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Eco-social futures: rethinking urban-rural communities in China

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Abstract/Resumo. How can the design of urban-rural fringe communities, informed by multiple social and ecological challenges, create a pathway toward sustainable development? This paper addresses the question above by proposing an urban design studio focusing on the urban fringe of a mega city in China. The objective of the studio is to cultivate a design that supports knowledge development. Students developed masterplans that rethink the urban-rural relationship of urban fringe in a mega city, a context that provides challenges and opportunities for innovative approaches. The projects proposed forms of community engagement between farming, businesses, and learning facilities. The design studio tasks, and the open discussion of these outcomes will evoke our awareness of problems existing in community development in urban-rural fringe of contemporary China and call for more sensitive solutions for the future development.

Keywords/Palavras-chave: Urbanism, China, Urban-rural interfaces, Communities, Knowledge

1 Introduction

The rapid population growth and urban development in China have led to the emergence of sprawling mega cities, coinciding with the absorption of small rural communities into urban areas (Yeh and Chen, 2020). However, this expansion has now reached a critical point, impeding sustainable environments and spaces with social quality (Li et al., 2023). Consequently, the excessive consumption of natural resources, farmland, and water has become a pressing issue for many Chinese cities, negatively affecting both the citizens' life quality and the environment. Nevertheless, recent urbanization advances in China have seen the implementation of eco-city initiatives and sponge city strategies aimed at mitigating environmental challenges such as pollution, flooding, and water scarcity (Cheshmehzangi et al., 2021a). These efforts are not only addressing immediate concerns but are also reshaping perceptions of urban development in the country.

Depending on the scale of urbanization, Chinese mega cities have extensive urban fringes that are characterized as an interface between urban and rural life, industrialization,

agricultural and natural environments, accommodating both low-, medium- and high-density communities (Li et al., 2021). However, these places are under constant threat of transformation into large high-rise gated communities, a prevailing housing type in urban China (Cheshmehzangi et al., 2021b). The proliferation of such large-scale urban developments exerts significant impact on the local population, leading to displacement of local population, land fragmentation, rise in housing costs, forced migration, and erosion of traditional urban lifestyles (Wang et al., 2020) or even worst, can result in ghost neighborhoods in urban edges (Shi et al., 2022). Consequently, architects, urban designers and planners tasked with planning these territories encounter opportunities and challenges that traditional planning approaches cannot resolve (Yeh and Chen, 2020). One of the key issues is fostering education and social cohesion among residents, adapting to shifting demographics, accommodating individuals with disabilities, and embracing evolving lifestyles, all of which introduce new layers of social complexity in China. How can the design of urban-rural fringe communities, informed by these multiple challenges, create a pathway toward sustainable development?

This paper addresses the question above by proposing an urban design studio focusing on the urban fringe of a mega city, which will be explained in detail in the next sections. The introduction of sustainability criteria, strategies, and concepts in design studios have been advancing in China (Gamez, 2018; Sedrez et al., 2021; Lin et al., 2022) leveraged by the United Nations Sustainable Development Goals (and its targets), climate change, and government policy. Such pedagogical approaches promote a more comprehensive understanding of urbanization in contemporary China, but also requires building solutions that are responsive to local conditions, challenging traditional approaches such as top-down planning and social-cultural programming.

The studio takes the concept “future community” (from the recent government propaganda) as an opportunity to rethink the urban design and architecture of urban-rural fringe, and to create an inclusive, vibrant community for the future. Using knowledge as key element to promote social changes, students were motivated to make an interconnection between learning and farming into the design, allowing existing and new housing spaces to connect and support new economic transition. In the proposed future community design brief, it was suggested that design thinking should be centralized on the following three aspects: 1. rethink the relationship between urban and rural, come up with an integrated design solution for farming and urban life; 2. rethink the boundary for urban community, and challenge the gated community as stereotypical urban block; 3. rethink the social classes, job divisions, and vulnerable social groups, creating a truly inclusive and friendly neighborhood space.

The objective of the paper is to discuss the studio designs and strategies aiming at generating knowledge neighborhoods, in this case, with a focus on socialization through education on agriculture.

2 Eco-social futures

In searching to build healthy communities, Ebenezer Howard (1898) came up with a visionary scheme Garden City at the turn of the 20th century, proposing an intermediate landscape (i.e. town-country) that can have merits from both city and country. This

promulgated the English garden-city movement with its worldwide influence. A hundred years later, in the unrivalled process of urbanization in China, the Garden City concept, by adding two sets of merits from town and country together, is still appealing, particularly to Chinese philosophy *zhongyong* (中庸 in the middle way, or golden mean), beheld by a long line of intellectuals from the past to the present.

On the other hand, the settlement pattern in China is entrenched in a static form, that is, an enclosure, being courtyard houses, urban wards, and cities in the past, and gated communities in the present. In the studies of urban form and life in the Tang-Song dynasties (ca. 618-1279), Xie (2020) observes that there is a persistent force to preserve walled enclosures in urban China from the early archaeological findings dated in the Western Zhou dynasty (11th century BC to 771 BC) until recent modern urbanization started from the 1980s. The gated communities in modern China are in fact a culturally rooted product from the past.

A walled enclosure draws a boundary that divides inside and outside. The original enclosure of courtyard house was to articulate orders. This concept is well explained in the early lexical work *Erya* (尔雅, Near Correctness), compiled during the late Warring States period and completed in the early Western Han dynasty. This work includes an entire chapter - *Shigong* (释宫, Glosses on house) devoted to specifying the architectural terminology from the pre-Qin period. For example, *Erya* states, "*the eastern and western walls are called xu (序, order)*". A detailed explanation follows: "*In the front of the living quarter, there is the hall, which is divided by the walls into the eastern and western side-rooms. These two walls help distinguish inside and out, the intimate from the foreign, and are therefore called xu (order)*" (*Erya yizhu*, 2012). Yet, how an enclosure can address social inclusiveness? Reflecting on the stereotypical development model in urban fringe of China, that is, high-rise gated communities, the question remains as is there a much better option? This calls for a new vision for urban fringe development.

The sinologist Frederick Mote (1978) coined the term "urban-rural continuum" in describing the organic unity of rural and urban areas in pre-modern China. Farmers commuted to cities on a daily basis, selling their rural products. Ritual ceremonies praying for farming harvest would be led by scholar-officials in cities. Farming products including grain, wine, and livestock would be the offerings for various rituals conducted in courtyards. Such fruitful connection between urban and rural has been lost in the modern urbanization process, which converted into the concept of metapolis (Ascher, 1995): a discontinuous, heterogeneous, fragmented, multilayered space that integrates city and neo-rural. On the selected site (Figure 1), like many urban fringe areas elsewhere, it is possible to observe the gruff replacement of farming land with real-estate development, and the sharp contrast of these two different landscapes (farmland and gated community). These conditions offer students an opportunity to reflect on the aesthetic qualities proposed by Garden City and the Chinese idealism for golden mean. Considering a common picture, that is, modern people are attached to the buzz of urban life and longing for an idyllic country living, the establishment of a delicate equilibrium between urban and rural seems to be possible.

Figure 1. Site location and context presenting a typical urban fringe of Ningbo with patches of agriculture and residential blocks. Authors, 2024. Source: Bing Maps.

3 Case Study

Ningbo is a historic port city in northeast Zhejiang Province with a long history that can be traced back to 7000 years ago. According to the archaeological remains and ancient literature, the walled city of Ningbo was built in the year 821 (Tang dynasty). As a port city in the Tang-Song dynasties, Ningbo has played a critical role in maritime commerce since then and until modern times. A walled city with port facilitates was well portrayed in a 19th century map of Ningbo, and courtyards are the dominating form within the walled enclosure (Figure 2).

Figure 2. Map of Ningbo (寧郡地與圖) produced by anonymous after 1846, Library of Congress, USA. Source: *Ning Jun di yu tu.* [After, 1846]

Since the 1980s, Ningbo has embraced the urbanization process and has been developed into a mega city with 3.5 million inhabitants and one of the first cities to incorporate the sponge city program as a pilot in China. Ningbo location is strategic due to its connection with the ocean and traditional port. However, the selected site is located on the south fringes of the city. The objective of the studio is to cultivate a design that supports knowledge development.

The site (Figure 3) benefits from various infrastructures that facilitate such urbanization, including its proximity to two universities, an established NGO serving people with disabilities, farms and traditional villages. Furthermore, the upcoming construction of a new subway station is planned within the selected site, north-west corner, which is now surrounded by farmland. A mix of mid-scale and self-consumption farming can be identified on the site. In the south-east, a small reminiscent farming village reinforces the need for appropriate urbanistic decisions, whereas other areas, still not transformed into residential communities, maintain mid-scale farming practices. This shared context, typical of Chinese mega cities, provides an ideal foundation for envisioning eco-social futures as explained in the next sections.

Figure 3. Site boundaries containing four residential blocks and agricultural land (selected site traced in yellow). Authors, 2024. Source: Bing Maps.

4 Studio

The Future Communities studio is a year-long vertical design program that combines second and third-year Architecture students from the University of Nottingham Ningbo China. In the initial semester, participants design a masterplan outlining various architecture projects to be developed in the subsequent semester. This comprehensive approach fosters collaborative efforts among students and encourages horizontal peer learning. The studio convenes twice a week and employs a diverse range of pedagogical techniques including lectures, workshops, desk critiques, and reviews, alongside social engagement activities such as site visits, talks and interviews. In line with government

policy aimed at minimizing demolitions, the studio actively explores alternative approaches for existing infrastructures within the site. The studio structure is presented in figure 4.

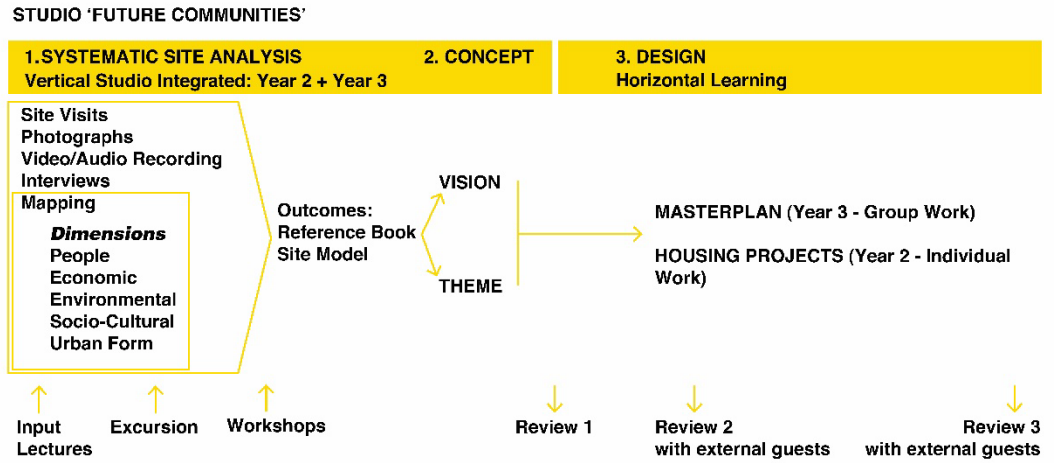

Figure 4. Future Communities' studio structure. Authors, 2024.

3.1 Analysis

Starting with a thorough site analysis, each group has systematically mapped multiple layers of information to compile a comprehensive reference book informing the design process. The reference book is concluded with a vision and theme for a masterplan and housing design. Through collaborative efforts within three groups of 10-11 students, the individuals were able to contribute to various aspects of the research. The three groups were encouraged to explore and reflect on the topics of urban farming, knowledge production, urban and gated communities, and lifestyles.

For instance, Group A's investigation of public spaces revealed the contrast between towering residential complexes and the surrounding farmlands and waterways (Figure 5), which they termed as an 'artificial landscape'. As previously noted, the prevalent urban development trend in China often involves the conversion of fertile farmland into gated communities. Notably, the unoccupied space at the center of the site is for the construction of a new school complex.

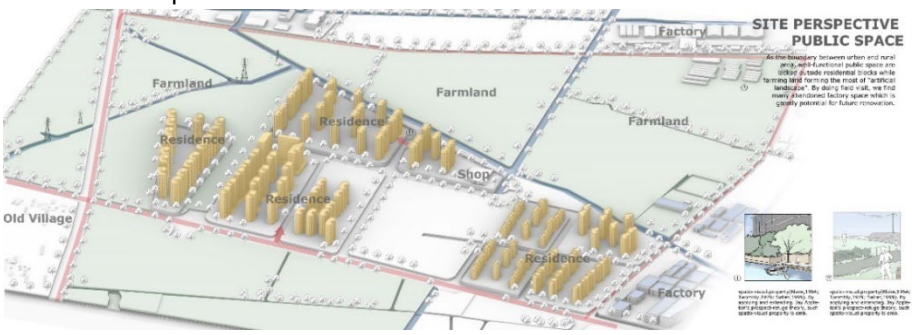

Figure 5. Existing structures. Group A, 2022.

The students were prompted to document the site's diverse layers and dimensions using various methods including site visits, photography, video and audio recording, as well as conducting interviews with current dwellers and users of the existing facilities Their

observations were then synthesized into diagrams summarizing the collected information. Across all groups, three distinct clusters of residents were identified on the site: low-income workers residing in public rental apartments, resettled individuals from neighboring agricultural regions, and young professionals benefiting from talent incentive policies. This multifaceted diversity generates a sense of impermanence, but also fosters different uses of public spaces and activities, from formal to informal appropriations of space, as cataloged by Group C (refer to Figure 6). These groups also represent a new reality of modern population flows in mega Chinese cities.

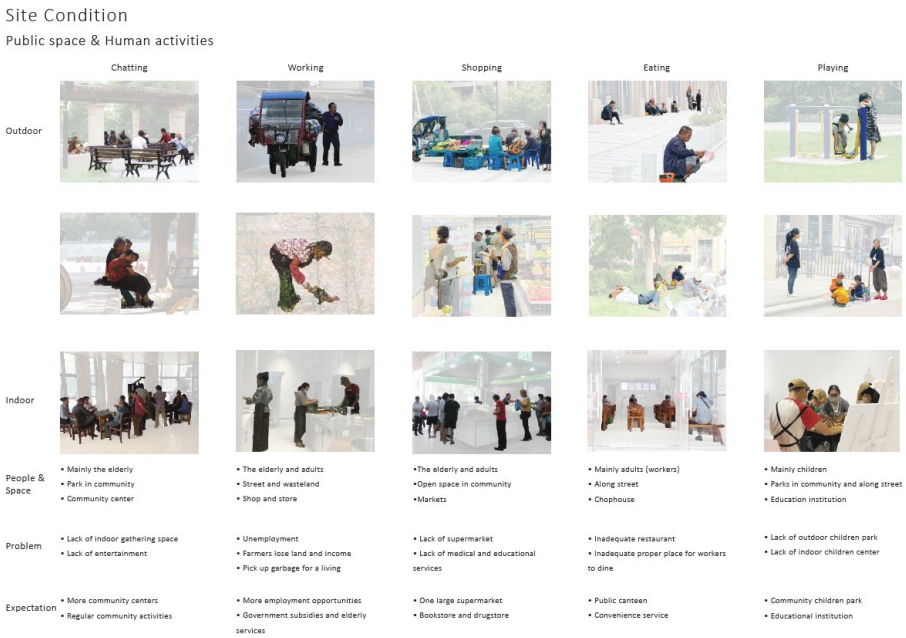

Figure 6. Catalogue of human activities. Group C, 2022.

Meanwhile, Group B undertook an analysis of the site's ambient noises and smells (refer to Figure 7). It was anticipated that these investigations would aid in navigating the complexity of the site and inspiring solutions by integrating various perspectives. Such complexity serves as a crucial challenge, compelling the students to weigh the relevance, significance, and priority of different factors in their decision-making process.

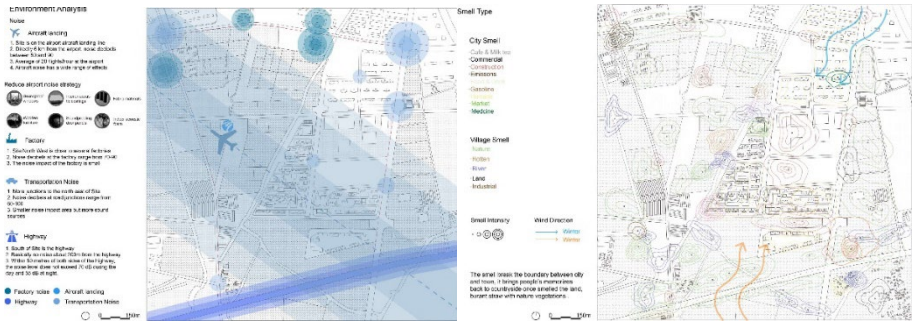

Figure 7. Noise and smells analysis. Group B, 2022.

As the groups explored social dimensions of the site, they adapted their own perceptions and created comic-style storylines to illustrate their findings (Figure 8). For example, Group A explained several conflicts arising from the utilization of space, and the needs of elderly and children. Through interviews, they observed the rapid conversion of agricultural land into construction sites, resulting in excessive noise and uncollected construction waste. Despite the elderly population's enjoyment of cultivating vegetables for personal consumption, the area is prone to frequent flooding. Creating conditions to enable small-scale agriculture could greatly benefit this community. Additionally, the absence of recreational activities and public spaces for the elderly and children highlights a flaw in the planning of residential gated compounds in China.

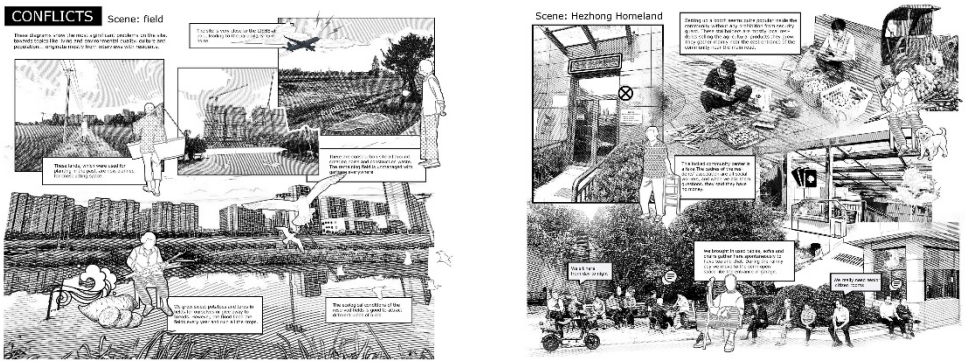

Figure 8. Site conflicts. Group A, 2022.

In concluding the analysis stage, the three groups formulated a vision and theme for their masterplan. Group A advocated for "Farmvilla at the Urban Fringe: A Concept of Agricultural Belt to Foster Future Community". Their proposal incorporated shared farmland alongside a high-tech agricultural program, strategically dispersed within walkable distances throughout the site. Group B put forth "Rice+ City: Celebrating Rice Industry and Cultivating Cultural Experiences". By utilizing rice as a focal point, the group aimed to enrich the site's cultural offerings, with a portion of farmland repurposed to accommodate the program. Transforming rice farming into an economic draw, visitors would have the opportunity to engage with the whole process of rice farming, its associated food, and rice wine production firsthand. Group C proposed "City Gardner: Cultivating a Sustainable Farming Community" envisioning an open, inclusive, and sustainable community. Their plan involved opening the existing gated communities and introducing new programs to seamlessly integrate farming with community life.

3.2 Designs

The groups demonstrated a clear aspiration to advocate for lifestyle changes that foster a deeper connection with nature, encourage healthier eating habits, and strengthen community bonds. Simultaneously, they aimed to provide employment and learning opportunities for local residents. Group A's plan (Figure 9) introduced a city scale green belt, fundamentally altering the traditional trajectory of urban development by integrating agriculture into the urban fabric. The plan prioritized the establishment of gathering spaces interwoven with farmlands, including multiple high-tech agricultural research facilities, community-centric green spaces of varying scales, and communal gardening initiatives. Additionally, it emphasized enhancing riverbank ecologies and implementing permeable

flooring within residential communities to promote sustainable water management. A system that connects aquaponics and smart orchard with researchers, engineers, farmers, residents and merchants is rationalized by the group and leveraged by the numerous pedestrian connections in the design facilitating knowledge transfer.

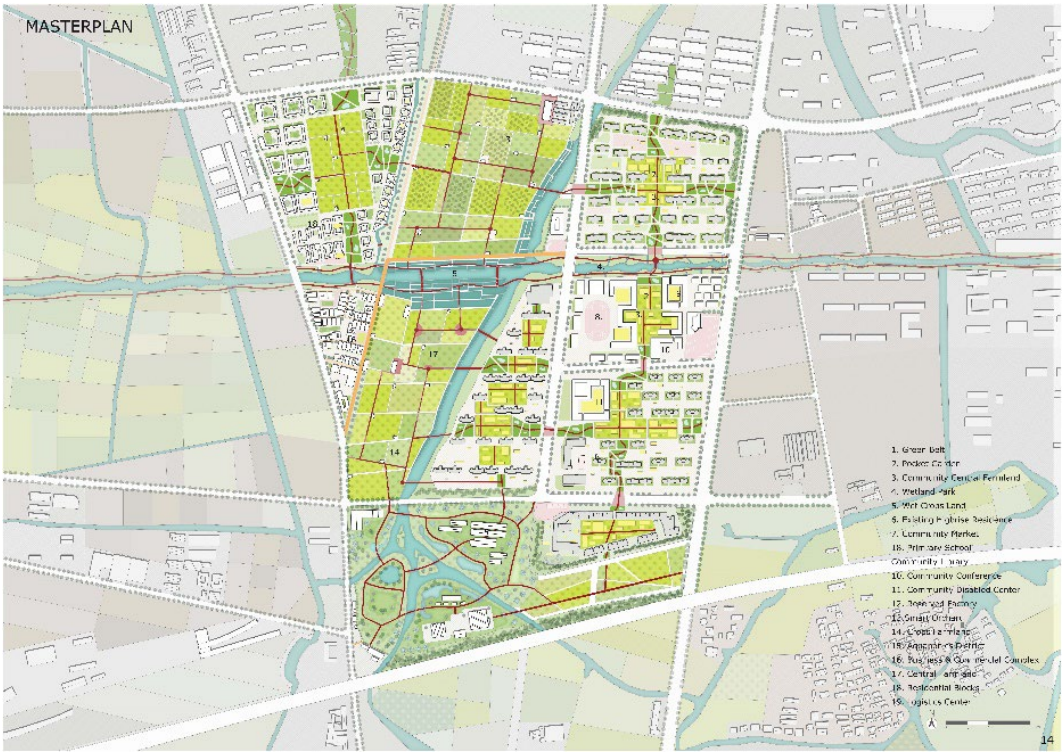

Figure 9. Masterplan Group A: Farmvilla at the Urban Fringe. Future Communities Studio, 2022.

Within Group B, a strategic approach was taken to leverage various programs and activate what they termed "nodes" (Figure 10). These nodes serve as key points interconnected by a central pathway, facilitating movement for both visitors and residents alike. Recognizing a deficiency in restaurants during their analysis, this plan emphasizes the promotion of rice-based cuisine as an element of cultural exchange. To enrich the outdoor experience and foster community engagement, initiatives such as a rice farming experience, a rice plaza, a market, and a lively snack street are proposed, which is supported by education on culinary and food production. Additionally, a dedicated research facility is envisaged to complement the farmlands, offering opportunities for businesses to flourish and contribute to the area's economic activity.

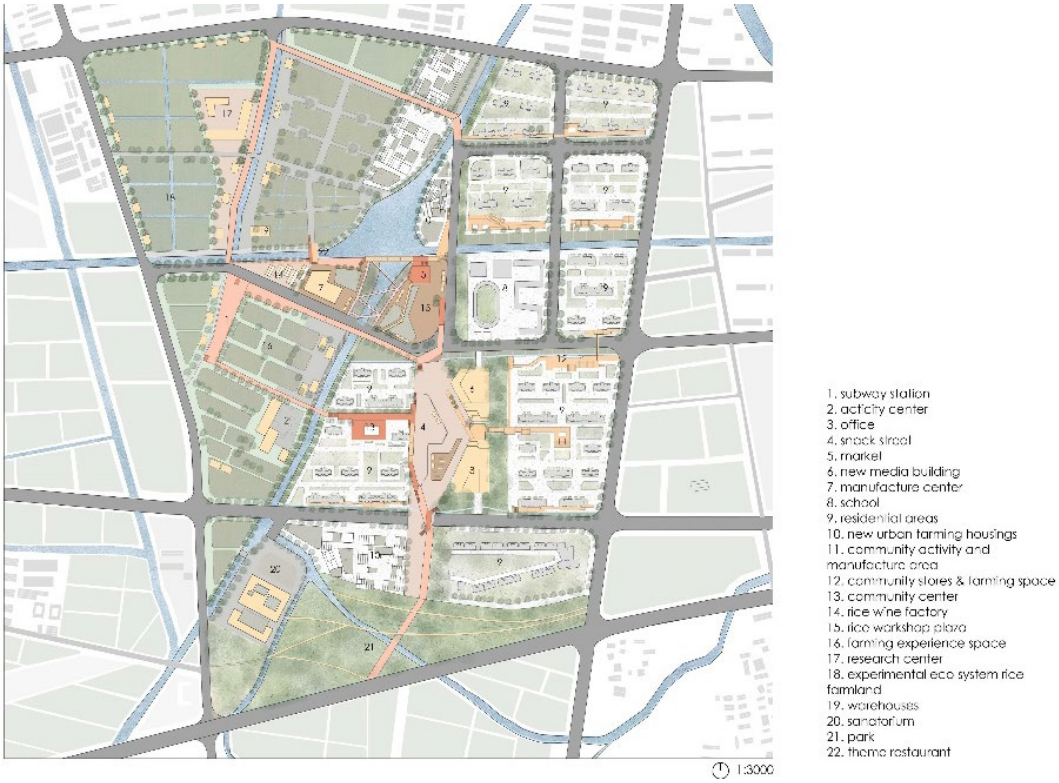

Figure 10. Masterplan Group B: Rice+ City. Future Communities Studio, 2022.

In Group C's plan, the site was segmented into four distinct sectors, organized from north to south: residential with integrated farming, public programs and educational facilities, solely residential areas, and high-tech farming combined with residential spaces (Figure 11). This strategic division aimed to optimize the utilization of space by tailoring each sector to the site's existing conditions, thereby minimizing fragmentation and ensuring a cohesive layout. Existing structures underwent renovation, incorporating green roofs and facades to enhance sustainability and environmental integration. Moreover, ground-level spaces were repurposed as open community areas, while first-floor spaces were reserved for residents, linked via a network of skywalks to facilitate connectivity within the development. Through these interventions, Group C sought to create a harmonious and interconnected urban environment that caters to diverse needs while fostering a sense of community and sustainability.

Figure 11. Masterplan Group C: City Gardner. Future Communities Studio, 2022.

These three plans were discussed with a team of architects and urban designers throughout the semester and external expert critics attended review sessions. The teams start with large groups (10-11 students), but ultimately the masterplan is the responsibility of year 3 students, which was formed by 4 students per group. Year 2 students collaborated in the analytical part and individually proposed one of the (social) housing designs. Having a system of two reviews with participation of external reviewers, this studio allows enough time for students to reflect and act on insights provided during reviews. For example, after review 3, they have an extra week to submit the work.

External reviewers' comments are summarized for each group as follows. Group A: the masterplan needs to present more diagrams explaining the relationship between farmland and community, and a better explanation of the aquaponic farm, in addition enhance the narrative and concept of green belt. Group B: a narrative could be better formulated to explain how the tourism approach to farming can be implemented on the site reflecting on spaces for tourists, dwellers, or both. Group C: even though the masterplan presents a logical concept, the north-south connection between the four zones was considered the weakest part of the masterplan, which could be represented in sections and views of the plan. This is the first large scale project for these students, and they had to develop several skills throughout the semester, including soft and hard skills such as collaboration, teamwork, time management, architectural and urban design representation and visualization, theoretical approaches, data analysis, and so on. This studio is not only aiming achievement of learning outcomes but disseminating the idea of knowledge districts as an alternative for future communities in China.

In the tutors' perspective, Group A successfully integrates their design to a large-scale view of the city allowing green spaces to form a network, while groups B and C worked on maintaining and transforming the existing farmlands. All groups proposed forms of opening the existing gated communities by integrating the ground floor to productive areas, suggesting the house extension to green spaces and infrastructure. This is a major challenge in current Chinese perception of community, still rooted on the idea of compartmented spaces. Group C even suggests absorbing the ground and first floor with a series of connecting bridges that creates new public places directly connected to public buildings. Of the three plans, Group B fails to recognize urban patterns to resolve the site issues, despite their well-developed program of activities and functions. These plans are rooted in new ecological thinking that was fostered by tutors, and despite being an academic exercise, contrast with Chinese recent plans for ensuring an integration between nature and people, different forms of learning, and need to rethink future communities.

5 Discussion and Conclusion

As a walled city built in the year 821, the urban form of Ningbo largely remained unchanged throughout the imperial period. Even in the 1970s, the city of Ningbo was within the previous walled boundary, though the city walls were demolished. The city moat still remained, within which was the built world full of courtyard houses, beyond the moat were farmlands. Comparing to the urban fabric in a long history of the past, the recent high-rise developments on the rural-urban fringe are a grotesque intrusion that interrupts a gradual transformation of the landscape in such fringing zone. In this sense, we probably can refer to the New Urbanism Transect, a concept as well as an organizing principle that has been widely adopted in urban zoning practice. Considering the shifting lifestyle of contemporary Chinese society, environmental, economic and policy constrains, challenges are more severe than before and elsewhere. In this sense, architects, urban designers and planners are challenged to mediate citizens needs and expectations with fast and large land consumption by housing developments. Here, knowledge exchanges facilitate possibilities to achieve more sustainable communities.

From environmental, social, and cultural sustainable approaches, three groups of our design studio suggested different remedies to the alarming existing condition on urban-rural fringe communities. Through the pedagogical process, the students were well informed by the site context, sustainable design principles, historic and social conditions of urban-rural fringe in China, and urban design strategies. They perceived several unique and context-related social and cultural dimensions through observation, interviews, and research that integrated into possible futures. We understand the limitations of these outcomes of urban design and their illustrative nature. To address Eco-social futures, design solutions can be unlimited from various focal points. Nonetheless, the design studio tasks and the open discussion of these outcomes will evoke our awareness of problems existing in community development in urban-rural fringe of contemporary China, and call for more sensitive solutions for the future development.

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