

DONGTAN ECO CITY: A MODEL OF URBAN SUSTAINABILITY?

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COVER PICTURE: DONGTAN-ECO CITY ANIMATION.CHARACTERS DRAWINGS BY DANA RONEN (STUDIO 84)

Peter Sigrist: Dongtan Eco City
The Urban Reinventors Online Journal, Issue 3/09
The Right to the City: the Entitled and the Excluded
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Notes from the editor: The project was to be concluded for the Shanghai World Expo in 2010; by that time, 5,000 people should be living in Dongtan Eco City. However, the planned housing, water taxis, sewage-recycling plant and energy park all failed to materialize. The project was stopped and all references to Dongtan were removed from the Shanghai World Expo website. Currently the project seems stalled as the UK's Daily Telegraph reported that the planning permits, which must be renewed annually, had expired. The future of the project seems unclear, but the Arup manager in charge of the project maintains: "There is no time pressure on when to develop Dongtan. Arup also continues to use its involvement in the project as evidence of its experience in "sustainable building," and touts the project as "the world's first zero emission city."

Abstract

This paper examines the extent to which plans for building Dongtan Eco-City outside of Shanghai live up to claims of providing a model of urban sustainability. It provides a discourse analysis of the project and its potential sustainability from integrated political, economic, social, and ecological perspectives. I argue that while Dongtan holds great promise for applying new technologies toward the reduction of pollution and resource consumption, it also risks further marginalizing less powerful sectors of the population and counteracting ecological benefits by developing on protected land and paving the way for automobile commutes to the mainland. In addition, the construction of new eco-cities outside of urban centers does not solve the problems of existing cities, where the majority of the world's population lives. Therefore, such development can not be considered a comprehensive model of urban sustainability.

Introduction

Though not yet realized, Dongtan Eco-City has been lauded as a progressive model of urban sustainability with the potential for successful replication throughout the world. It has also been criticized as an expensive form of public relations, gentrification, and even totalitarianism. These competing perspectives raise questions about the meaning of urban sustainability and the degree to which Dongtan represents a viable model. In addressing these questions, I will begin with a brief overview of the project, the debate surrounding it, and its historical context. I will then explore Dongtan's sustainability from political, economic, social, and ecological points of view. I will end with a series of conclusions on Dongtan's potential as a model of urban sustainability.

The project and debate in historical context

In 2005, Shanghai Industrial Investment Corporation (SIIC) commissioned the British engineering firm Arup to design a demonstration eco-city on Chongming Island across the Yangtze Delta from Shanghai. Chongming is a large alluvial island, the result of fifty years of soil erosion from deforestation surrounding the river (Girardet, 2006). It is also home to a migratory bird sanctuary and an estimated population of 650,000 (*China Daily*, 2004). According to Arup's initial plan, the city will occupy a third of the island, leaving the remaining area for agriculture and open wetlands. Energy is to be produced locally from renewable sources including sun, wind, biofuels, and recycled waste. The plan includes hydrogen-powered buses as well as extensive paths for cyclists and pedestrians. A bridge-tunnel and railway are currently under construction for rapid transport to Shanghai's financial district and international airport (McGray, 2007). Arup hopes the city will generate diverse employment opportunities so that residents can work close to home (Arup, 2008). Dongtan is to comprise three small villages, with the first phase scheduled for completion in time for the 2010 World Expo.

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This will accommodate 5,000 residents, while the city's population is projected at 500,000 by 2050 (ibid.). The Chinese government plans to showcase Dongtan as an example of its commitment to environmental sustainability, and the project is being promoted as a model for new cities around the world (Normile, 2008).

Although it has received a great deal of positive press, Dongtan has not escaped criticism. An online article by Herbert Girardet (2006), a respected urban sustainability expert and consultant on the project, generated spirited debate in the comments section. While some view Dongtan as a step in the right direction, others associate it with failed modernist urban renewal, class warfare on the poor, empty government promises, greenwashing, and “eco totalitarianism” (ibid: Comment number 9). One comment questions the validity of starting anew rather than integrating environmental planning into existing cities. Another expresses doubt about the city's cost-effectiveness and replicability. The overwhelming power of government and business interests is implied in the question: “In China today, is there a possibility of stopping large-scale urban renewal projects?” (ibid.: Comment number 5). Several planners call the new development a marketing ploy to attract good publicity and foreign investment (Bowerman, 2008). It has been reported that a Disneyland theme park is being planned for construction on the island after the World Expo (*Shanghai Daily*, 2007). The debate surrounding Dongtan reflects key issues facing sustainable urban development in China and throughout the world.

Processes of urbanization, globalization, and sustainable development have shaped the emergence of Dongtan. The world's urban population has quadrupled since 1950, and has recently surpassed rural population according to UN estimates (Lee, 2007). China has experienced massive urban migration as a result of agricultural modernization and industrialization (Yin and Wang, 2000). The population of Shanghai has nearly doubled since 1990 (UNPD, 2007), placing great strain on public services and increasing urban sprawl. Globalization, as indicative of the current expansion and exchange of business, technology, and culture throughout the world, has been linked closely with China's integration into the global economy. Deng Xiaoping selectively adopted neoliberal economic policies after coming to power

in 1978, initiating a pursuit of international capital to fuel economic growth. Since the opening of coastal cities to foreign investment in 1984, Shanghai has become a center of commerce, competing effectively with other cities for global finance, prestige, and political advantage (Chan 1999; Low and Elander, 2000; Rose 1999). Neoliberal economic policy has been adapted to the priorities of a strong Chinese state, creating what Ong describes as “sites of transformation where market-driven calculations are being introduced in the management of populations and the administration of special spaces” (2007: 3-4). At the same time, growing concern over climate change and the effects of ecological degradation on human wellbeing have increased pressure on nations to promote environmental sustainability (e.g., IPCC, 2001; UN, 1998; UN, 2002; UNCED, 1993; UNEP, 2003; UNWCED, 1987). China attended the Earth Summit in 1992 and became one of the first countries to formally commit to the resulting “Agenda 21” plan for sustainable development (Yin and Wang, 2000). Dongtan is taking shape in this context of rapid urbanization, competition for foreign investment, and increasing concern over environmental sustainability.

The term “sustainability” can be applied in many different ways. Mitlin and Satterthwaite identify various ideas of “what is to be 'sustained',” including “a person's livelihood, a development project, a policy, an institution, a business, a society or some subset of a society (for example a 'community'), culture or economic growth” (1996: 24). While environmental sustainability is the primary focus in the case of Dongtan, political, economic, and social factors also play important roles. I will focus on the ways in which these factors interact in relation to the eco-city model. Sustainable development is a matter of perspective, as Owens and Cowell explain: “different groups espouse divergent conceptions of what it means for development to be sustainable” (2002: 158). Sustainability is not always good for everyone. An environment, system of governance, economic plan, development initiative, or social policy may be harmful to different sectors of the population. I will consider the experience and needs of unique actors in assessing the viability of Dongtan as a model of urban sustainability. The term “urban” is also used in different ways, often resulting in data inconsistencies (Chapman et al., 1999; Lee, 2007; Tannerfeldt and Ljung, 2006). Some may not consider Dongtan urban because of its relatively low population estimates and location on rural land outside of Shanghai. However, since it is to

accommodate 500,000 people within an area of 12 square miles (Arup, 2008), this would most likely qualify it as a city. Dongtan represents many important issues in urban sustainability, both on its own and in relation to Shanghai.

Dongtan's sustainability from political, economic, social, and ecological perspectives

Dongtan's potential sustainability is largely influenced by political approaches to urban development. In 1994, the Municipal Government of Shanghai drafted a plan for transforming the city into an "international economic and financial center" (Chan, 1999: 66; see also Lau et al., 2001). Urban renewal became a top priority in efforts to attract global capital, resulting in rapid, virtually unregulated development (Chan and Shimou, 1999; Yun, 1999). Public opinion was rarely a concern in this process, which has been called a "liberal, if not democratic, program of municipal progress" (MacPherson, 1996: 518). Developers have commended its speed and efficiency (Schifferes, 2007), but it has also tended to ignore social and environmental concerns (Rose, 1999). While cooperation between the municipal government and private developers has generally been effective in pushing through new projects, this approach may not sufficiently address the needs of local citizens.

Local participation in development is a common theme in urban studies (e.g., Jacobs, 1961; Satterthwaite, 1997; Allen et al., 2002). In response to modernist plans implemented by decree (Relph, 1987; Scott, 1998), Jacobs called for increased input from local residents (1961). Participatory development has also been linked with improved governance (Allen et al., 2002; Girardet, 1999) and environmental sustainability (Bulkeley and Betsill, 2003). Swyngedouw describes the integration of political, social, and ecological aspects of sustainable urban development:

Urbanizing nature, though generally portrayed as a technical-engineering problem is, in fact, as much part of the politics of life as any other social process. The recognition of this political meaning of nature is essential if sustainability is to be combined with a just and

empowering urban development; an urban development that returns the city and the city's environment to its citizens. (2006: 37)

He recognizes politics as integral to the transformation of nature, helping to shape urban settings in ways that may or may not be just and empowering. In Shanghai, organized resistance to Dongtan does not appear to be gaining momentum, which suggests that the project is either acceptable to local residents or that protest is being suppressed in some way.

Governance is an essential component of urban sustainability (Mitlin and Satterthwaite, 1996). According to Chan and Shimou, the Chinese state is “uniquely positioned to adopt a unified planning approach (both of bottom up and top down) that is able to properly co-ordinate metropolitan development and the management of resources [provided that it implements] strategies to co-opt the problems, interests and exigencies of individual localities” (1999: 276). In the case of Dongtan, if new development is imposed upon the island by powerful government and business interests without input from local residents, it may contain inherent social problems that result in political unrest. If the needs of local communities are taken into account, Dongtan may prove more politically sustainable. On the other hand, if the state is strong enough to eradicate opposition, this might also promote the city's political sustainability. Thus sustainability is not necessarily a benign prospect for all.

Girardet describes Dongtan as “designed to ensure that China will play a key role in the emergence of a world of ecologically and economically sustainable human settlements” (2006: 1). He adds that the new city will provide an expanded market for the island's current farming and fishing communities (ibid.). Arup plans to bring new residents, jobs, and visitors to the island (Wood, 2007: 5). They present a somewhat vague economic plan that includes the provision of employment, housing, and local agriculture (ibid.: 7). Community economic development is a key component of the eco-city model (Roseland, 1997), which includes taking “some measure of control of the local economy back from the markets and the state” (Boothroyd, 1991). It is not clear how this might be implemented in the case of Dongtan. Roseland and Soos recommend a

process of “economic demand management,” in which communities work to reduce their reliance on economic growth through strategies such as local exchange trading, revolving loan funds, and community-supported agriculture (2007: 167). The municipal government's economic plan for Dongtan is based primarily on tourism in the form of resorts, theme parks, stadiums, and exhibition centers (*China Daily*, 2004). While this may be less polluting than heavy industry, it may also increase resource consumption, encroachment on agricultural land, and loss of wildlife habitats. On the other hand, it may provide an important source of local employment – another example of conflicting priorities in urban sustainability.

While Dongtan is described as a new concept, and in many ways it is, China has a history of building “satellite towns” on the outskirts of major metropolitan areas. Industrial expansion in the 1950s created a need for the redistribution of population and industry to relieve congestion in urban centers. Similar to Ebenezer Howard’s Garden Cities (1902; see also Relph, 1987), satellite towns were designed to provide residents with greenbelts, parks, local employment, and a “pleasant and unpolluted environment” (Fung, 1996: 327). This strategy met with uneven success, as services proved unsatisfactory, local jobs were limited, and the majority of town residents were forced to commute to big cities for work (*ibid.*). While Dongtan is not a traditional satellite town, it is likely to face similar challenges. It will also require the construction and maintenance of costly infrastructure for a relatively small population. Urban development tends to be most cost-effective when it makes use of existing infrastructure (Jenks and Burgess, 2001), and Dongtan has been criticized as an expensive alternative to improving environmental conditions in current high-density areas (Girardet, 2006: Comments: 2 and 4).

A cost-effective development model with diverse local employment is essential to Dongtan's economic sustainability and replicability. China's thirty-year history of urban agriculture (Allen et al., 2002) may bode well for the success of local food production. However, expensive real estate in densely populated areas tends to force out small farmers (Clark and Tsai, 2001). Township and Village Enterprises (TVEs) helped absorb agricultural workers during the 1980s and 1990s (Chapman et al., 1999), and more privately owned industrial clusters are currently

proving a dynamic source of economic activity (Naughton, 2007). Some of these ideas may be applied effectively in Dongtan. If the new city does not provide sufficient local employment, it risks becoming a commuter town for Shanghai. The case of Dongtan illustrates the economic, political, and social processes through which we shape our environments, often referred to as the production of space (Harvey, 1996; Lefebvre, 1974; Smith, 1984). According to Swyngedouw, “the urbanization of nature is largely predicated upon a commodification of parts of nature” (2006: 36). In the case of Dongtan, replication of the eco-city model does not guarantee its sustainability. New products tend to stay popular until the next new product comes along, at which time their survival depends upon functionality and durability.

Maintaining a degree of social equality has been integral to China's urban policy since the 1950s (Lin, 2007). Arup frames Dongtan's social benefits largely in terms of cultural diversity and quality of life, promising an “internationally, regionally, and locally accessible city” with “cultural, leisure, community, sporting, and educational facilities for all, regardless of age or ethnicity” (Wood, 2007: 7). There is a strong focus on “inclusive, cohesive and tolerant communities that recognise traditional and modern Chinese and other cultural values” (ibid.: 7). Based on these statements, it seems that Dongtan is being developed less for the purpose of social equality than as an attractive location for domestic and international elites. In reference to environmental initiatives driven by municipal governments, Peter Brand finds that “green awareness has been converted into a form of subjection, minor in its social locus and inconsequential in its broader ecological significance, but politically powerful for the management of neoliberal urban economic and social change” (2007: 628). Although Arup is not intent on promoting a neoliberal agenda, the environmental sustainability discourse surrounding Dongtan may attract a wealthy transnational social class that would displace the island's current inhabitants. Or it could provide a new local market for Chongming's farming and fishing communities, increasing their standards of living. Whatever comes to pass, Dongtan exemplifies China's moves toward market-oriented urban planning.

Efforts to appeal to a global public may prove socially unjust. Low and Elander identify a “tendency of globalization, in conjunction with neoliberal policies, to disenfranchise whole social strata economically and politically” (2000: 18). In cities around the world, poor people tend to be relegated to the least healthy and attractive areas, with limited access to basic services (Benton-Short and Short, 2008). Lack of affordable housing plays an integral role in perpetuating urban poverty (Perlman and Sheehan, 2007; Tannerfeldt and Ljung, 2006). In 2003, William McDonough and Deng Nan, daughter of Deng Xiaoping, designed a model eco-village called Huangbaiyu for farmers in China's rural northeast. The project faltered because housing proved too expensive (Heim, 2007). Although Dongtan appears to be courting a more affluent clientele, the case of Huangbaiyu underscores the challenges it will face in accommodating Chongming's current population. Despite significant attention to quality of life issues, Arup's literature reflects a primarily “green” agenda, with a focus on “ecosystem protection and the immediate and deferred effects of human activity at the regional and global scale” rather than a “brown” agenda based on “social justice and the immediate problems at the local level, especially those suffered by low-income groups” (Allen et al., 2002: 36). The new city could potentially cast large sectors of Chongming's population into poverty and divert public expenditure away from poor people in existing cities. While the brown agenda may be primarily a government responsibility, Dongtan can't be considered a socially responsible model of urban sustainability if it doesn't address these concerns.

Jenks and Burgess espouse a socially oriented vision of urban sustainability, which includes “living within environmental means, achieving equity and social justice, and inclusiveness in decision-making” (2001: 349). While Arup's promotional material is generally committed to these values, the inclusion of low-income groups does not appear to be clearly planned. Mixed-income housing can be an effective means of reducing spatial concentrations of poverty (Chaskin et al., 2007). If current island residents are priced out of the area, Dongtan may become a unique example of “rural gentrification” (Ghose, 2004; Phillips, 2005). Urban areas have been described as social mechanisms, ecological systems, and metabolisms that support human populations through complex political processes (Benton-Short and Short, 2008; Gandy, 2004; Girardet, 1996;

Heynan et al., 2006; Lee, 2007). If these processes are to be socially equitable, policies are needed to protect the wellbeing of less powerful groups (Tannerfeldt and Ljung, 2006). This could improve prospects for urban sustainability, as more people would have a stake in maintaining favorable conditions.

The ecological footprint model, which estimates the amount of resources needed to support human consumption (Rees, 1992; Wackernagel et al., 1998), has been used to promote the benefits of eco-cities. Arup compares the average ecological footprint of a conventional city (5.8 global hectares per person) with that of Dongtan (2.3 global hectares per person), acknowledging that this figure is still above the earth's estimated carrying capacity of 2.1 global hectares per person (Wood, 2007). They hope to condense the area of human settlement in order to "physically and legally protect the eco-city's internationally significant wetlands from any man-made intervention" (ibid.: 7). Their plan is based on the concept of "compact cities," which reduce per capita ecological footprint through efficiencies associated with concentrated housing, employment, infrastructure, and amenities (Allen et al., 2002; Burgess, 2001). Dongtan's railway connection to the mainland distinguishes it from automobile-dependent urban sprawl, which has resulted in substantial environmental degradation (Newman, 1999). It is thus in accordance with the concept of "polynucleated urban form," which includes the development of new towns outside of city centers, connected by public transportation (Jenks and Burgess, 2001: 347).

While Dongtan incorporates promising new strategies for environmental sustainability, the eco-city model does not directly address the environmental problems of existing cities. Metropolitan Shanghai is faced with "an outdated industrial base, an inadequate municipal waste collection and treatment system, [and] an energy structure that is based largely on coal" (Kin-che and Shu, 1996: 470). Urban sprawl is a serious threat to environmental sustainability (Allen et al., 2002; Tannerfeldt and Ljung, 2006), and 80% of new housing in metropolitan Shanghai is built on the outskirts of the city (Yun, 1999). Much of this development has been approved without thorough environmental impact assessment (Lau et al., 2001). As personal automobile transportation becomes more accessible in China, air pollution and carbon emissions will probably increase

substantially. In the case of Dongtan, adverse environmental effects from the 16-mile expressway that accompanies the railway could outweigh the benefits of reduced automobile traffic on the island.

It is uncertain whether the environmental sustainability measures planned for Dongtan can be applied in traditional cities, or whether this would be any less expensive or prone to gentrification. However, assuring the quality and sustainability of shared resources throughout the metropolitan area requires comprehensive solutions. Polynucleated urban planning would involve an expansion of the built environment that could decrease arable land, wildlife habitats, and efficiencies derived from population density. Chongming's lack of convenient transportation to the mainland discouraged major development in the past (Heim, 2007). Now that the bridge-tunnel is nearly complete (*People's Daily Online*, 2008), it is important that the eco-city concept does not become a justification for developing on protected land and displacing the island's current residents. If Arup, SIIC, and the Chinese government can provide a model of ecologically sound, socially just, economically viable, and politically inclusive urbanism, Dongtan may be a step in the right direction. However, it must not become a substitute for addressing the environmental problems of existing cities.

Conclusions

Dongtan Eco-City is a complex example of urban planning in an era of globalization and increasing concern over environmental sustainability. It is promising in its focus on renewable energy, reusing waste, and reducing dependence on automobiles. Arup has done an impressive job of designing a city capable of minimizing resource consumption. They have also presented vague but generally progressive ideas for Dongtan's social, political, and economic sustainability. However, these areas fall primarily under the responsibility of Shanghai's municipal government, which has concentrated on building the bridge-tunnel and courting tourist attractions. There does not appear to be a clear plan for integrating the island's current population into the social, political, and economic fabric of the city. In addition, the construction of new eco-cities does not directly address the severe environmental problems facing traditional cities. Solving these

problems is essential to the sustainability of healthy ecosystems. Dongtan will be valuable if it stimulates the application of new technologies to improve environmental conditions throughout the metropolitan region. However, it is not a sufficient model of urban sustainability because replication would involve building more eco-cities (linked by rail, but also expressway) on undeveloped land – a form of sprawl that could precipitate the decline of central cities. This process might be called sustainable suburbanism, except that problems of the urban core tend to affect surrounding areas as well. A true model of sustainable urbanism must include solutions to the problems of existing cities.

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