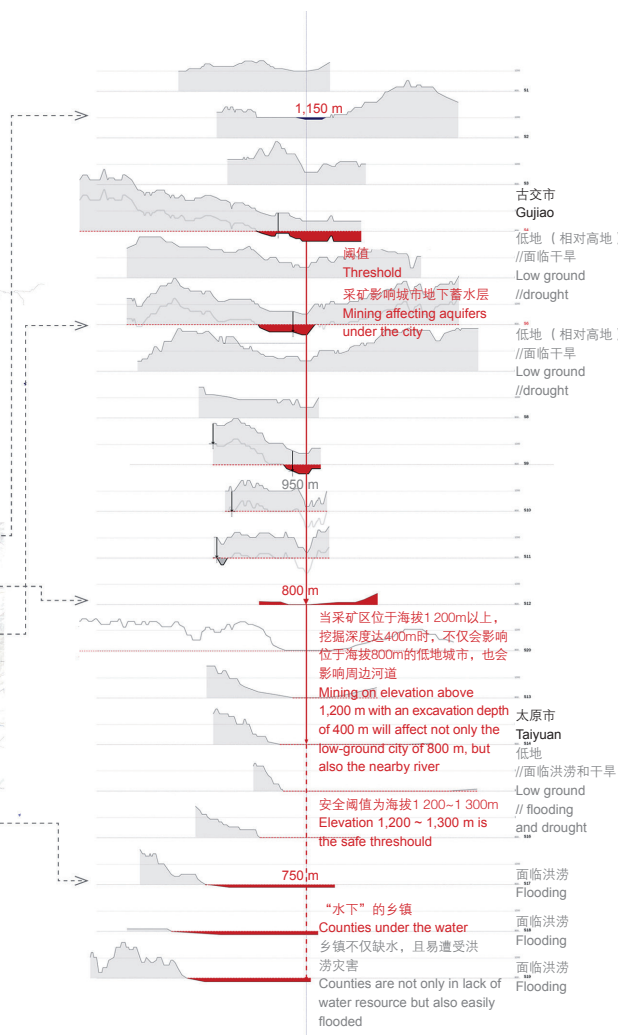
城市完全依靠水库供水  
Cities with water resource only from reservoirs



设计过程 // 极端水问题和随之而来的灾害  
Process of work // extremes of water and following disasters

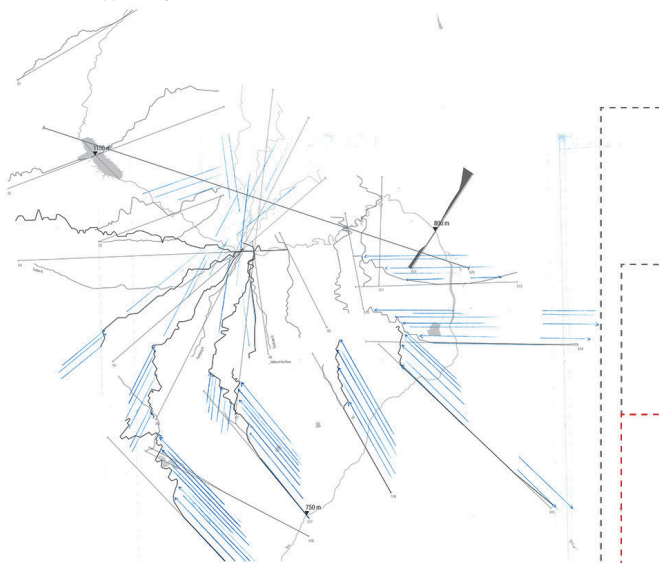


尺度2 Scale 2  
太原市-古交市所代表的市域尺度  
Taiyuan-Gujiao city

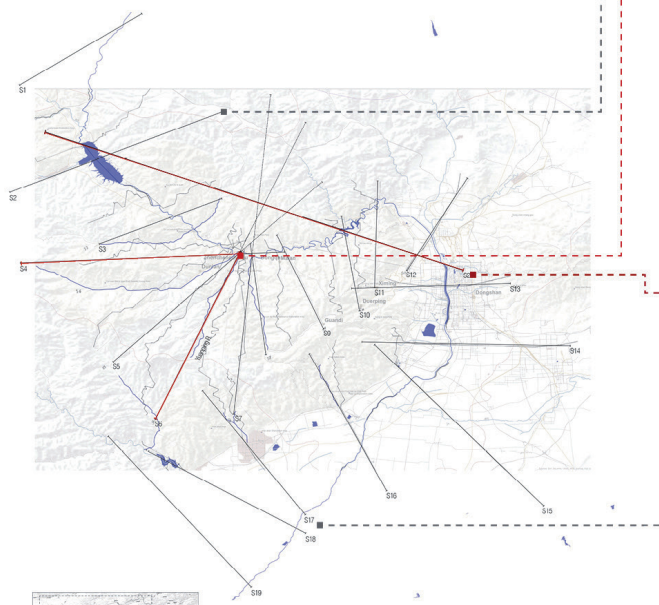


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有机会从季风雨中获得水分的地域  
Terrain with opportunity of monsoon wetness



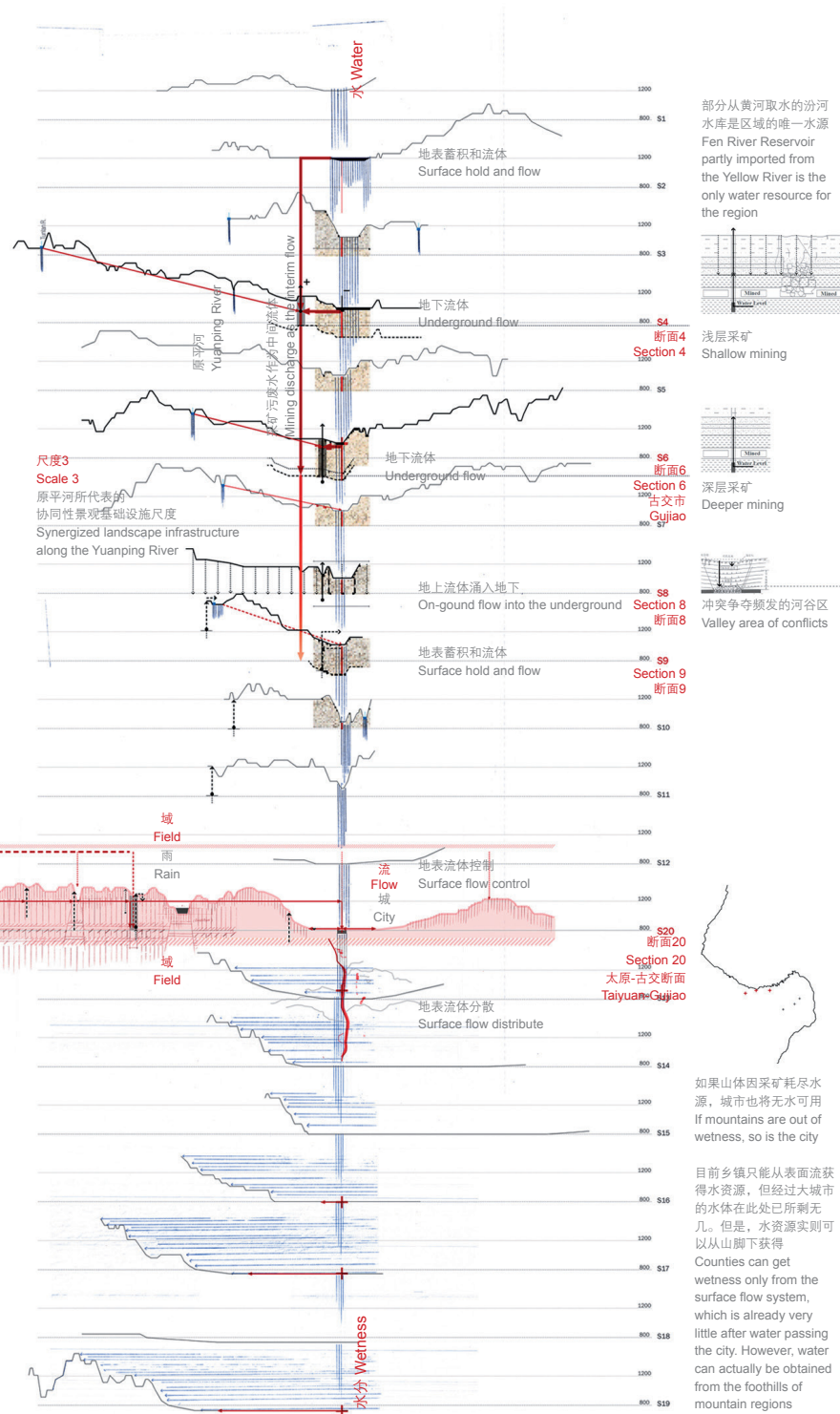
设计过程 // 以原平河作为下一尺度  
Process of work // Yuanping River as the next project



尺度2 Scale 2  
太原市 - 古交市所代表的市域尺度  
Taiyuan-Gujiao city

6. 创造具有水分的“域”来截获在水体中的水：该图展示了两种设计意图，一是在采煤区所在的高地将污水转化为水分，二是从山脚低地处直接用降雨创造水分。由该图推导出了尺度3所在的位置。

6. Create fields of wetness to intercept flows of water: the diagram presents that the design is to transform wasted and polluted mining water into wetness on the high ground and also to invent wetness from rain on the foothills. It points out where Scale 3 is.



废水转化为水分，第二种则是收集汾河河谷山脚处的雨水并通过改变植被、土壤、地形等方式延长其留存时间。

最后一个尺度的设计对象是一片沿原平河的现有采矿区。笔者展示了在不同场地条件下如何应用一系列小的设计干预来处理采矿污水和保持水分。设计证实了具有可操作性的低干预景观手段能够提高区域抗旱能力，更重要的是，面对煤矿资源在未来几十年内终将枯竭的现实，设计为山西创造了多元化的未来发展模式。

## 4.2 促发多种轨迹

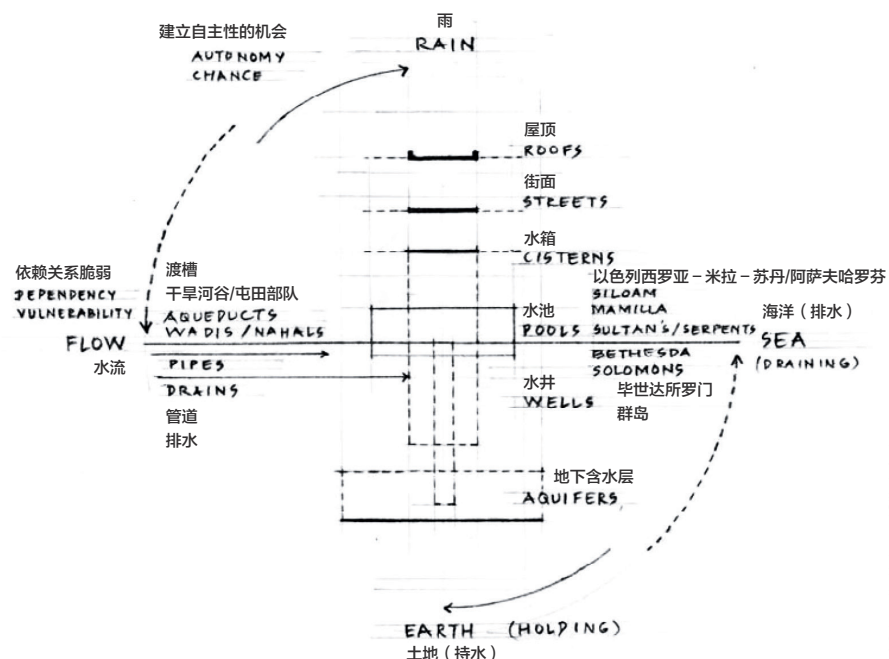
过去已有一些通过剖面研究采矿业及其与环境之间关系的先例，例如帕特里克·格迪斯的“文明化进程中的河谷剖面”。该剖面将地形、景观类型和人置于不同层次之上并叠加相联，但占据相等权重的每一个层次并没有展示出彼此之间的影响。与“河谷剖面”不同的是，笔者将景观基础设施作为脉络基底，来促发生态、活动、时间、物质等事物演变的轨迹，并使其相互交错关联。

从轨迹设计层面来看，一条单一的轨迹可以决定新的基础设施中的种子项目是否启动，而这些项目也可以反过来影响轨迹的确立。也就是说，设计改变了环境，且其自身也在不断接受和适应环境的变化。

## 4.3 协同性的景观基础设施

设计研究向功能单一的现有水利基础设施发起挑战，试图建立一套由以下两个框架协同发挥作用的景观基础设施。框架一：针对山区中农户们难以从邻近水库和市政设施以外的地方取水的问题，笔者设计了一种自主获取水源、食物等生活物资的生发机制；框架二：通过生态、娱乐、教育层面的活动项目，来加强城市（太原市和古交市）和山区之间的互动。此外，设计亦鼓励不同团体合力推进方案的实施。

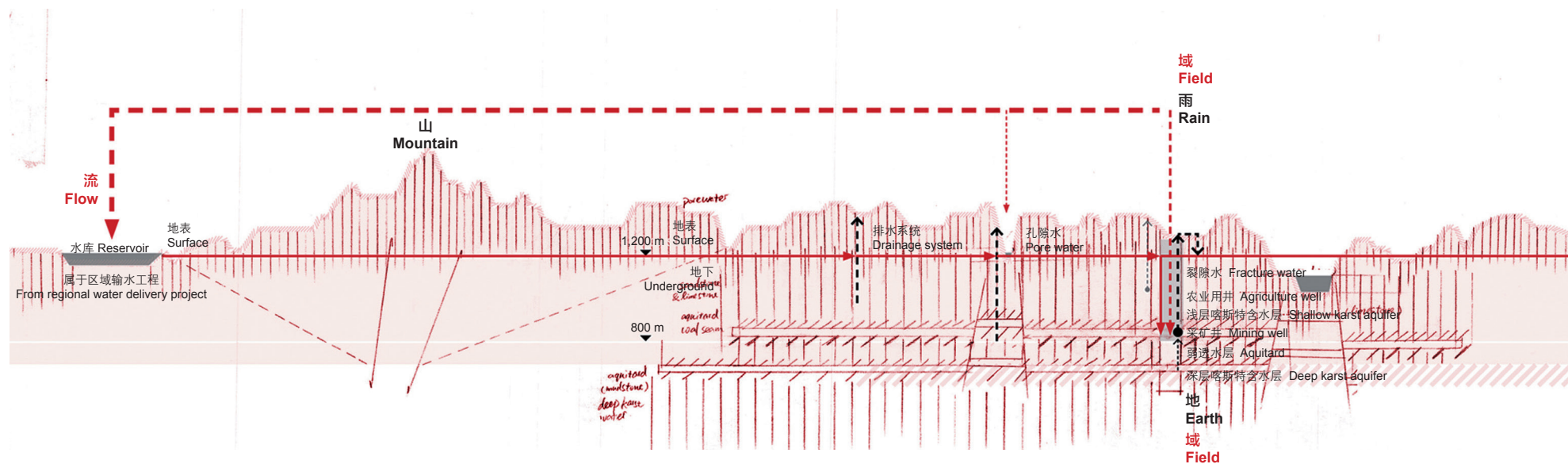
由此，该项目彰显了社会公平与合作的意义，也弱化了山西无法回避的采矿业所带来的经济发展和生态破坏之间的冲突。LAF



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## 致谢

作者感谢项目指导老师宾夕法尼亚大学景观系教授阿奴拉德哈·马图尔，项目主要评审老师哈佛大学设计研究生院“风险和韧性”硕士研究项目联合主任、哥伦比亚大学建筑规划历史保护研究院兼职教授迪利普·达·库尼亚及宾夕法尼亚大学斯图尔特·韦茨曼设计学院院长和佩利教席教授弗雷德里克·R·斯坦纳对项目给予的宝贵指导与建议；作者对宾夕法尼亚大学的理查德·韦勒教授，以及来自中国和印度高校的郑晓东、辛迪·桑德斯、玛利亚·维拉洛布思、尼古拉斯·潘兹纳和迪普塔·塞提什老师在多次项目汇报中的指点指导和两国实地考察中的帮助深表感谢；同时感谢曾经鼓励和支持过该项目的所有人。



## 1 Common Grounds in Two Seemingly Contrasting Mining Landscape

The overall project begins with the author's concern for floods and droughts caused by mining industries in two seemingly contrasting landscapes, the Western Ghats in India and Shanxi Province in China. With 1,500-kilometer-long mountain ranges, the Western Ghats in India is deposit by torrents of water when summer heats up the land. The Ghats is facing "excessive water" and floods as the combined result of heavy monsoon rainfall and loss of forest cover from extensive surface mining. By contrast, Shanxi Province in China is challenged by "limited water." The underground coal mining leads to drought which also brings up the concern regarding sustainable urbanization and diversified development mode.

Despite their seemingly contrasting landscape conditions, the Western Ghats and Shanxi Province actually share two common grounds.

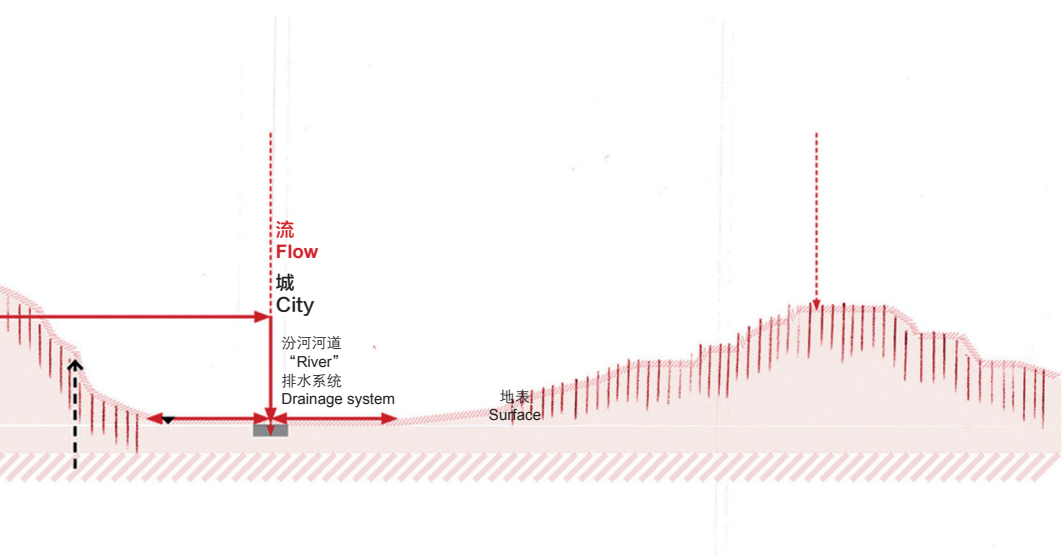
First, both regions are constructing a mega-water-infrastructure to prevent floods and droughts. Such infrastructures are, in fact, directing large amounts of water to the mining industry. For example, China has invested heavily in the inter-basin water transfer infrastructure across Shanxi since the launch of China's 12th Five-Year Plan (2011 ~ 2015), which is known as "2 longitudinal and 10 horizontal trunk waterways." However, the research in the project reveals that such engineered infrastructure is inadequate in controlling natural disasters, and the role of ecological restoration in sustainable water management has not been fully recognized.

In the author's view, either the solutions of getting water

to satisfy human needs of electric power and natural resources, or releasing water problems caused by human consumption, such as building up revetments and reservoirs to prevent floods and drought, seem clear but are actually calling existing way of articulating water problem into question.

While separated geographically on a map, these two regions are profoundly connected in section across the Himalaya Mountains and the Tibetan Plateau by the monsoon rain. The discovery opens a new imagination of geohydro-relation between the two terrains — any matter is endowed with a certain amount of wetness. Rain renders much wetness to Ghats as it does less to Shanxi. In other words, rather than simply defining Shanxi as "dry," Ghats as "wet," this common ground sheds light on the possibility of an alternative water infrastructure which engages both terrains as a landscape with different gradients of wetness. The project thus intends to gather a regional-level capacity for building "wetness" of resilience when facing extremities of "water." This is a radical shift compared with a problem-solving approach, as engineering does, to one that is grounded in landscape and uncovers opportunities.

As the final portion of the one and a half-year landscape research and design program, the project "In-Between Waters / Intercepting Wetness: Inventing Rain in the Mining Landscape of Shanxi Province, China" asks a critical question: how can one construct wetness from engaging with rain before it becomes waters that is contained in reservoirs, embanked river, urban drainage system, and mining wells. The project contributes to landscape architecture discourse by intercepting and inventing wetness in place of seeing water, its scarcity and excess, in the complex coal-mining landscape of Shanxi.



7. 该图探索了如何利用水被定格的瞬间以及水和物质间的可能的轨迹联系来创造水分，也启发了在山-城背景设定下展示水体与水分对比关系的断面的生成。
7. The diagram discovers moments when water gets snapshot and possible trajectories of waters and materials to create wetness. It also inspires the drawing of the long cross section with waters versus wetness in city-mountain setting.
8. 该图揭示了城市与山体，或是基础设施及其所在环境，如何通过两种截然不同的形态——（可见但被限制的）水所在的“流”和（潜在但更具包容性的）水分代表的“域”——相互关联。
8. The diagram reveals how cities and mountains, and infrastructures and their milieu are actually connected through two contrasting ideologies: flows of waters versus fields of wetness.

## 2 Four Nested Scales

Following the logic of wetness transition, the author traverses three transects during a field trip in China. Travelling along the Fen River from north to south across the Shanxi Province are Datong, Taiyuan-Gujiao and Linfen-Yellow River transects. The field trip helps consisting strategic sections, and suggests the location of sites to be intervened by design.

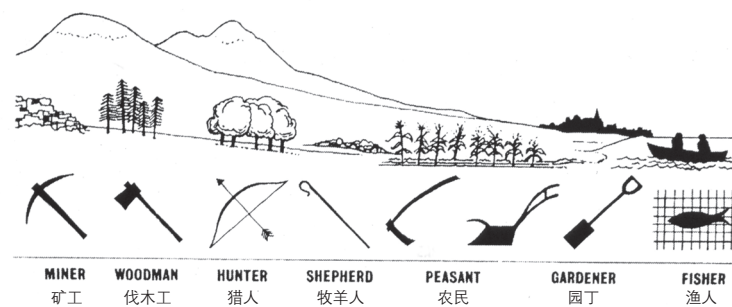
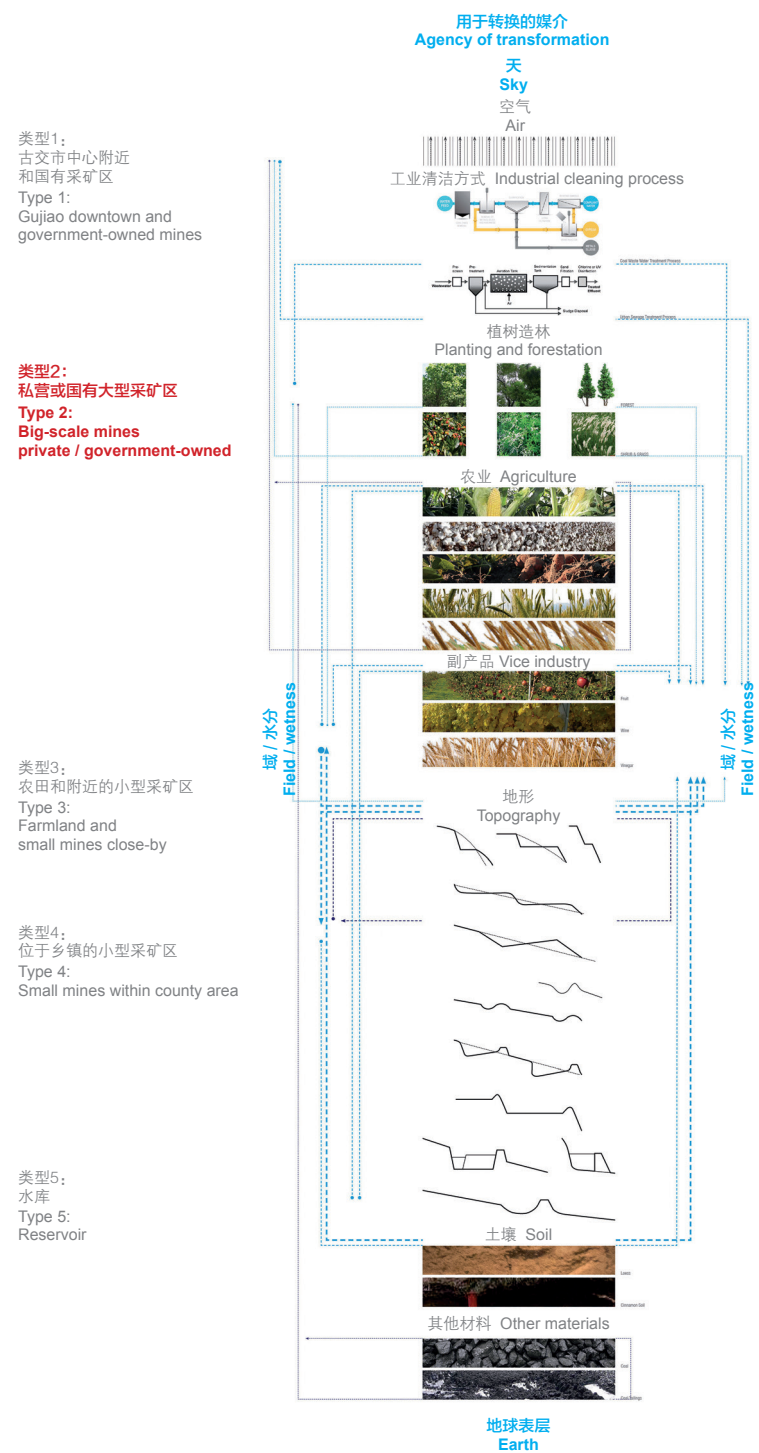
Based upon the fieldwork and process of research, four scales — Shanxi regional scale, Taiyuan-Gujiao city scale, the Yuanping River trail-synergized landscape infrastructure scale, and lastly, design interventions on existing mining area scale are explored and examined. As opposed to arbitrarily selecting a boundary to design, the four scales are integrally nested. The examination and drawing out between different uses of collected waters and regional embedded wetness present the accurate problem, thus informing where to design the next scale. Moreover, a design on any scale will have magnificent reverberant impact on all scales because of the relation formulated at the beginning stage of the project.

## 3 Sectional Investigation

The project is based upon the author's extensive investigation which negotiates science, engineering, arts, and design interventions. Rather than applying a linear process of investigation and intervention, a steady elucidation of connecting fieldworks, obtained data, research, representation, design, and planning are demonstrated in this project.

Sequential sections are deployed as a critical device to draw novel connections between research and design, thereby revealing relations between underground and aboveground systems as well as infrastructure and its milieu. Rather than simply drawing a dividing line demarcating the underground and the aboveground, the project shows other ways of depicting sections — those in porche and flipped hatch. The different ways of representing wetness are not merely for achieving aesthetic goal, but for driving research and design decision.

By structuring sequential sections along a specific river and associating sections with obtained scientific data, the author discovers the underground coal mining on the high-elevation mountain areas leads to drought in the upper stream while causing floods in the down stream where cities are. Specifically, the coal extraction deeper than a certain level under Gujiao City at the upper stream of the Fen River will directly affect the hydrological balance of Taiyuan City at the lower stream. The third scale design is therefore decided along the Yuanping River close to Gujiao because there are large amounts of waste and polluted water from mining operation to be addressed to compensate for water resource.



9. 不同场地类型下的设计干预策略模型。应用于尺度4中的设计策略与模型中的类型2相对应。
  10. 帕特里克·格迪斯的河谷生产和溪流消耗图
  11. 在尺度4上的具体设计干预将一座现有大型采矿区转变为包括农业和休憩观赏用地的多功能场所。
9. Matrix of design intervention strategies under different scenarios. The design strategies on Scale 4 is corresponding to Type 2 in the matrix diagram.
  10. Valley of production and streams of consumption by Patrick Geddes
  11. Detailed design interventions on Scale 4 transform an existing large mining area into a place that can be multi-used, including farmland and recreational scenery area.

## 4 Intercepting Wetness in Shanxi Mining Landscape

Adapting Anuradha Mathur and Dilip da Cunha's hydrologic diagram, the project calls out a diagram of hydrologic cycle in city-mountain setting with fields of wetness versus flows of water as four dimensions. The cross section drawing from Taiyuan to mountainous Gujiao and further to the Fen River Reservoir accurately points out the downside of most existing water infrastructures is its basic concept of separating water from its milieu and thus becoming multiple contained flows. Juxtaposed to it is fields of wetness coming from rain to vegetation and layers of geologic materials which open up tremendous possibilities of landscape interventions.

### 4.1 Transforming Water into Wetness

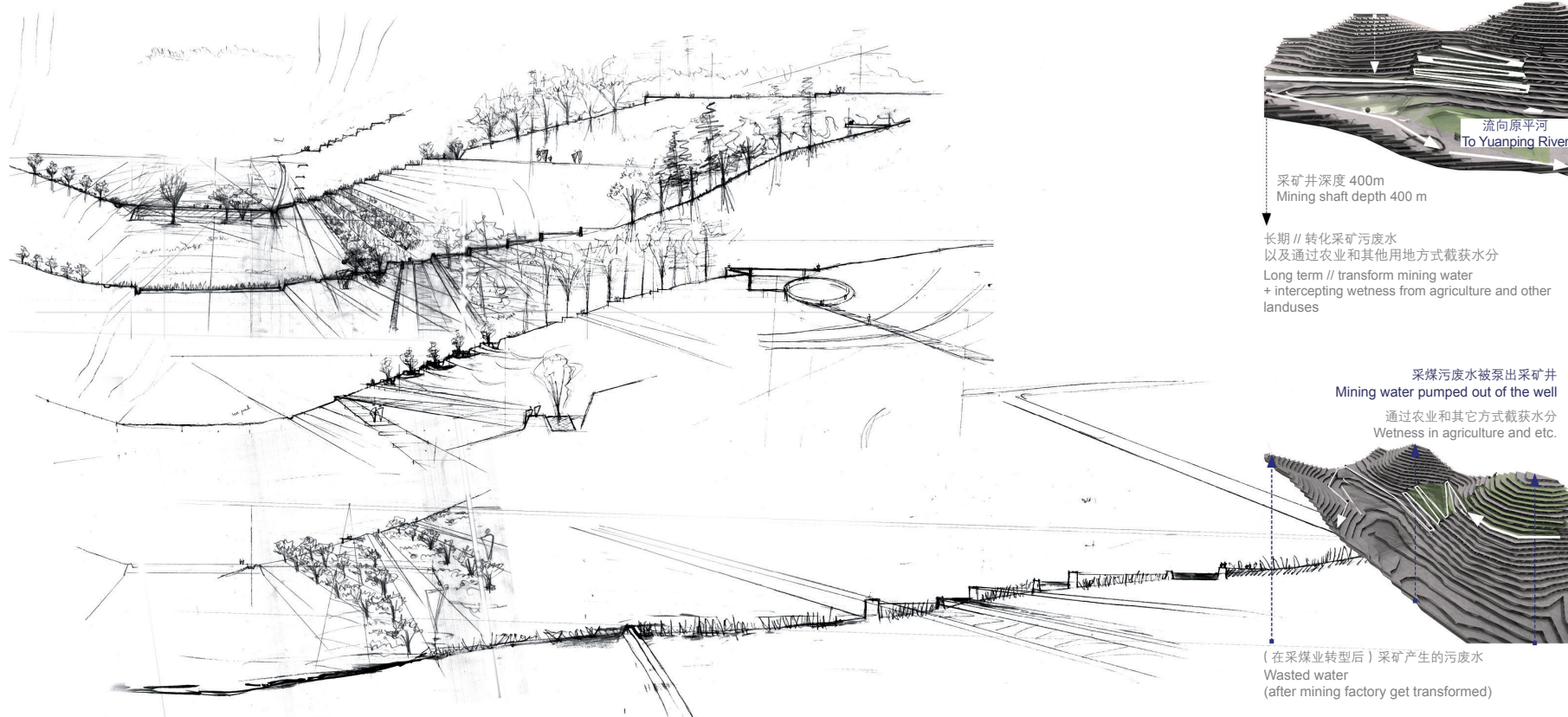
Based on the cross section from Taiyuan to Gujiao and further extending to the Fen River Reservoir, the research process through representation ultimately arrives at two ways to intercept wetness in the "arid" Shanxi terrain. The first approach is by transforming the waters being polluted and wasted back into wetness. The second approach starts from rain gathered on

the foothills of the Fen River valley, and then holds and extends it through planting, vegetation, soil, and topographic changes.

In the final-scale design of an existing mining area along the Yuanping River, the author presents a matrix of small interventions in different scenarios to intervene with mining water and hold wetness. The design demonstrates that light and practical landscape strategies can increase the region's resilience capacity to drought. More importantly, they can diversify development modes for Shanxi Province when the underground coal resource is exhausted in the near decades.

### 4.2 Initiating Multiple Trajectories

In the past, several precedents have used sections such as Patrick Geddes's Valley Section of Civilization to understand mining and its relation to environment. This section associates topography, landscape types, and people in different layers, where each layer plays an equal role that does not seem to have impact on other layers. However, this project determines the landscape infrastructure to be an underlying thread which initiates intertwined ecological, programmatic, temporal, material, and many other trajectories.



12. 从尺度2到尺度4的两种协同性框架，即设计自主获取水资源的机制，以及加强城市和山区之间的互动。
13. 落实景观基础设施的合作机制
14. 设计事物演变过程的轨迹：该图展示了各先锋性种子项目之间的时空轨迹关系。由于在该项目中研究、表达、设计和规划过程彼此关联，项目始终保持着开放性的接纳态度。

12. Two frameworks of synergy from Scale 2 to 4 which are developing autonomy of getting water / wetness and enhancing interaction between city and mountain.
13. Cooperating mechanism of implementing the landscape infrastructure
14. The drawing of "design with trajectories" depicts the spatiotemporal

trajectories between the pioneering seeding projects. It shows the open-endedness of the project because of its embedded inter-connectivity between research, representation, design, and planning.

From the trajectory design, a single trajectory interactively decides the design of each seed project along the new infrastructure. Thus, the design remains open and adaptive to its changing environments.

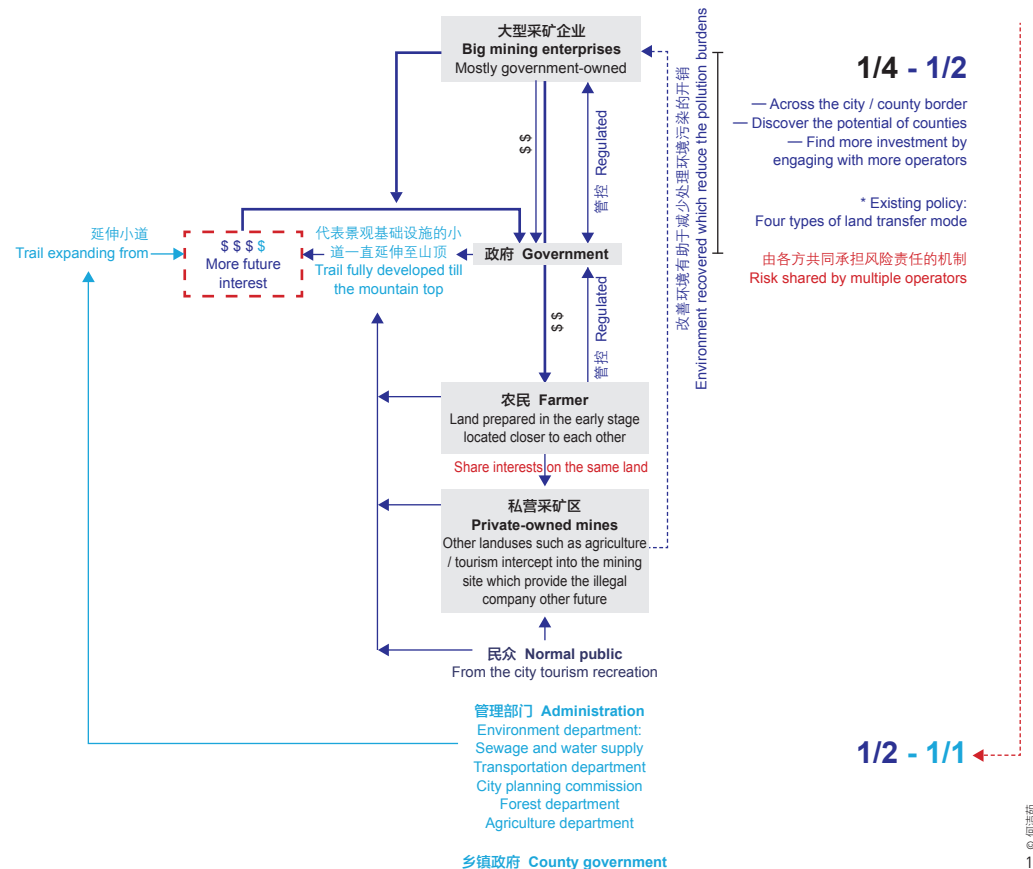
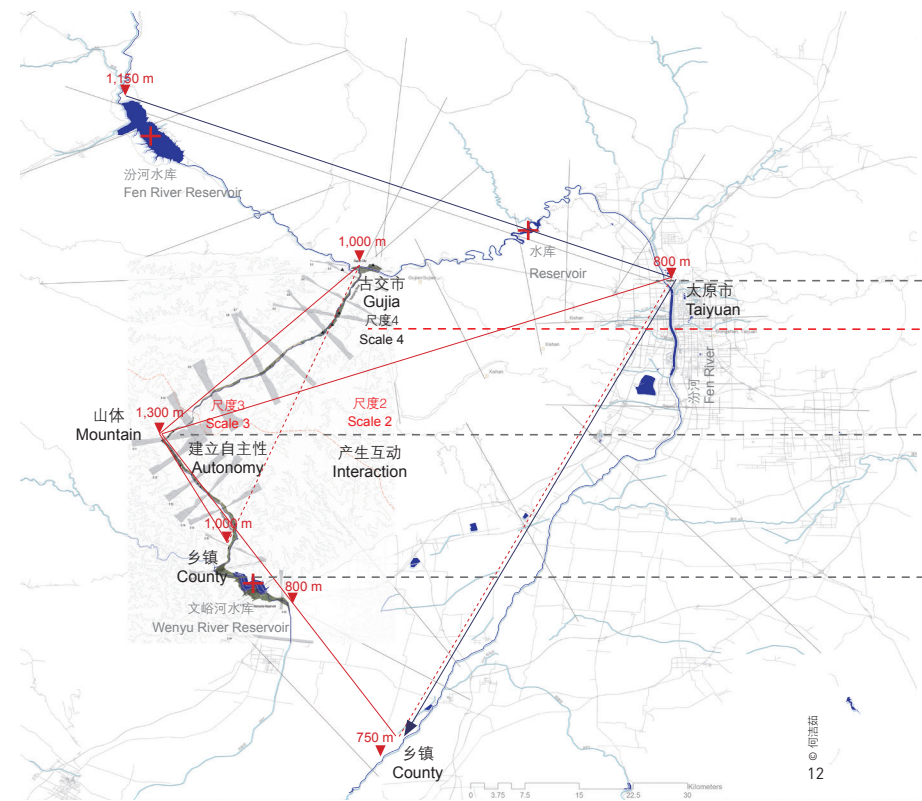
### 4.3 Synergized Landscape Infrastructure

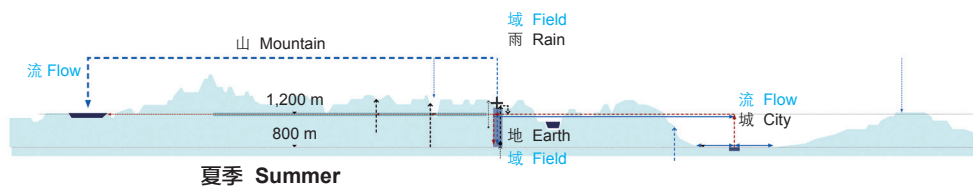
Challenging the singular ambition of existing water infrastructure, the design within the research is a synergized landscape infrastructure of two frameworks. First, for the mountain area where it is hard for farmers to get water other than from closeby reservoirs and civil infrastructure, the author designs an autonomous paradigm of getting water and other living resources including agricultural products. Second, an interaction is enhanced between the cities of Taiyuan and Gujiao and the mountain area through ecological, recreational, and educational programs. Furthermore, a cooperation between different parties is encouraged to implement the project.

Therefore, the project responds to the meaning of social equality and cooperation and blurs the dualistic outcomes, namely economic development versus ecological disruption, by the inevitable coal mining industry in Shanxi. **LAF**

#### ACKNOWLEDGEMENTS

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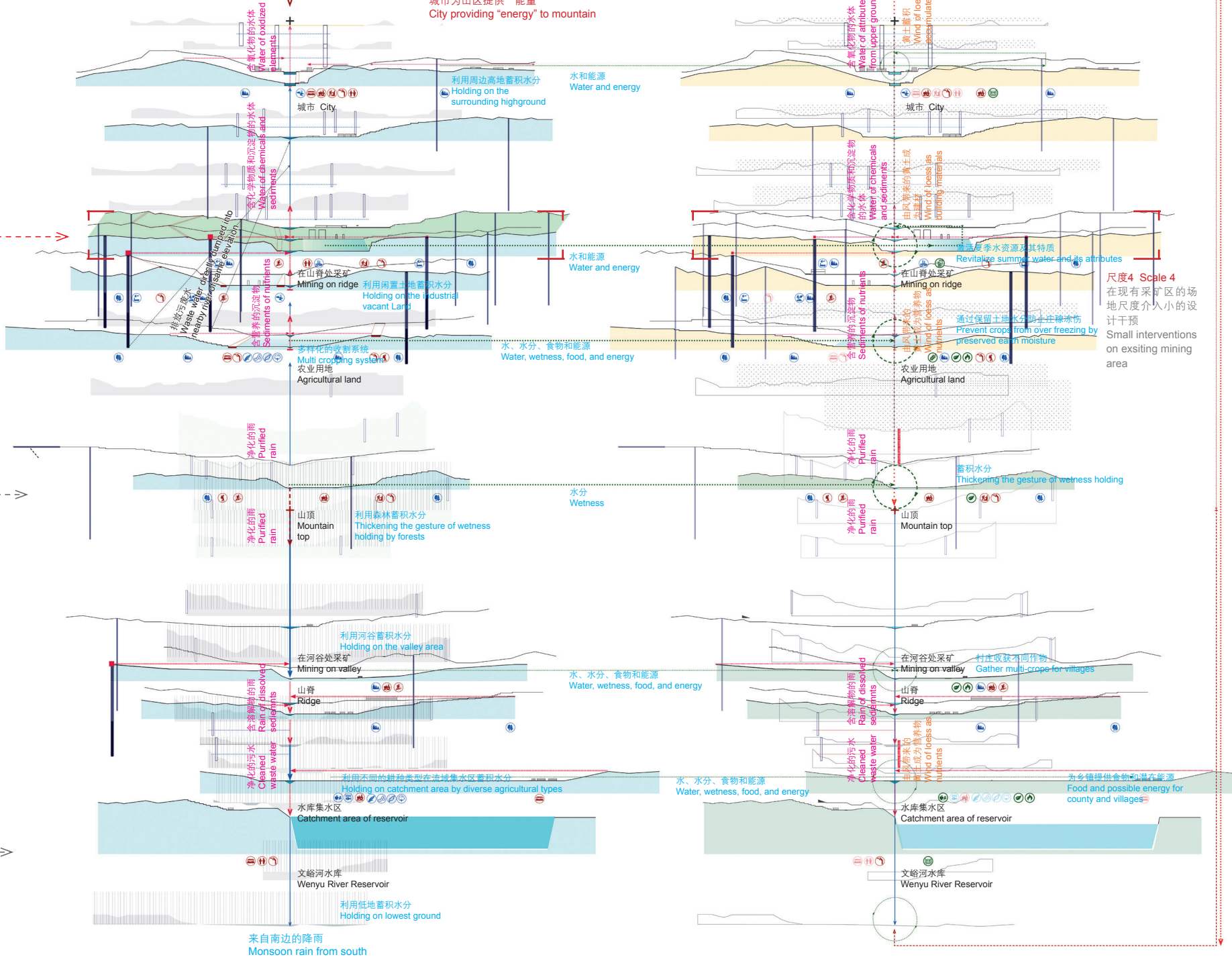


夏季 Summer

冬季 Winter

高地防止城市被淹  
Highground preventing city from being flooded  
城市为山区提供“能量”  
City providing “energy” to mountain

来自北边的黄土 Wind of loess from north  
在山地形成水-粮食-能源的自治体制  
Highground formulating autonomous group of water-food-energy



尺度4 Scale 4  
在现有采矿区的场地尺度介入小的设计干预  
Small interventions on existing mining area

来自南边的降雨  
Monsoon rain from south