

Case Profile Series on  
Land Trusts as Climate Change Solution Providers

## Ant Forest: Using Financial Technologies to Advance Climate Solutions in China



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The International Land Conservation Network is a program of the Lincoln Institute of Land Policy

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Cover photograph of Ant Forest's Tree Planting Project creates green job opportunities for locals in Kubuqi Desert, Inner Mongolia, China. Source: Ant Group.

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## CASE OVERVIEW FOR EDUCATORS

**Topic:** Leveraging credit card networks to attract philanthropic resources to protect and reforest land

**Subtopics:** Land Restoration, Climate Mitigation, Flood Protection, Cross-sectoral partnerships

**Timeframe:** 2016-2021

### Primary Learning Goals:

1. To understand the complex challenges and unique opportunities of China's transition to a low-carbon society.
2. To understand how technology-enabled, bottom-up approaches can effect behavioral change toward green lifestyles, and how they can complement the top-down climate action initiatives led by governments.
3. To understand the importance of collaboration between big financial technologies companies and conservation groups, local communities, and local governments in tree planting and nature conservation.

### Secondary Learning Goals:

1. Develop insights into how a consumer-oriented initiative can grow very rapidly and have a significant impact with a very large audience.
2. Gain an understanding of the large networks of public and private partners that can make projects successful in multiple dimensions.

### Primary Audiences:

1. Land Conservation organizations and practitioners.
2. Public and corporate decision-makers and regulators.
3. Staff, directors and supporters of NGOs, community organizations, and
4. Interested members of the general public.

**Prerequisite Knowledge:** General knowledge regarding large financial networks, climate change and the conservation of land and biodiversity

**Summary:** This case study explores how a Chinese financial technology giant – Ant Group – embraced the nascent idea of green finance by developing an innovative personal carbon account called Ant Forest and linking it with a variety of afforestation and nature protection programs run by non-profit partners. While China's environmental protection efforts in the past followed a top-down, government-led approach, today's ambitious transition toward a low-carbon economy calls for a whole-of-society approach. Ant Group found a powerful way of incentivizing hundreds and millions of users to adopt more sustainable lifestyles.

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## Historical Context

China faces daunting environmental challenges. The Loess Plateau in Northwestern China, once a fertile region that led to the formation of early Chinese civilization, has long been plagued by desertification. Centuries of overgrazing and subsistence farming, exacerbated by population growth and climate change, have degraded vast areas of ecosystems so much that in 1972 the United Nations World Food Program designated parts of the region as one of the world's least habitable. The region is also one of the poorest in China.

Since 1978, Northern China has been the focus of a major afforestation program known as the "Green Great Wall." This government initiative aims to afforest 88 million acres, thereby tripling the forest cover in Northern China from 5% to 15% by 2050.<sup>1</sup> By 2019, over 74 million acres of new forests were planted in some 13 provinces. Aside from the Green Great Wall initiative, China has implemented several payments-for-ecosystems programs to address various environmental crises, such as the Natural Forest Conservation Program launched in 1998 and the Grain to Green Program that began in 1999. Notably, these environmental programs all follow a top-down, government-led approach.

Still, rapid industrialization and economic growth in recent decades have made China one of the biggest greenhouse gas emitters in the world. In 2006, China overtook the United States as the world's largest carbon dioxide emitter for that year. China accounted for 27% of carbon dioxide emissions of 2016, far surpassing the United States, which accounted for 15%.

As environmental pressure built both at home and abroad, China made transitioning to a low-carbon economy a top priority. In 2016, China signed the Paris Agreement, pledging to reduce carbon intensity by 60-65% and increase forest stock by 4.5 billion cubic meters by 2030 compared to 2005, among other targets.

In March 2016, China's "Thirteenth Five-Year Plan" for the first time set out concrete carbon emissions targets and laid out decarbonization pathways for a variety of sectors. Among them is the establishment of a green financial sector.<sup>2</sup> In August 2016, seven ministries, including the People's Bank of China and the Ministry of Finance, jointly issued policies to support green finance and carbon markets.

## Problem Statement

As the Chinese government began to adopt ambitious policies, there was increasing recognition that transition toward a low-carbon economy would require more than top-down government initiatives. The whole society would need to adopt a low-carbon lifestyle. But there was a noticeable gap between the Chinese public's awareness of climate change and their willingness to change. China Climate Communication Project Center's 2017 survey report found that more than 90% of respondents believed that climate change was happening, but only 27.5% of respondents were willing to pay the full price for their own carbon emissions.<sup>3</sup> Therefore, there remains significant room for widespread public participation in several nature conservation initiatives, especially those around civically protected areas.

At the same time, the financial technology sector in China was developing at breakneck speed. By 2016, Ant Financial (later renamed Ant Group), a spinoff of China's e-commerce giant Alibaba Group, had revolutionized the way Chinese people pay for goods and services. More than 450 million users used its popular Alipay mobile app to pay for everything from groceries, to bike rentals, to wealth management products by 2016.<sup>4</sup> As financial technology became increasingly prevalent in everyday life, it became apparent that it could also play a key role in China's transition to a low-carbon society. More citizens have the opportunity to participate directly in green finance and nature conservation. But how?

## Possible Strategies and Solutions

In the summer of 2016, Ant Financial decided to explore the nascent idea of green finance. At a lunch meeting, Ant employees from various teams gathered to brainstorm ideas. Several of them stayed behind and volunteered to create an innovative green financial product to encourage users to live a green lifestyle. They considered several ideas.

1. Green credit: Ant Financial could help small and micro businesses that sell green products raise funds by setting up a green performance evaluation system and by providing favorable loans to merchants that purchase green products.
2. Green auto insurance: Ant Financial could link auto insurance rates with annual car inspection results to incentivize consumers to shift to lower emission vehicles.

One of the volunteers was Bai Xue, who only joined Ant Group a month prior to the meeting. She had never heard of green finance before. After several colleagues from Ant Group's research institute explained the concept, "all the professional terminologies still sounded too fancy for me to understand," recalled Bai. "I went into each weekly meeting with a lot of respect for my knowledgeable colleagues, but I left each meeting with even more confusion." In one of the early weekly meetings, Bai challenged the group, asking: "How can I expect our users to use green finance if I myself struggle to understand it?"<sup>5</sup>

Then someone said, "when we talk about green, I think of trees. How about planting a tree on

our mobile phone? A real tree!” The team started a lively discussion and co-creation. The team decided to design an interactive feature to allow users to participate in green finance and environmental protection in a relaxed manner. Users generate “green energy” whenever they engage in low-carbon activities. The “green energy” will then nourish a virtual seed. Whenever a seed becomes a tree in the virtual world, Ant Group will plant a real tree in the real world.<sup>6</sup> In this way, “Ant Forest” was created and began to move towards a public, philanthropic product.

But few people believed it could succeed. Some thought users might not be interested in it. Others were concerned about the lack of funding for the trees. More and more people left the team. At one point, only five people remained. “We felt like a bunch of nobodies,” recalled Bai. But those that remained persisted.

## Solutions and Implementation

### *Tree Planting*

In August 2016, Ant Forest was launched on the company’s Alipay mobile app, rewarding its users with “green energy points” each time they took a step to reduce their carbon emissions. Ant Financial evaluated the data of participating users. The algorithm was based on individual behaviors that can be recorded by various apps, such as walking or riding a shared bicycle, taking public transit, placing utensil-free takeout orders, and other activities that reduce resource consumption and carbon emissions.<sup>7</sup> Alipay connected the data of each app as the calculation basis for Ant Forest. For example, users can reduce carbon emissions by buying train tickets online instead of going to the train station. Ant Forest then converted the “avoided carbon emissions” into users’ virtual green energy points and stored them in their personal Ant Forest account. Users can use green energy points to redeem different types of trees online when the points are accumulated to a certain amount. Once a users’ virtual tree had fully grown, Ant Forest promised to plant a real tree in the real world.

But to make that happen, the team confronted a major challenge: how to find willing partners to provide trees and funding? While some team members focused on product development, others started to knock on doors. It did not go well. Almost all the companies and environmental groups they talked to rejected them. “In retrospect, we were crazy,” Bai recalled one instance when she was sitting across the table from five vice presidents of a potential funding partner.



Figure 1: Collecting green energy and planting trees on mobile app. Source: Ant Group

“Think about it -- a random young person comes to you saying that she has this big idea. She needs you to provide tens and millions of trees, but she has nothing to show you now.”

Finally, SEE Foundation, a private environmental foundation that had previously worked with Ant Group, agreed to provide the funding for 1.6 million real trees in 2016. SEE Foundation

had already been planting a particularly drought-resistant tree known as *Haloxylon* in China’s Inner Mongolia region to combat desertification. One *Haloxylon* tree can stabilize up to 10 square meters of sand.<sup>8</sup> Decision makers at SEE Foundation thought the vision described by the Ant Forest team was highly aligned with its own goal of stabilizing some 1,330 square kilometers of desert in Inner Mongolia.

In the beginning, Ant Forest planted trees mainly in Inner Mongolia in partnership with SEE Foundation. But user volumes grew so quickly that all available trees were soon claimed. Ant Forest attracted more than 60 million users in just three months after it first launched and accumulated 200 million users in 5 months. With the initial success, Ant Forest expanded its implementation partners to the China Green Foundation, Yili Foundation, and Yunan Green Environment Development Foundation. Tree planting expanded to Gansu, Qinghai, Shanxi, Hebei, Sichuan and Yunnan provinces.<sup>9</sup> For example, in Yunnan province, Ant Forest launched a green corridor initiative to reconnect two critical habitats of endangered Yunnan Snub-Nosed Monkey that had been separated by human settlement.<sup>10</sup>

Funding sources also expanded. While the SEE Foundation funded the first batch of trees, Ant Forest attracted so much attention that its parent company, Alibaba Group, soon stepped in to fund the scale-up effort. At the same time, the variety of tree species expanded based on local context. Different types of trees required different amounts of “green energy” to be redeemed, depending on the size and difficulty of planting the tree and its carbon sink ability calculated by The Nature Conservancy China (TNC China)<sup>11</sup>. Users can obtain an electronic certificate, symbolizing their environmental protection achievements. Trees were planted and maintained in conjunction with local governments, philanthropic NGO partners, and local farmers and herdsman.



Later, more and more lifestyle-related services were recognized by Ant Forest, such as recycling mobile phones, switching to green offices (paperless and online meetings), bringing their own bags, or shopping at businesses that use environmentally friendly bags, E-reading, and the like. In September 2019, Ant Forest partnered with Starbucks to launch an initiative where consumers can bring their own cups for drinks and gain green energy. More than 650,000 people participated during the first month and reduced carbon emission by 51 tons.

To allow users to see the fruits of their labor, Ant Forest started to provide regularly updated satellite images of the planting area in the app for users to review. In early 2017, Ant Forest put out a public call on social media: tell us your story with Ant Forest, and you may have a chance to visit Ant Forest on March 21<sup>st</sup> – World’s Forest Day.

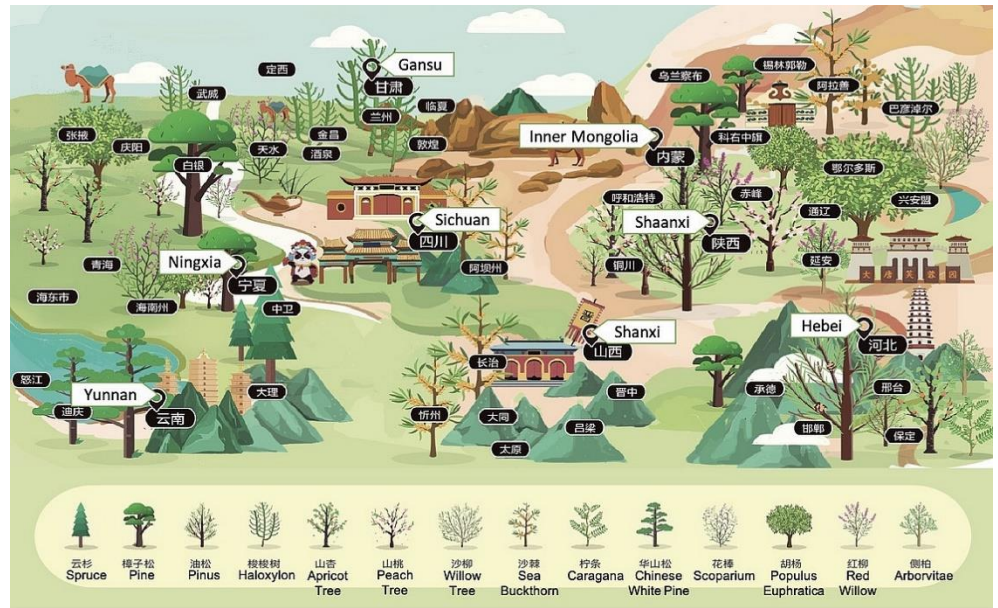


Figure 2: Different trees were planted in different areas according to local environment. Source: Ant Group

“We originally planned to select eight stories, but we ended up receiving more than 20,000,” recalled Bai. An overweight user said he started exercising to accumulate “green energy points” and lost almost 80 pounds within six months. A pregnant mom planted a tree on the same day her baby was born. After spending days and nights going through all submissions, the team selected eight lucky users. Their visits in Inner Mongolia were live streamed, and tens and millions of people saw a different world far away from their cities: the sandstorm was still raging, but a green oasis was starting to take shape. One viewer commented, “finally, this world is a little bit different because of me.”

When the Ant Forest team presented these user comments to Ant Group leadership, the executives were impressed. The leadership team immediately decided that the Ant Forest project would enjoy an unlimited budget. The synergy between Alipay and Ant Forest was clear: the huge number of users of Alipay provided Ant Forest with a very convenient user base, and the success of Ant Forest, in turn, increased Alipay user-stickiness (that is, the willingness of credit-card customers to remain loyal to Alipay). Users collected green energy in Ant Forest, completed challenges, and showed off their trees among friends. Within half a year of Ant Forest’s initial launch, Alipay’s daily active users rose by 40%.<sup>12</sup>

## ***Protected Areas***

In addition to planting trees, Ant Forest explored other ways to protect the environment. In early conversations with non-profit partners, the Ant Forest team came across the notion of “civically protected areas.”<sup>13</sup> In September 2017, Ant Forest launched a land protection product, where users can use green energy to “adopt” or virtually claim to protect five square meters of protected areas. TNC China calculated the energy value of each protected area based on the ecosystem carbon sink ability in the next ten years. The Yanghu Protected Area in Anhui Province, managed by the Paradise International Foundation,<sup>14</sup> was the first protected area to go online. Each user could redeem 13kg of green energy for a five square meter (or 54 square feet) piece of a natural reserve. Within five days, the challenge of protecting the 2,000-acre natural reserve was completed by eight million Ant Forest users.<sup>15</sup>

The success of the Yanghu Protected Area allowed the Paradise International Foundation and Ant Forest to form a close partnership. By the end of 2020, Ant Forest and several non-profit partners had jointly launched 13 protected areas in Anhui, Sichuan, Shaanxi, Yunnan, Hainan, Shanxi, Jilin, and Qinghai Provinces. All told, more than 200 million people had adopted a total of 420 square kilometers (or 103,784 acres) of protected area through Ant Forest.<sup>16</sup> Every protected area became a hit when it came online. Ant Group provided most of the funding for patrolling, installing cameras and education programs in protected areas. The public could view precious videos and pictures of endangered wild animals in these protected areas through Alipay, deepening the connection between the public and nature protection.

The Ant Forest team found that the growing popularity of protected areas also boosted the sale of agricultural products within those protected areas. In Guanba Protected Area in Sichuan Province, villagers had long relied on forests for subsistence bee farming. Still, raising bees was difficult work, and with low and fluctuating honey prices at local markets, many still lived in poverty. When Ant Forest came in, the question locals asked the most was, “if you help protect the forest, how can we maintain our livelihood?”

When Ant Forest experimented with promoting agriculture products from protected areas on the Alipay e-commerce platform, 10,000 bottles of honey from Guanba and surrounding villages were sold out within a minute. In the past, Guanba honey was sold for \$5.5/lb in local markets. Now their prices jumped six-fold to \$34/lb on Alibaba’s e-commerce sites. Average per capita income from bee farming alone grew from around \$1,500 to \$4,600-\$7,700 a year. In addition to connecting local honey with a nationwide market, Ant Forest also improved bee farm productivity and reduced hard labor on the supply side. Alibaba provided artificial intelligence technologies to enable beehives to run autonomously. At this time, the farmers that have been liberated by technology are now paid by Ant Forest to patrol and protect the forests. The villagers of Guanba deeply appreciate that ecological protection and economic development do not necessarily conflict with each other, but they can be mutually beneficial.<sup>17</sup>

## Results

The growth of Ant Forest was spectacular. Within six months of its initial launch, the number of users reached 200 million. By the end of 2020, the number of users had exceeded 550 million, and more than 220 million trees had been planted in areas under the threat of desertification, covering a total area of 3 million mu<sup>18</sup> (or 500,000 acres). Protected areas with Ant Forest support exceeded 420 square kilometers (or 103,784 acres), and protected more than 1,587 species of wild animals. Regarding socio-economic impact, Ant Forest helped create around 730,000 green jobs and RMB 98 million (USD 15 million) in income by paying farmers and herdsmen to grow trees and patrol protected areas, developing organic agricultural products, and connecting them with e-commerce platforms.<sup>19</sup>

Importantly, Ant Forest and its partners helped build a symbiotic and sustainable relationship between forests and local communities. Millions of Ant Forest users, through the low-carbon behavior, now contribute both to nature conservation as well as the surrounding communities that patrol the area. With the financial contribution from Ant Forest, the Paradise Foundation trained thousands of villagers on ecological protection, turned them into forest patrol teams, formulated patrol routes, established patrol standards, and installed infrared cameras to catch poaching in protected areas. Whereas nature conservation programs were often viewed as a drain on cash-strapped local government budgets and were chronically under-funded, Ant Forest significantly increased the pay for forest patrol.

The Ant Forest model is built on a multi-stakeholder approach. By the end of 2020, Ant Forest has attracted nearly 1,000 partners, including non-profit organizations, scientific research institutions, local governments, universities, and private companies, to work with protected areas.<sup>20</sup> Through multi-party cooperation, there will be more diversified ecological agriculture models in the future, including the expansion of tree species, ecological tourism in protected areas, and under-forest economy.

An impact evaluation conducted by the Research Center for Eco-Environmental Sciences of the Chinese Academy of Sciences estimated that various Ant Forest afforestation projects from 2016 to 2020 had a gross ecosystem product (GEP)<sup>21</sup> of 2 billion RMB (or USD 311 million) in 2020 and will have an 11.3 billion RMB (or USD 1.8 billion) impact in the year in the future when all trees are fully grown.<sup>22</sup> Among all the ecological impacts studied, sand stabilization was estimated to yield the largest economic value (at 48%), followed by climate moderation (at 25%), and carbon sequestration (at 13%, representing the sequestration of about 1.6 million tons of CO<sub>2</sub>).<sup>23</sup>

The Ant Forest initiative has proved to be remarkably successful in a very short period. The young employees of Ant Financial who dreamed up the program were extraordinarily creative, inventing a new and highly effective way to promote conservation in China. The program has changed the way that conservationists strategically approach land protection in China, earning international recognition as it received a “2019 Champions of the Earth” award, the United Nation’s highest environmental honor, for “turning the green, good deeds of half a billion people into real trees planted in some of China’s most arid regions.”<sup>24</sup>

## Analysis and Evaluation

For years, China had relied on a government-led, top-down approach to energy conservation and environmental protection. Using increasingly stringent environmental regulations and stepped-up enforcement, the government had mostly targeted various industrial producers. However, much less effort had been made to mobilize environmental action among consumers. As the Chinese economy increasingly shifted to a consumption-led growth model, and as China embarked on an aggressive decarbonization push, the wider public must be part of the solution.

Against this backdrop, the timing of Alipay's foray into green finance in 2016 seemed right. Few other technology products enjoyed the same level of ubiquity in Chinese consumers' everyday lives, and even fewer played such a central role in the market as a financial intermediary. Armed with an immense amount of data on people's everyday activities, Alipay was well-positioned to nudge people to live a greener lifestyle in a uniquely bottom-up fashion.

At its core, Ant Forest functions as a personal carbon account. First, by quantifying the amount of carbon emissions averted for each type of activity, it helps break down big, abstract climate goals into more concrete actions that everyone can take. Second, by making carbon credit accumulation a competitive game among friends, it helps socialize and positively reinforces behavioral change toward a low-carbon lifestyle. Third, by allowing users to redeem carbon credits with a variety of real trees and protected areas, it allows users to appreciate a direct connection between individual actions and the collective problems. Above all, Ant Forest dramatically reduced the barriers for individual action in solving a collective action problem.

While this approach may seem intuitive today, it was not in 2016. When it comes to corporations "giving back" to society, the dominant approach had been "corporate social responsibility." Using this approach would have led Alipay to donate money and staff time to worthy social causes such as afforestation. But such measures are often difficult to scale up and sustain, limiting their impact. Alipay's approach was decidedly different. Instead of treating Ant Forest as a window dressing expenditure to maintain a positive public image, it treated it as an opportunity to increase user stickiness to the larger Alibaba ecosystem. Ant Forest became a core feature within Alipay. This set Ant Forest and Alipay on a mutually reinforcing, and thus more sustainable, cycle, yielding a much bigger environmental and social impact.

Yet Ant Forest's success has also put the program under the public spotlight. In September 2020, President Xi Jinping announced at the United Nations General Assembly that China has set the goal of peaking carbon dioxide emissions by 2030 and achieving carbon neutrality by 2060. Major companies such as Ant Group are expected to come up with their own decarbonization strategy. Some suspect that Ant Group would simply use Ant Forest to offset its carbon emission and not carry out additional decarbonization across its supply chain. Others point to Ant Forest's limitation in capturing data. According to this view, a user's carbon account is only as complete as the data Ant Forest can collect, and Ant Forest is unable to capture low-carbon activities outside of its ecosystem, rendering its carbon accounts inaccurate. But a more accurate accounting of one's carbon footprint would involve capturing data from other apps and

platforms, which would raise concerns over market monopoly, privacy, and cyber security.

## Lessons Learned

First, technology-enabled, bottom-up approaches can be a powerful way to effect behavioral change and to complement the top-down climate action initiatives led by governments. It has proven to be scalable and replicable. In June 2019, the leading mobile wallet in the Philippines, GCash introduced GCash Forest on its app. Inspired by Alipay Ant Forest, GCash Forest enables local users to contribute to reforestation and environmental preservation by adopting low carbon activities in their daily lives. With the technical support of Ant Financial, GCash, in conjunction with the Philippine Ministry of Environment and Natural Resources and environmental charity organizations, plans to plant 365,000 trees in the country in the next 365 days. GCash forest has accumulated 1.3 million users.<sup>25</sup>

Second, broad collaboration between technology companies, environmental non-profits, local communities, local businesses, and local governments are key to success. Oftentimes, the same environmentally fragile areas are also the poorest parts in China. In this context, poverty alleviation and environmental protection must go hand in hand. The Ant Forest experience shows that creating well-paid and green new jobs in eco-agriculture and eco-tourism is critical in obtaining local buy-in. For this reason, it is important to engage with and incentivize all local stakeholders.

Third, the type of plant species must suit the specific ecological contexts. In Inner Mongolia's desert, shrubs that are highly tolerant to dry weather are the most appropriate plant, even though they may not absorb much carbon. Instead of being fixated on carbon, one must recognize a wide range of ecological goals, depending on the context in which one operates.

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## Appendix 1: Study Group Questions

One of the several uses of this case profile is in an academic setting. Following are several questions that an instructor can pose to their study group to engage participants in the details of the narrative.

- Is this a novel initiative? How have the protagonists creatively addressed the need to engage the public on sustainability?
- Are the solutions that have emerged in this case measurably effective and strategically significant for the practice of green finance? Why and why not?
- Are the solutions described here transferrable to other jurisdictions and will they endure?
- Are the cross-sector partnerships formed in this case sustainable? How to motivate other corporations to build partnerships with non-profits to meet the climate challenge?
- If you were the head of Ant Forest, what would be your priorities in the next year, or ten years?

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## Endnotes

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<sup>1</sup> Columbia University, 2021

<sup>2</sup> Climate Change Laws of the World, 2021

<sup>3</sup> Energy Foundation, 2021

<sup>4</sup> Green Digital Financial Alliance, 2020

<sup>5</sup> Alibaba Charity, 2021

<sup>6</sup> Alibaba Charity, 2021

<sup>7</sup> The Ant Forest records low-carbon behaviors into personal "carbon accounts". A set of algorithms developed by Ant Financial and China Beijing Environmental Exchange (CBEEEX) are quantified into "green energy". For example, riding shared bikes will gain 159g green energy points; taking subway will gain 52g each time; driving electric cars will gain 891g each day; buying train tickets online will gain 136g each time; placing utensil-free takeout orders will gain 16g each order, etc.

<sup>8</sup> See Foundation Website, <http://conservation.see.org.cn/Project/namenggu/introduction/2019/1018/59.html>. The cost of one

<sup>9</sup> Chinese Academy of Science, 2021

<sup>10</sup> Jin et al, 2021

<sup>11</sup> For example, it requires 17,900g green energy to redeem a Haloxylon, 96,000g for an Arborvitae, 114,000g for a Pinus and 198,000g for a Source.

<sup>12</sup> Wang, 2019

<sup>13</sup> Civically protected areas in China refer to the demarcated areas where non-governmental entities are involved in governing or managing for the purpose of long-term protection of nature and ecosystem services.

<sup>14</sup> The Paradise International Foundation is a nonprofit environmental organization with a focus on nature conservation. We are committed to protecting the treasured lands and waters around the world with the charitable spirits, scientific measures, and sustainable means. Jack Ma was on the first term board member, who is the founder of Alibaba and Ant Group.

<sup>15</sup> Alibaba Charity, 2021

<sup>16</sup> Ant Group, 2020

<sup>17</sup> The Paper, 2020

<sup>18</sup> Mu is a Chinese measure of land area. There are about 6.07 mu per acre, and about 1,500 mu in a square kilometer.

<sup>19</sup> Ant Group, 2020

<sup>20</sup> Ant Group, 2020

<sup>21</sup> GEP (Gross Ecosystem Production) refers to the total economic value of the final products and services provided by the ecosystem in a certain area for human well-being and sustainable economic and social development during the accounting period. It accounts for the economic values of water and soil conservation, sand stabilization, carbon sequestration, air purification, and climate moderation.

<sup>22</sup> Assuming constant 2020 prices.

<sup>23</sup> Chinese Academy of Science, 2021

<sup>24</sup> United Nations Environment Programme, 2019

<sup>25</sup> United Nations Climate Change, 2021