FARM IN ANCIENT CHINA: A VIDEO GAME CONCEPT

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Abstract

My thesis project is a video game concept which depicts Calendar Valley, a game that simulates ancient China and allows the player to farm like a traditional Chinese farmer. Modern farming is highly industrialized and chemical-based. It has disrupted the environmental equilibrium and disconnected traditional farming families like mine from their farmlands. Traditional Chinese farming, based on nature and sustainability, is becoming forgotten. Knowing the importance of traditional farming practices and appreciating the technology-dependent urban lifestyle, I have attempted to bridge the paradox of traditional and modern practices by proposing a farming simulation game. As video games are not merely intended for entertainment, but also can be applied to education, it is feasible to embed the goal of connecting traditional Chinese farming with modern audiences into a video game which simulates ancient China.

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Chapter 1 Introduction

My thesis project and its artwork exhibition have involved the creation of game art concepts and gameplay concepts for a farming simulation game Calendar Valley, which simulates ancient China and allows the player to farm with traditional Chinese farming practices.

The idea of designing the game concept of Calendar Valley that introduces Chinese traditional farming methods came from my connection with the small-scale farms in China—my grandparents, uncles, and aunts used to be farmers, so I was a frequent visitor to the small-scale farms. China is now shifting the manual-labor, small-scale collective farming to highly industrialized and chemical-based farming. This change has pervasively impacted the lives of families like mine that it has broken the connection between the farmers and their traditional farming lives. As a result, the time-tested wisdom of traditional farming practices, which is based on the cycles of nature, is in danger of being gradually forgotten.

As someone whose family experienced the transition from rural farming practice to modern city living, I am very aware of what has been lost or disrupted. However, I am also someone who enjoys the aspects of a technology-dependent urban lifestyle which includes my two big favorites—digital art-making and video games. As a person who is connected both to modern and traditional life, it seems logical to reconcile this paradox to help people who do not have these connections. So, I wanted to propose a video game, which is an element from modern life, in the theme of traditional Chinese farming, to help these people to gain a better understanding of traditional Chinese farming practices.

1.1 My connection with Chinese small-scale farms

My grandparents, aunts, and uncles were farmers. Their farms were the traditional small-scale farms in rural Jiangsu (江苏), where I used to visit frequently during my childhood. Like the many other traditional farms in Jiangsu, China, the staple crop of their farms was rice. The traditional farms in China, which are usually run by families, averagely occupy several 'mus (亩)' of fields (1 mu= 666.67 m^2). The family members of the farms live close in order to reach others when it comes to the busy farming seasons. Unlike the large agricultural organizations with better investments, marketing chains, and regulations, most of these small-scale farms are weak at making profits, so most farmers live in poverty (Wiggins et al. 1345). Since the 1970s, China started to develop modernization and industrialization. Cities in China were in need of massive cheap labors to manufacture commercial food and commodities, also to build railways and steamboats, which offered lots of job opportunities to the farmers (Chi 101). Millions of farmers left their farms to work in cities, and this phenomenon was called the rural migration (Farrar). My aunts and uncles joined this migration as well. My uncles found jobs at construction sites, and meanwhile, my aunts worked in a toy factory. Shortly after my uncles and aunts moved to the cities, my grandparents retired from farming. Since then, I was disconnected from the small-scale farms.

Three years ago, on the way back from a trip, I noticed a small farm on the side of the highway. Several machines were parked along the field, and a farmer was manipulating a drone to spread pesticide. This looked so different from the traditional farming methods in my memory. I started to realize, along with the rapid development of China, traditional

farming is becoming increasingly connected to machinery and automation, and less connected to people and culture.

1.2 Modern farming and its environmental issues

The New York Times points out, “China’s agriculture sector is far from being dominated by big commercial farms, but the process has begun” (Schuman). In 1964, the Chinese government proposed “four modernizations.” As one aspect of the “four modernizations,” agriculture modernization aimed at applying the modern farming technologies, including the use of modern inputs, modern machines, modern irrigation, and modern collective organization (Ye 329). Compared to traditional farming, modern farming has a higher efficiency but works indifferently to the cycles of nature. In a traditional way of farming, the farmers plant crops according to the seasons; in modern farming, farmers use plastic greenhouses to extend the growing seasons and intensify cultivation (Wang et al. 186). Plastic greenhouses allow off-season vegetables and fruits to grow, for example, watermelon, a type of fruit that gets ripe in summers, now can be available all seasons because of the usage of greenhouses. The traditional farming controls pests and fertilizes croplands by using multiple cropping systems. Multiple cropping is the practice of planting more than two or three pieces in the same area during the same season (Singh et al. 623). Modern farming controls pests and fertilizes the crops by using chemical pesticides and fertilizers, which are efficient and cheap. Pesticides are designed by companies to destroy the unwanted agents like fungi, weeds, and insects, resulting in up to 400% return on investment to industrial farmers (“Top Pesticide Using Countries”). The chemical fertilizers contain a high concentration of nutrients that are required for plant growth (Cheremisinoff 222).

However, modern agriculture causes environmental issues. For example, the usage of plastic greenhouses contributes to heavy greenhouse gas, soil and groundwater pollution (Wang et al. 186). The usage of plastic greenhouses is linked to excessive fertilizer uses, heavy rotation, high temperature, and moisture, etc., which are the factors resulting in acidification, secondary salinization, nutrient imbalance, and soil ecology environment changes of soil (Song et al. 8941). Research also shows that plastic greenhouse systems usually receive excessive amounts of N fertilizer, which then causes a high emission of Nitrous Oxide (N2O), a type of greenhouse gas (He et al. 1666).

Since China consumes the most pesticide worldwide, the overuse of pesticide is a big concern in China, which has been criticized for damaging human health and polluting environment (C. Zhang et al. 2). The compounds in pesticide have more than 1,000 active ingredients, which are marketed as insecticide, herbicide, and fungicide, which are efficient in killing insects and weeds, however, research has shown that long-term contact to pesticide can cause human chronic diseases, such as respiratory problems, particularly asthma and chronic obstructive pulmonary disease (COPD), cardiovascular disease such as atherosclerosis and coronary artery disease, chronic nephropathies, autoimmune diseases like systemic lupus erythematosus and rheumatoid arthritis, chronic fatigue syndrome, and aging (Mostafalou and Abdollahi 157). Pesticide can spread through water sources, such as ponds, rivers, and ocean, and then cause sickness and death to fish and other animals (Jakuboski), which has a negative impact on animal species distribution and biodiversity (Snelder et al. 748).

Chemical fertilizers frequently contain phosphate, nitrate, ammonium and potassium salts, along with a large number of heavy metals, which can cause environmental

problems like drinking water pollution, unbalancing soil pH and soil structure, nitrogen oxides (NO, N2O, NO2) pollution in the air (Savci 290).

1.3 Traditional farming is sustainable

Compared with modern farming, traditional farming cooperates with nature and does less harm to the environment. A case study of traditional agriculture in Taiwan summarized the advantage of traditional farming practices:

The traditional farming practices contributed guided by the traditional farming calendar and characterized by mixed cropping, intercropping, and rotation, which optimized the use of limited arable lands in the area. These practices also contributed to maximizing and securing local food supply and maintaining endemic crop varieties. The results suggested that traditional farming offered a way to overcome the limitation of modern agriculture and support ecotourism as a sustainable alternative to mass tourism, by preserving crop diversity, social institutions and cultural traditions, and stabilizing the local environment (Ba et al. 1).

The application of multiple cropping can relieve pest control and make good use of soil nutrients. The United Nation's Food and Agriculture Organization (FAO)gives two examples of multi-cropping: to plant vegetables that the pests hate, such as garlic and pepper, between tomatoes, carrots and other crops, can prevent tomatoes and carrots from pests; crops like cowpea, beans, and other leguminous crops have roots can make nitrogen in the soil for other plants, so plant legumes with crops that require lots of nitrogen (like maize and sorghum) can benefit these crops greatly ("Multiple Cropping"). Crop rotation is a practice of growing different crops in a specified order in the same fields ("Crop Rotation"). Crop rotation can benefit the cropland with fewer pests and plant disease, and

also rotations that include legumes can fertilize soil ("Crop Rotations"). The application of crop rotation in China can be dated back to the West Han dynasty (西汉), about 2,000 years ago, including legume-cereal rotation, green manure-rotation, etc (Zeng et al. 53). In legume-cereal rotation, a legume, such as soybeans, can provide N, which is an important nutrient to plants, to the following crop ("Crop Rotations").

Traditional farming cooperates the environment and stays in harmony with the environment. A great example of this cooperation is the application of the Integrated Farming System (IFS). An integrated system is an agriculture system "with multiple enterprises that interact in space and /or time to get benefits through a synergistic resource transfer among enterprises" (Archer et al. 1).

To create an IFS, the farmers need to know the local environment well, and view the components of the environment around the arable area holistically, as an integrated system; then create a biological-social-economic system, with the goal of seeking an integrated effect of the whole system (Li 13). The IFS system mimics the natural ecosystems, which can inspire ecologists to design more agricultural ecosystems in harmony, rather than conflict (Marten 331). An example of the application of IFS is the rice-duck system. The rice-duck system raises ducks on rice paddy, no chemical pesticides or fertilizers are required, "while 20% higher crop yields are obtained and net income on a cash cost basis increased by 80%" (Khan et at.143). The other examples of IFS are like rice-fish system, rice- frog system, mulberry fishpond system, etc.

1.4 Traditional farming is not without its drawbacks

Traditional Chinese farming has a symbiotic pattern in which farmers, animals, organisms, and soil physically connects together. This pattern makes traditional farming's ecological system responsive and balanced. However, it is also important to address the negative impacts of this pattern that the farmers' health can be under potential risks when they live and work close to the soil, animals, and pathogenic organisms.

For example, mixed crop-livestock system(MCLS) is one of the oldest and most traditional farming practices. The small-scale farmers let livestock freely run on grass and naturally grown crops, and use wastes from livestock to fertilize the soil for growing crops (Salaheen et al. 1398). The livestock wastes which carry pathogens can cause zoonotic diseases by spreading through food and water (Cavin and Butler 153). These pathogens include parasites like Cryptosporidium, Giardia, which can cause human diarrhea, nausea, fever, vomiting, and fatigue; parasitic worms that can survive in manure for a long time without having an animal host, which lead to several different diseases in cattle and sheep; fungus that can result in increased crop disease in crop production fields ("Pathogens and Organic Matter"). People who live close to pig farms or expose to fields fertilized with pig are more likely to get infected with methicillin-resistant Staphylococcus aureus (MRSA). A study found who had the highest exposure to pig manure were 38% more likely to get community-associated MRSA (CA-MRSA)and 30% more likely to get health-care-associated MRSA (HA-MRSA) (S. Zhang).

Furthermore, the small-scale farms, which are the basic units of traditional farming production, are vulnerable to climate changes. Climate changes can trigger pest outbreaks, floods, droughts, crop failure and livestock mortality to the traditional farms (Harvey et al. 2), which does not only influence on agricultural production of farmers but also put farmers'

well-being and food security at risk (Jamishidi et al. 147). The reason why small-scale farms are vulnerable to climate changes are: a) the small-scale farms have a high reliance on ecosystem goods and services; b) their low capacity to adapt to changes; c) their dependence of rainfed crops; d) their location in marginal landscapes makes the farms exposed to a variety of climatic hazards (Donatti et al. 264). The Earth's climate has been changing throughout history. Because of human activity since the mid-20th century, the global warming trend is not stopping ("Climate Change: How Do We Know?"). According to Lingbo Xiao, "the global climate system is suffering rapid turbulence. In the future, the adaptability of human society will be increasingly tested severely by aggregate extreme weather events and severe ecological crises related to climate change (Xiao et al. 1721)." A world without hunger will be therefore interrupted by the climate changes, China, a country has the most population in the world, will not be exempt from such changes (Tong et al. 759). In front of the trend of global climate change, small-scale farms are hard to adapt, because they are limited to the shortage of water for irrigation, necessary farm inputs, capital, information on appropriate adaptation mechanisms, and farmland (Sanga et al. 169).

Because of the drawbacks of traditional farming, the trend of shifting traditional farming to modern farming is unstoppable. However, as discussed above in chapter 1.3, traditional farming has its sustainable and ecological sides, which makes it worth being reintroduced to modern society and able to inspire modern sustainable agriculture development.

1.5 Reconnecting through a virtual world: a possibility

Video games, while primarily being intended for entertainment purposes, can also be applied to serious educational applications, such as simulating traditional Chinese farming.

According to Mitchell and Savil-Smith, video games can be effective educational tools for the following reasons: a) video games motivate the player to win or achieve the goal, b) they provide a complete, interactive virtual playing environment, c) they provide the player with immersive experience and sustaining interest, and d) they use technology to represent reality or embody fantasy (17). A simulation game, as one of the popular video game genres, possesses these four features and expands upon them. Simulation games allow the player to be trained into a profession by putting the player in a virtual environment which reflects a slice of a real-life environment. One of the valuable points of simulation games is that they enable learning when the activities are too costly or dangerous, difficult or impractical to be set in the classroom (Mitchell and Savil-Smith 20).

Simulation games have been widely used for training and learning in farming-systems education (Stewart et al. 118). For instance, "*Computer games and fun in farming-systems education? A Case Study*" analyzes a farming simulation game, *Risky Business*, addresses farm business issues which can be linked to the game's educational goal. According to this article, in Risky Business, the player runs a farm that faces the threat of dryland salinity. As the farm owner, the player is tasked to make the right decisions when faced with a variety of farming difficulties such as whether to expand the farm size, adopt a new pulse crop, buy new technology, or operate the farm with partners. These issues can be opportunities or risks-- they decide whether the player's farm profits or loses. Through solving these issues, the player can gain the experience/knowledge of the influence of price

and climate variability on farm management; the importance of making tactical decisions; the difficulties of assessing whether innovations can make profits; the stress of dealing with salinization; and the value of seasonal forecasts (Stewart et al. 120).

The current video game market is dominated by farming games that present modern farming in western countries. *Farming Simulator 17, Pure Farming 2018*, and *Farm Manager 2018* are the representative examples. They simulate the environment of North America and European Farms and let the player farm with modern machinery. The introduction of *Farming simulator 17* on Steam is "take on the role of a modern farmer in Farming Simulator 17! Explore farming possibilities in a new North American environment. Drive over 250 farming vehicles and equipment from over 75 manufactures, such as Challenger, Fendt, Valtra or Massey Ferguson ("Farming Simulator 17")." Highlighting modern farming is a popular trend during the development history of western farming games. Back to 1993, Maxis released *SimFarm*. When the player enters *SimFarm*, the game asks the player to select a region on the American map to start building her farm. The player then can purchase farming machinery like tractors, harvesters, and sprayers. When the fields have pests and weeds, the player can buy chemical pesticides, and herbicides to take them under control. In 2008, *Farming Simulator 2008* came out, which is the first work of the Farming Simulator series. Later in 2018, more farming simulation games, like *Pure Farming 2018, Farm Manager 2018*, which are similar to Farming Simulator were released. From SimFarm to Farming Simulator series and its similar games, the graphics of the games have been improved, more details of farming have been added, but the main goal of the gameplay is the same: they encourage the player to make more money and expand the size of her farm through increased mechanical and chemical activity. The environmental concerns are ignored in these games. As discussed above, using chemical inputs like

pesticides, herbicides, and fertilizers can damage the environment and harm human health. These games present the player with beautiful natural scenery but ignore the issues behind modern farming, which over the long term, do not help the player learn about the environmental and health concerns that are related to modern farming.

The other branch of the popular farming video games represents the life of traditional western farmers. They let the player enjoy the peaceful countryside life and building up a friendship with neighbors (can be a non-player character or another player). The representative games of this branch are Harvest Moon, Stardew Valley, Staxel, and Farm Together. In these games, the player farms with traditional farm tools, like hoes and sickles. But this type of game does not help the player learn the sustainable and ecological side of traditional farming because they do not have the relevant content involved.

Board games, by their analog nature, do not belong to video games, but because their popularity keeps growing— more than 5,000 board games were introduced to the U.S. market in 2016 (Oliver). It is worth discussing the farming games in the board game market. Farming board games are more diverse in the themes than farming video games. Beside games of modern farming, the board game market also has games like *Agricola* and *Finca*. The theme of *Agricola* is farming in 17th century Germany, the player is a farmer with her spouse and kids, and the main goal of the gameplay is to feed all the family members ("Agricola"). In *Finca*, the player crops and delivers the fruits in the Mediterranean island of Mallorca. The player is challenged to crop more efficiently and deliver faster than her opponents ("Finca"). These board games show different goals of the gameplay and themes from farming video games; however, they yet highlight the sustainability of traditional farming.

I propose a simulation game which can help the player learn the sustainable and ecological side of traditional farming. Because traditional Chinese farming practices contain sustainable and ecological applications and become of my connection with Chinese small-scale farms, I set up the background of the game in ancient China, where the player can farm as a traditional Chinese farmer.

1.6 Goals of the game concept

Seeing the possibility of introducing Chinese traditional farming in the form of a farming simulation game, as well as the value of this possibility filling up the gap in the current farming simulation game market, I decided to make the first step towards realizing this possibility-- developing a game concept. This game concept works as a blueprint and frame for the further development of making an actual game. This concept establishes the cultural context and visual elements of the game world, provides the beginning of the game story and defines the essentials of the gameplays. All these three parts serve the main goal-- to bring the player to an environment which simulates ancient China and to introduce the knowledge of Chinese traditional farming, involving the cultural context and visual style concepts which create the atmosphere of ancient China, and meanwhile, the gameplay concept combines entertaining and educating together.

Chapter 2 About Calendar Valley: before the details

2.1 Naming

The game's title, Calendar Valley, is named after the main stage of the game for two reasons. First, the game's main stage is a fictional valley that is called Calendar Valley. In Calendar Valley, there is an old tradition related tightly to the calendar: every family makes their plan, which is based on the 24-solar terms (二十四节气) for the year-round farming at the start of spring. Then they carve this plan on the wall, with rock or bamboo chips to make sure they have a farming plan to follow.

Second, "calendar" implies the importance of arranging the time wisely and taking the right action at the right time. To the ancient Chinese farmers, knowing the seasons and utilizing the weather characteristics of each season was critical to farming. Thus, these farmers needed to follow the seasons and finish certain farming practices before the end of each season. Much classical Chinese literature records the importance of catching up with the farming seasons. The farming season is called Nongshi (农时) in ancient Chinese literature. In The Works of Mencius, Mencius (孟子) once talked with Liang Hui Wang (梁惠王, the third emperor of Wei kingdom 魏国, 400-319 BC) about how to be a wise king and rule the country; Mencius said "if the seasons of husbandry (Nongshi) be not interfered with, the grain will be more than can be eaten" (Mencius 180). FanSheng-Chih Shu（氾胜之书）, an important agriculture book written in the West Han dynasty, mentions that the basis of farming is following the rhythms of the seasons, fertilizing, planting early and harvesting early. Lv Shi Chun Qiu (吕氏春秋)has an essay which is named Shen Shi (审时, Fitness of the Season), which addresses the importance of farming

with seasons. In this essay, the experience of farming crops timely is highlighted, which include the benefits of planting crops in time with the season and the losses of planting when missing the right time. According to these classical works, using the right farming practices of the right time is an essential part of farming, and it directly influences the crop's growth and harvest. So, naming the game "Calendar Valley" indicates the key feature--making calendars and the importance of time in this farming simulation game.

2.2 The game platform

The importance of determining the platforms is that different platforms provide the player with different gaming experiences. For example, consoles can be connected to a TV and provide usage for more than one controller, which allows more than one player to play the same game at one time. This makes consoles great for party games. Mobile devices like smartphones and tablets have great mobility: they are portable and can access the `Internet outdoors by using data. This mobility allows the player to be connected to the server of the game with much less limitation of time and space. Pokémon Go utilized this mobility and combined it with augmented reality to create a world where the virtual interacts with the real.

On the other hand, some special types of gameplay may require a certain function of its platform (or device) to support it. In Fruit Ninja, the player crashes the fruits that pop up on the screen by swiping their fingers on the fruits. This gameplay has to be presented on a platform which is equipped with a touch screen; thus, the player can enjoy the instant interaction between their physical fingers and the virtual fruit.

I chose PC for Calendar Valley is because PCs are designed for one user to use at one time, which allows a single player to enjoy soaking herself in the game without being

distracted. Adams describes the interaction between the player and her PC as "when a player plays a game on her PC, she sits close and builds a tight connection with the game machine. This interaction usage can create a space between the player and her computer which isolates the other unrelative things. The player can thus, easily achieve an immersive experience." (Adams 107). Calendar Valley is a single player game in which multiple-player participation is not needed. Also, a keyboard and mouse, which are the classical gaming devices for PC, are suitable for the game control of Calendar Valley. The basic game control in Calendar Valley is moving (the main characters) and selecting (the objects). A mouse can provide the player with accurate clicking and a keyboard can help the player call up different functional menus quickly. Thus, the combination of mouse and keyboard can offer the player an efficient and fluent gaming experience.

I also considered making Calendar Valley a board game. Because board games, which are taught in classes in several countries, can also be used to teach general and specific knowledge, and introduce other countries or cultures (Gobet et al. 155). Compared with video games, the value of board games is that the player can get better social engagement by interacting with other people face-in-face the items are physical so the player can get to touch them ("Tabletop vs. Video Gaming"). However, I want Calendar Valley to offer the player a vivid experience of being a Chinese farmer and tell the player a good story which involves Chinese traditional folk tales, so video game is a better choice for Calendar Valley than a board game.

Even though Calendar Valley is designed to run on a personal computer (PC). There might be a possibility for Calendar Valley later to be transplanted to consoles or other platforms. For instance, Stardew Valley, a relaxing farm game, was initially designed for

PC but later transplanted to Nintendo Switch and PlayStation because of its popularity. However, in my project, the main platform of Calendar Valley is targeted at PC.

2.3 The potential player and game concept direction

Before developing the concepts of Calendar Valley, I tried to figure out what type of player will be playing Calendar Valley and how they will interact with the game.

Video games are different from other media such as books, documentaries, or physical museums which people can obtain information from, because the ways in which the audience use books, documentaries, and physical museums are watching, reading and experiencing. But in video games, the audience does not just watch, read and experience--rather, they need to play. A goal distinguishes a video game from other forms of play activities, "add a goal to informal play and usually you will get a game", as Salen and Zimmermann explain how to get the audience to play (Rules of Play: Game Design Fundamentals 258).

To set up the goal for the player to achieve, I had to figure out what type of player will be playing Calendar Valley. This question is worth discussing because different players have different biases, and their biases decide what they want from a video game, and if they will keep playing. To answer this question, I researched the stereotypes of different players. Richard Bartle, a professional game design consultant, summarized four things that players enjoy in *MUDs* and defined a model of four player types out of these four things (Bartle). According to Bartle, the four things are: achievement, exploration, socializing and imposition, and the four types of players that correspond to the four things are: achievers, explorers, socializers, and killers. In *The Game Design Reader: A Rules of Play Anthology,* Salen and Zimmerman agrees that this model also works in other kinds of games and

summarized the four types of players from Bartle's article: achievers enjoy reaching top of the high hierarchy in the game and try efficiently to reach that hierarchy; explorers enjoy chasing the knowledge and digging in for more details, and they are proud of being omniscient in front of beginners; socializers enjoy making friends and building up social influence; killers enjoy showing off their fighting skills and value their reputations (6).

According to Bartle's four player types, achievers and explorers can definitely find enjoyment in Calendar Valley, because Calendar Valley is a simulation game that brings the experiences of farming in ancient China to the player, and the experience is knowledge-based. To keep the player chasing the goal (as described by Salen and Zimmermann), these pieces of knowledge are not revealed to the player directly, but the game requires the player to explore and achieve these insights for themselves. Before the knowledge elements are revealed, they are kept secret from the player. So, the player will spend most of their time finding the secrets of the ancient Chinese farmers, the secrets of the 24-solar terms and the secrets of the traditional Chinese food and festivals. Once she unlocks a secret, she will be able to utilize and practice this secret in the game. The found secret will become an achievement of hers and lead her to the next unexplored secret. Killers might not be able to find their fun in Calendar Valley, because Calendar Valley does not offer any experience of fighting, killing or assassinating. Even at the end of the game, to defeat the final Boss Nian (年), there are no elements of fighting games in Calendar Valley. To defeat the Boss, the player needs to collect certain items that she can achieve from accomplishing the assigned quests.

Chapter 3 The cultural context concepts

Adams explains the cultural context as a game's "culture in the anthropological sense: the beliefs, attitudes, and values that the people in the game world hold, as well as their political and religious institutions, social organization, and so on" and how the cultural context works-- "these characteristics are reflected on the manufactured items that appear in the game: clothing, furniture, architecture, landscaping, and every other man-made object in the world" (Adams 149). This reflection can help the visual elements to be designed under a certain style, and thus, look harmonious.

The early video games back to the 1970s, tend to have very simple context settings. For example, in Pac Man, except for knowing the main gameplay is to collect the yellow dots and avoid the ghosts, the player does not know where she is, why she needs to collect the dots and why the ghosts attack her.

Along with the development of the game industry, the cultural context in video games has become more explicit and specific, which attracts and absorbs the player. The online game World of Warcraft (WOW), which was developed by Blizzard, has a massive cultural context setting, involving races, forces, geography, religions, and history. With this setting, the player gets to know the conflicts between different races in the world of WOW, and her standpoint. So, when she is given a mission, she can always associate this mission with WOW's cultural context and understand the meaning of accomplishing this mission. For example, when she is asked to fight against an enemy, she can understand the meaning of this fight, and gain a feeling of destiny-- that she must defeat this enemy to earn glory. The other advantage of WOW's cultural context is that Blizzard can always add new contents that are based on the game's cultural context to keep the world of WOW updated

so that the history never stops developing. The player can witness the development of history and even participate in that history's event.

Knowing the advantage of having the cultural context, I added cultural context to Calendar Valley's concepts, which includes two parts: the historical background and the story.

3.1 Historical background: The Song dynasty (宋朝)

The historical background of Calendar Valley referenced the Song dynasty (960-1927), which had two periods: the Northern Song dynasty (北宋) and the Southern Song dynasty (南宋). According to Encyclopedia Britannica, the Song dynasty was founded by Zhao Kuangyin (赵匡胤). Later, the Song dynasty lost its North territory to the Juchen (女贞) tribe, so the court escaped to the South. In 1127, emperor Gaozong (高宗) relocated the capital of the court to the South and settled the capital down in Lin'an (临安, today's Hangzhou 杭州), since then, the Southern Song dynasty was established ("Song Dynasty"). I set the historical backwound of Calendar Valley in the Song dynasty for two reasons.

First, by the Song dynasty, the agricultural technology achieved great advancement, which can offer a great knowledge resource for Calendar Valley's gameplay design. For example, Champa rice (占城稻) was introduced to China during the Song dynasty, which was drought resistant, early maturing and non-photoperiod sensitive (Barker 185). This fact was incorporated into the gameplay, that the player can manage to get Champa rice, to achieve better rice production. Another example is in Chen Fu Nong Shu (陈旉农书, the farming book of Chen Fu), a book that was written by Chen Fu (陈旉) in the Song dynasty,

summarized the usage of "Huo Fen (火粪，the fire excrement)" -- a fertilizer made of plant ash. The usage of "Huo Fen" was also designed into the gameplay, as shown in Figure 1.

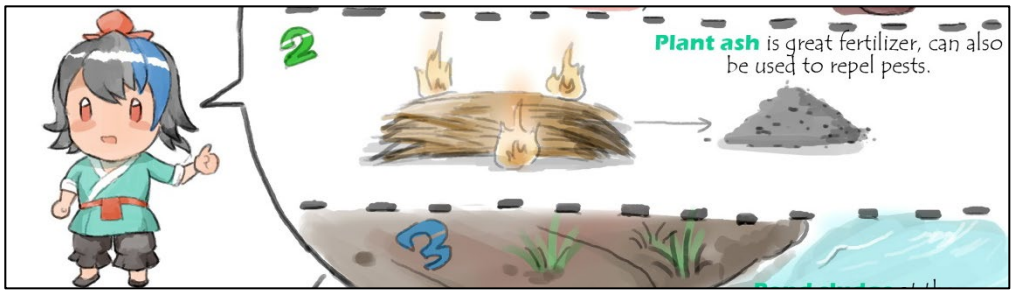


Figure 1 The gameplay of Calendar Valley: Make fertilizer out of plant ash

Second, the relocation of the Song dynasty gave me a "chance" to create a valley that is isolated. An isolated valley represents the wish of having a peaceful land that can help people escape from reality for a while. A famous Chinese fable, The Peach Blossom Spring, which was written by Tao Yuanming (陶渊明), is a great example of this wish. In Peach Blossom Spring (桃花源记), a fisherman rows along a river and accidentally finds a forest full of peach trees. After walking through the forest, he finds a cave which connects to a tunnel. At the end of the tunnel is an isolated valley. The valley has beautiful croplands, houses, lakes and bamboo forests. All villagers get along with each other; children and elderly all live happily. Then the villagers treat the fisherman with wine and food. During the conversation, the fisherman gets to know the villagers came to this isolated place since the Qin dynasty (秦朝), they have never left the valley or got in touch with the outside world. So they do not even know how many dynasties have shifted outside of the valley. After leaving the place, the fisherman reports this isolated place to the local officer. Then the officer orders some people to go find this place with the fisherman, but they never get

to find it again. This isolated valley is the ideal paradise for all the Chinese writers for thousands of years(Bing 648).

So, I created a background story of Calendar Valley that mimics the Peach Blossom Spring, to indicate to the player that this valley is a peaceful paradise, which will make her feel relaxed in this virtual world.

Not only in literature, but also in video games, an isolated land is often interpreted as a "utopia" which is different from the often tiring and complex reality. Stardew Valley is a great example that uses an isolated land as its game's background. In Stardew Valley, it is introduced to the player at the beginning, that the "player's grandfather" leaves her a sealed letter before he dies. And the grandfather tells the player not to open the letter until a day "when you feel crushed by the burden of the modern life and your bright spirit will fade before a growing emptiness (Stardew Valley)." Many years later, the player's character works in a company that is called Joja, where the employees look tired and soulless. Then the player's character remembers her grandfather's words and opens the letter. The letter says the grandfather leaves the player a farm in Stardew Valley and guides the player to Stardew Valley, which "connects with people and nature". The shift from a company to a farm in the game implies to the player that she can get away from whatever tiredness and unhappiness that she has in reality; instead, she is connected to a virtual paradise, where life is easy and refreshing. Even though this paradise is virtual and digital, she can still relax her soul safely here.

The relocation of the Song dynasty can give me a chance to create the "virtual paradise" -- the villagers of Calendar Valley find this isolated valley, which sits in the mountain land during their migration from the North to the South. Then they settle down

here and build Calendar Valley. In Calendar Valley, the villagers can support themselves by farming.

3.2 The background story

The background story in the concept of Calendar Valley to engage the player. Playing a video game is like experiencing a trip because the player visits the virtual places with her eyes and mind; she also gets to know some virtual friends or enemies; and she also gets to have emotional feelings-- happiness, sadness, relaxation, anxiety, etc. In this virtual trip, the player is given missions to accomplish. The mission types are different; depending on the game, it can be defeating an enemy, passing a level, or collecting a certain number of items. The story of a game explains the theme of this virtual trip, where the player starts the virtual trip, and in what direction the virtual trip goes. Adams describes the importance of story in a video game as:

Without a story, a game is a competition: exciting, but artificial. A story gives the competition a context, and it facilitates the essential act of pretending that all games require. A story provides greater emotional satisfaction by providing a sense of progress toward a dramatically meaningful, rather than an abstract, goal (Adams 208).

According to Adams words, the story can give a meaning to the goal that the game requires the player to accomplish, which can provide the player with emotional satisfaction from the game. Natalia Padilla-Zea has a similar opinion about what a story can do in the game:

A good story supports what is known as a parasocial phenomenon, related to the feelings generated in the player about the characters: the feeling that the player has to protect the protagonist and thwart enemies (Padilla-Zea et al. 462).

Padilla-Zea thinks that with a story, the player can feel what the characters feel, and takes the mission that is given to the characters as her mission. In games, the characters are the identities given to the player, so the missions are not "directly" given to the player, but the identities (or the characters) that they are using. In summary of both Adams and Padilla-Zea's opinion, the story can make the player understand the meaning of finishing the missions in the position of the characters and give the player emotional satisfaction after finishing the missions, which in a word, can bring the player a better engagement with the game.

One function of the story in Calendar Valley is to engage the player. At the beginning of the story, the player's avatars-- the three immortals, two brothers and a sister, Feng, Yah, and Song (see Figure2), are sent to Calendar Valley to learn the hard work of farming and find the methods to defeat Nian, as the punishment of stealing and wasting the Queen Mother's (王母娘娘) flat-peaches (蟠桃, or the magic peaches).

Figure 2 The immortal forms of Feng, Yah, and Song

This plot was inspired by The Journey to The West (西游记), where Sun Wukong (孙悟空) steals the flat peaches from the Queen Mother. When I first read this part in The Journey to The West, I was a kid, and this plot left me a deep impression. But I regretted the waste of the flat peaches. According to The Journey to The West, the flat-peaches take 9,000 years to get ripe, which means lots of efforts have been spent in taking care of the peach trees. So the reason I designed the plot of Feng (风), Yah (雅), Song (颂)wasting the flat-peaches and getting the punishment of becoming a human farmer, was that I wanted to compare the efforts of planting the flat-peaches to the efforts of farming crops, and make the player think of the preciousness of the harvests, as shown in Figure 3 and Figure 4.

Figure 3 The story of Calendar Valley: Feng, Yah, and Song get caught stealing the flat-peaches

Figure 4 The story of Calendar Valley: Feng, Yah, and Song sent to farm as punishment

This story explains who the player's avatars are, and why she needs to learn to farm in Calendar Valley. The final mission is also implied to the player-- to defeat Nian. To defeat Nian, there are certain items that are required. To collect these items, the player needs to finish the missions that the game assigns. These missions are related to the story of the game. For example, Nian is scared of the sound of firecrackers, so then the player needs to find firecrackers. In order to buy firecrackers, the player needs to pay Pedlar Zhang a certain amount of crops. And to get the crops, the player needs to learn how to plant them. If the player cannot get firecrackers, then she cannot defeat Nian. As a result, she will lose lots of harvests and money-- even get her house destroyed. She cannot stop the loss from happening until she can defeat Nian. Thus, she needs to get firecrackers, and before getting firecrackers, she needs a certain crop-- to plant this crop, she needs to have the relevant knowledge. So she learns the relevant knowledge of farming through playing Calendar Valley.

Chapter 4 The visual concepts

4.1 The art style

Thanks to the rapid development of computer graphics hardware, the visual art style of video games has witnessed a great change from the pixel and vector style in the early 1980s, to today's photorealistic 3D. Today, the visual style of video games has great diversity, ranging from abstraction to realism. Even though the newest technology can present a realistic visual experience vividly to the player, the unrealistic visual styles are still popular in the video game market, i.e. the pixel style, cell-shading style, and isometric style, because these unrealistic styles (such as Anime) can match the theme or the atmosphere of the game better and work well with the gameplay of the game. The game *Okami* is a great example, as shown in Figure 4, in which the visual style works perfectly with its cultural background and gameplay. *Okami* is a 3D game, but each of its screenshots looks 2D; like the traditional Japanese ink painting: the color of the environment does not have changes in the depth of the space and the objects are outlined by thick black lines.

Figure 5 Okami, a game in a watercolor style

This ink painting 3D style matches *Okami*'s (See Figure 5) theme which involves traditional Japanese folktales and myths, reminding the player of traditional Japanese scroll painting. Also, it works nicely with *Okami*'s core gameplay: the player can take the screen as a canvas and draw different inky patterns on the screen to attack the enemy or solve the puzzle.

Inspired by *Okami*, I tried to find a visual style which can suit Calendar Valley's cultural background and gameplay, and finally, I determined ~~three~~ two keywords for the visual style: ~~2.5D, isometric projection, and watercolor. "~~isometric projection", also known as 2.5D, and "watercolour".

As defined by Wikipedia, the term 2.5D "…describes effects in visual perception – especially stereoscopic vision – where the 3D environment of the observer is projected onto the 2D planes of the retinas…Thus, while the effect is still effectively 2D, it allows for depth perception…" Before 3D was able to be made in video games, 2.5D allowed the player to feel the space out of a 2D plane. This dimensionality has been used in many simulation games, because it can provide a bird's eye view of the game's scene for the player, and encourages them to view the game levels holistically, and thus they can make more strategic decisions.

Some classical Chinese ink paintings carry the features of a 2.5D view. A good example is the famous Chinese landscape painting, "Along the River During the Qingming Festival (清明上河图)". Along the River During the Qingming Festival" was created by Zhang Zeduan (张择端) in the Northern Song dynasty (see Figure 6). The painting depicts the landscape of Bian Liang, the capital of the Northern Song dynasty, and the life of people at that time. The visual angle of this painting is a bird's view, which allows the whole

painting to have both 2D and 3D's visual advantages: it can create an illusion in which the audience feels they are viewing a space instead of a 2D plane- the depth and width of the landscape can be sensed and understood by the audience's brain; it allows the audience to move their eyes freely on the painting and get to know what is happening in the painting with just a glance, thus the audience can gather information efficiently from the painting. This benefit inspired me to choose the isometric projection, which is a 2.5D view to display the world of Calendar Valley. Isometric projection is a representation of three-dimensional objects (like a building) on a flat surface, showing the horizontals of the object equally 30° to the base-line (Lucie-Smith).

Figure 6 Along the River During the Qingming Festival (partial)

The watercolor style is a style in which the characters and environments look painted by watercolor or ink washes (Cho et al.). This style can make Calendar Valley look more stylistic and remind the player of the aesthetic of ancient China.

4.2 The character concepts

I created two types of characters in Calendar Valley- the main characters and the Non-player characters (NPCs).

The main characters are the avatars that can be controlled by the player to do things in the game. They follow the player's orders and can be arranged to farm, eat, rest, etc. There are three main characters in Calendar Valley-- Feng, Yah, and Song. They have different personalities (see Figure 7), and their personalities correspond to their abilities, which means they have different advantages and disadvantages in doing things. So, the player needs to learn about the characteristics of these three characters and use a good strategy in arranging their farming activities. Only a good arrangement can achieve the best efficiency and results. For example, Feng is a physically strong character, so he is great to be assigned with work that requires lots of energy and strength, but he is weak at thinking, so he might not be the best person to do things that require flexibility and skills.

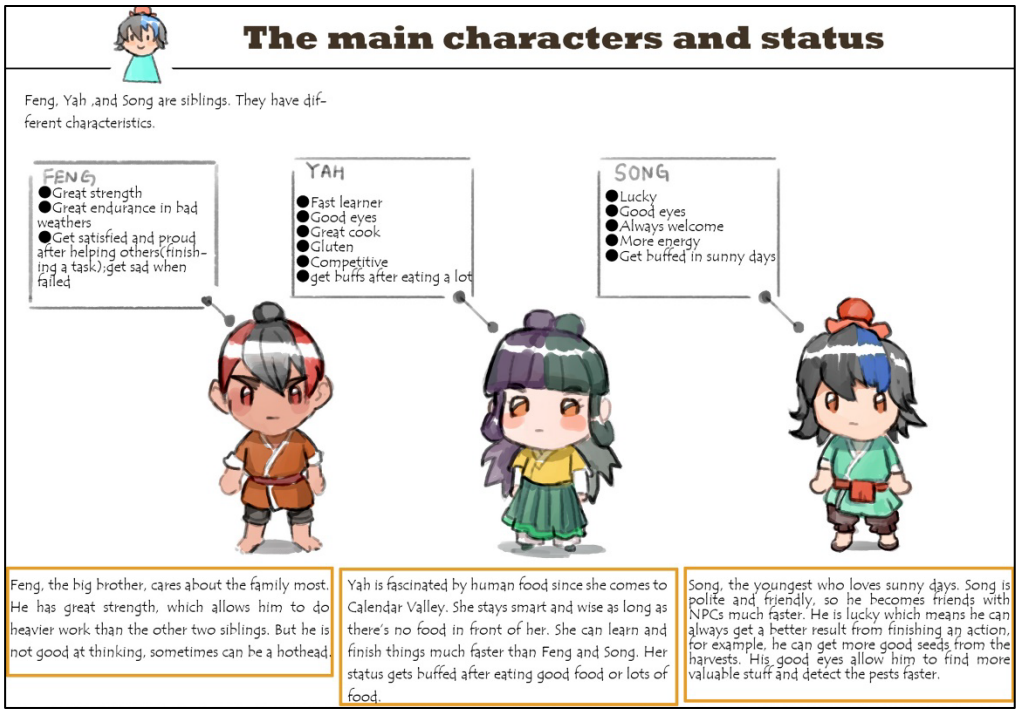


Figure 7 The characteristics of Feng, Yah, and Song

Feng, Yah, Song are brothers and sister. As introduced in the chapter of the game's story, they used to be immortals, but because they wasted and stole the Queen Mother's

flat-peaches, they were demoted to humans. To distinguish their immortal and human forms, I added fluffy ears on their immortal forms.

Figure 8 The character concept: Feng

Feng (See Figure 8) is the big brother. He is designed to be a strong character with great strength and better resistance to bad weather changes. So, he can do heavy work, work for quite a long time without getting exhausted, and barely get negative status in the bad weather. But his disadvantage is that he learns things a little slower than Yah and Song.

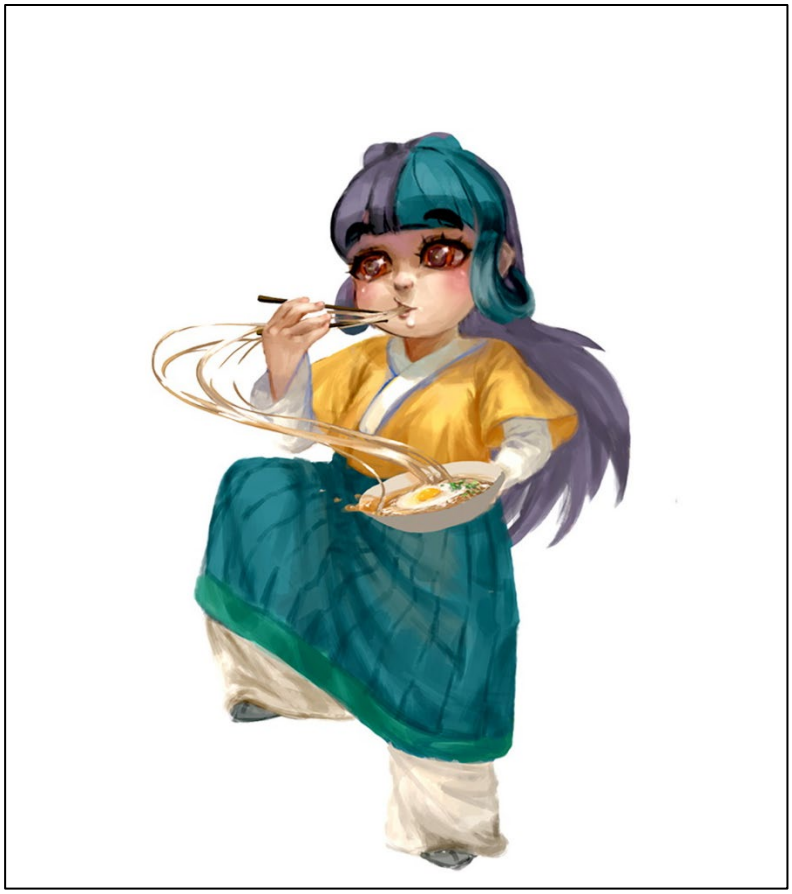


Figure 9 The character concept: Yah

Yah (See Figure 9) is a wise character and able to learn things fast. Because she has never had human food before she comes to Calendar Valley, she is fully attracted to human food, so she becomes a foodie and enjoys cooking. Yah's weakness is that she gets frustrated if she gets hungry, or eats bad food, which will cause her efficiency of working to dramatically drop.

Figure 10 The character concept: Song

Song (see Figure 10) is the youngest brother. His best ability is to quickly build up friendships with the non-player characters. So he can always get extra favor and gifts from the NPCs. His weakness is he lacks patience, which means his efficiency declines if he repeats doing one thing for a long time.

The non-player characters (NPCs, see Figure 11) are not controllable by the player, but they can interact with the player's characters, i.e. chatting, giving missions to the player, and trading with the player. Some of them are designed to be functional. For example, Old Sun, an old villager NPC, who is the player's neighbor, functions as a "farming teacher". He provides the player with the guidance of farming.

Figure 11 The concept of NPCs

4.3 The building concepts

China has a vast territory with diverse climates and cultures, so in different locations, the traditional buildings have different styles (She et al. 775), for example, in the Loess

plateau (黄土高原)there is Yaodong (窑洞), which can be dated back to the Qin dynasty, the architecture looks like tunnels and caves, which can provide the indoors with a nice temperature (Zhu 159). In Fujian (福建), Jiangxi (江西), and Guangdong (广东) provinces there is Hakka Tulou (福建土楼) (Poon 21), which are roundhouses connecting to each other and the mountainous region, which are good for temperature control, defensibility, and communication among the community (Lowe 2796). From so many styles, I finally decided to reference the hui style in Calendar Valley's building. The hui style (徽式风格, see Figure 12 and 13) is a distinct architectural style in the historical Hui-zhou (徽州) region, which is located in today's southern part of Anhui Province and northeastern part of Jiangxi Province ("Hui-style Architecture, Representative of Ancient Chinese Buildings"). It is also a locally classic style of buildings belonging to the area I wanted to present in the game, south of the Yangtze River (长江). The main feature of the hui-style building is black tile roofs and white walls. The combination of black and white also matches the aesthetic of traditional Chinese art: in Chinese ink painting history, many artworks only contain two colors, black and white-- the black is the brush-inkwork and the white is the blank (Hu 453).

Figure 12 A picture taken in Xidi: a hui-style building 1

Figure 13 A picture taken in Xidi: a hui-style building 2

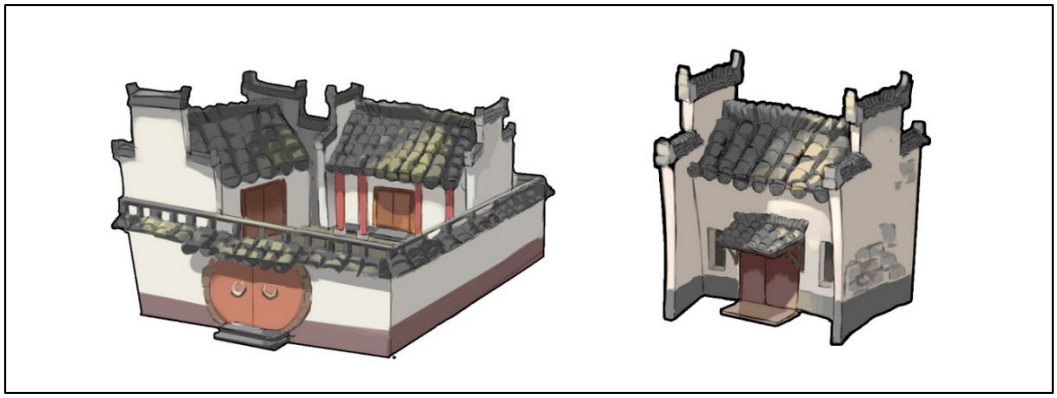


Figure 14 The building concepts: the dwellings

The stores (See Figure 15) are where the player can trade items. There are three stores that I have designed: the grocery store, the convenience store, and the bookstore.

Figure 15 The building concepts: the stores

The player can buy delicatessen items and desserts from the grocery store, buy farming tools and small items (mainly for daily use) from the convenience store, and books from the book store. The owners of the stores are the Miao brothers and sister (妙式兄妹, Figure 16). Their family runs the businesses for generations. They worship cats because their ancestors had saved a cat and the cat brought then them a fortune. So I added the elements of cats into the three stores.

Figure 16 The owners of the stores: the Miao brothers and sisters

Chapter 5 The Gameplay concepts

5.1 The graphic novels

I used graphic novels, in addition to text, to depict the gameplay of Calendar Valley. The graphic novels start from the three main characters finding the new released game Calendar Valley, starting the game, and end up with have a big fight to become the first to play the game.

The main body of the graphic novels introduce the gameplays of Calendar Valley in the form of a gameplay guide. The gameplay guide is a popular design in lots of video games. For example, in *Ni no Kuni II,* every time when the player discovers a new gameplay mechanic, the game collects this gameplay into a "library", where the player can find the detailed description of this gameplay. This design can remind the player of the gameplay efficiently by providing the player with brief texts and vivid pictures, which can allow her to imagine the gameplay in her mind and learn the gameplay quickly.

The combination of images of texts in graphic novels can help those who are new to read the gameplays of Calendar Valley gain confidence in reading and understanding the content quickly. According to critics like Alverson, "the images scaffold word/sentence comprehension and a deeper interpretation of the words and story. The relative speed and immediate enjoyment build great confidence in new readers (Alverson)." When a person who is not an experienced video game player reads the gameplay guide of Calendar Valley, it might be a challenge for her to understand how the gameplay works, and only use texts might be too abstract for her to imagine the gameplays in her mind. The graphic novels, which involves some short storytelling, can help her form a flow in her brain with the images in sequence. So she can then gather information through this flow and get a better understanding of the gameplays.

5.2 The gameplay

The gameplay is the challenge that the game offers to the player, and the actions the player can then choose to make in the game (Adams 313). In Calendar Valley, two main forms of challenges were designed. The first type of challenge is about farming, which is based on the challenges that the ancient farmer could face in farming practices. Traditional farming is influenced dramatically by the changes in climate. According to Raffaele Vignola, the small-scale farms are vulnerable to the climate changes, like rainfall, temperature, the frequency or intensity of extreme weather events- all of these climate changes can "affect the crop and animal productivity as well as their household's food security, income, and well-being", and the extreme weather events can cause landslides, flooding, droughts or other problems" (Vignola et al. 127). On the other hand, good climate and weather can boost the productivities of the crop and livestock, which is beneficial to the farmers. Inspired by the influence of climate changes on small farms, I designed one of the fundamental gameplays: grasping the knowledge of 24- solar terms.

The 24-solar term (Figure 17) is a solar calendar that is used to predict weather changes and agricultural activities. In Chinese traditional farming, a year is divided into 24 periods which is called the 24-solar terms. The 24-solar term is a calendar that summarizes the changes of weather and phenology. Each term corresponds to a point on the ecliptic, and every two points are spaced 15 ° from each other. So, one term shifts to the other when Earth moves 15 ° on the ecliptic. They start from Beginning of Spring (立春), and end at Great Cold (大寒), running in cycles. In ancient China, before weather forecasting was invented, the farmers followed the 24-solar terms to arrange farming practices. Not only

used in agriculture, but the 24-solar terms were also the "lifestyle guidance" to ancient Chinese people- many Chinese conventions are arranged based on the solar terms.

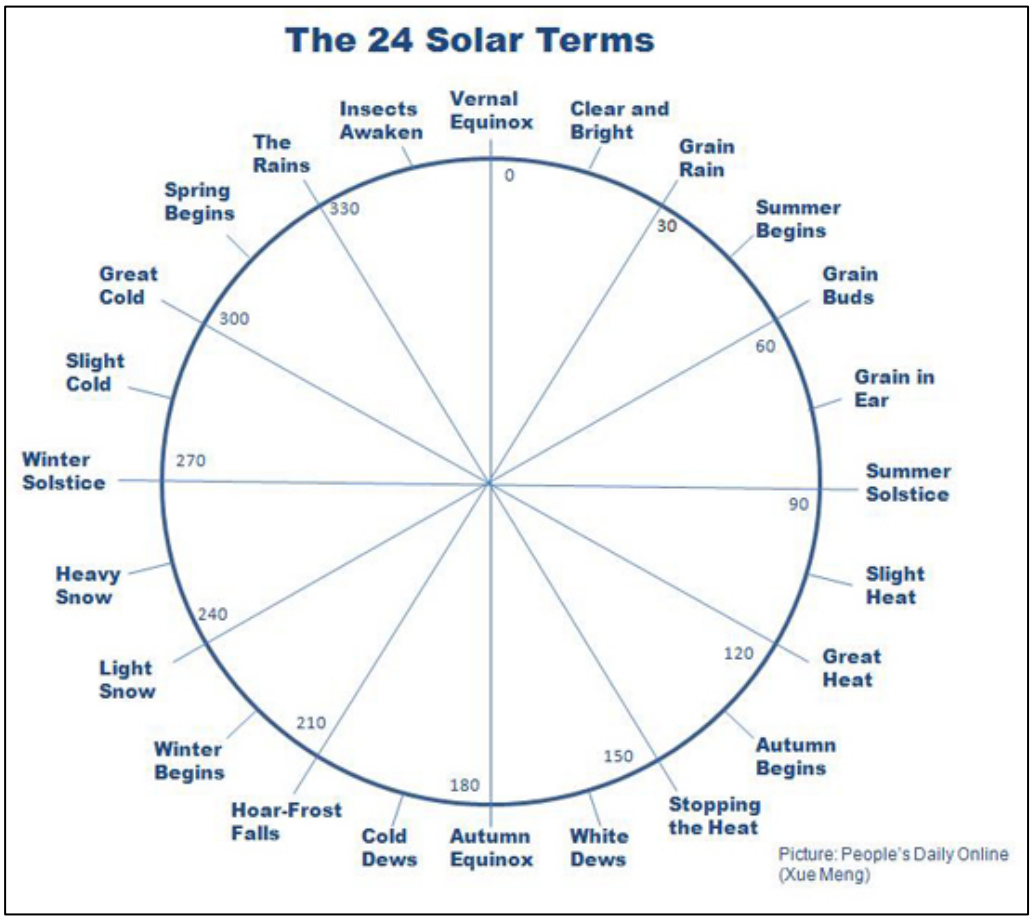


Figure 17 The cycle of the 24-solar terms

So, I used the 24-solar terms as the calendar of Calendar Valley, and also added a gameplay that is called "plan and calendar". A game year (a year in Calendar Valley), is divided into 24 sections, corresponding to the 24-solar terms. At the beginning of every solar term, the weather feature of this solar term is told to the player. The player needs to utilize the weather feature and arrange her farming plans. For example, during Rain Water (雨水, from February 19th or 20th to March 5th or 6th), the temperature rises, snow melts, and more rainfalls, which is suitable for seeding, so the system will recommend "seeding"

to the player during this term. Then the player can put “seeding” on the calendar any day during Rain Water. If she completes “seeding” within the day on the calendar, she gets some rewards. In this way, the player can learn the 24-solar term and agricultural arrangement of Chinese farmers.

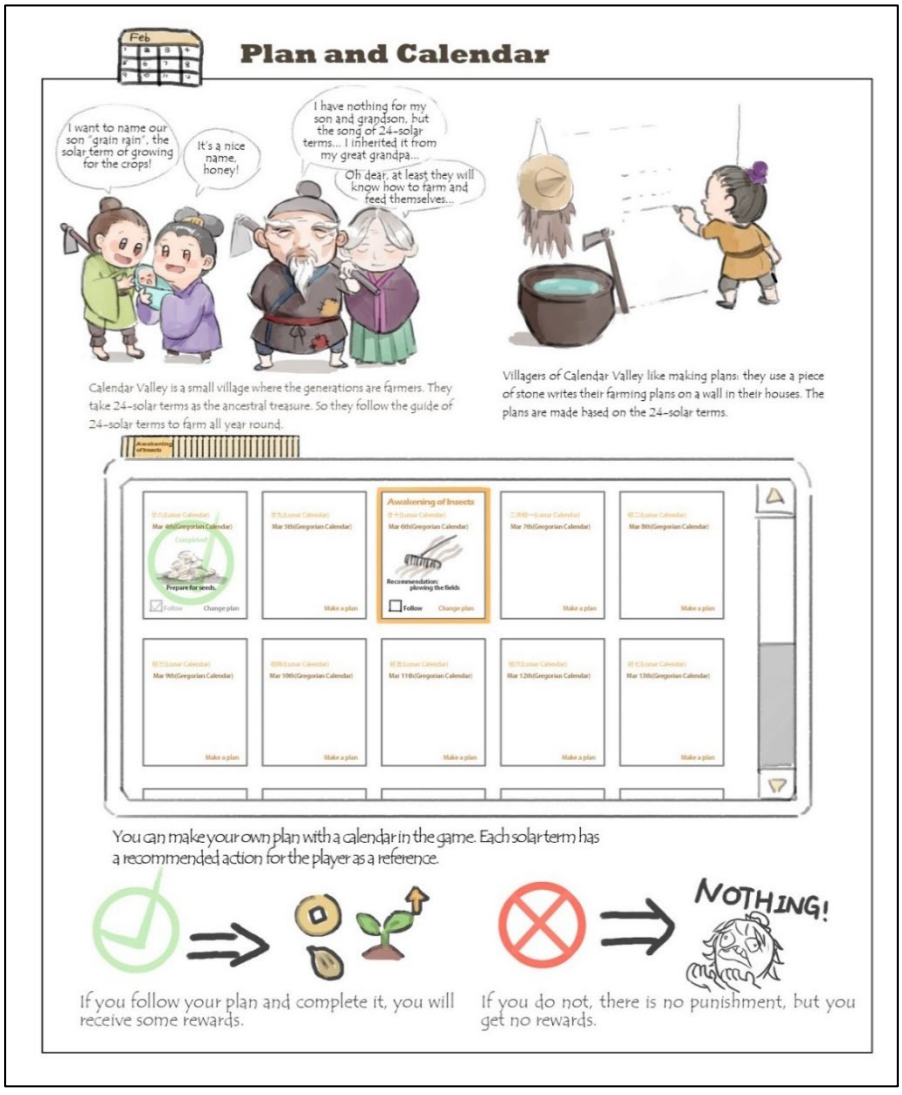


Figure 18 The gameplay concept: the plan and calendar

Each solar term also has a convention suggestion. For example, during Clear and Bright (Qing Ming), the player will be suggested to have some sweet green balls. The sweet green balls (青团), which can be dated from the Tang dynasty and are made of rice powder,

vegetable juice and stuffed with sweet bean paste, are a sacrifice to the ancestors, and also a dessert to take during Clear and Bright (清明) (CCTV English). If the player's characters eat sweet green balls, she can get some "Calendar Coins", with which she can buy special items. Through this "do and reward" strategy, the player will get to know traditional Chinese farming practices as well as the conventions.

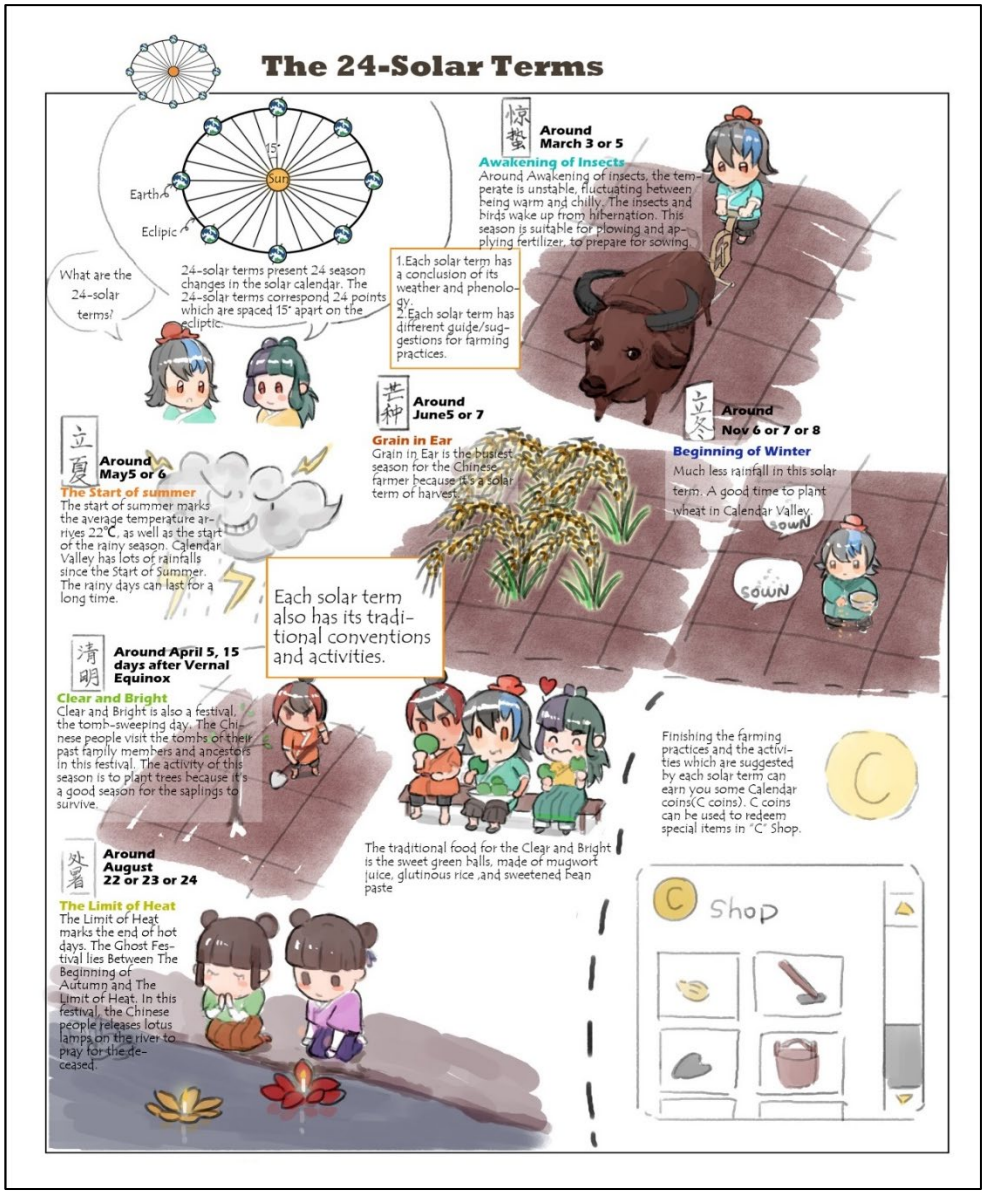


Figure 19 The gameplay concept: the 24-solar terms

The other main featured gameplay of Calendar Valley is called the Integrated Farming System (IFS) creation. This system serves the functions of pest control, nutrient cycling, food production, efficient attribution of labor among tasks, and flexibility to deal with environmental and social fluctuations (Marten 330). Examples of IFS which have been sustained for many centuries can be found widely in China. One of the famous IFS system is the rice-duck system, which is implemented in many provinces of China since ancient time. This system allows ducks to run freely in the rice paddy, eating pests and weeds. Thus, pests and weeds are taken under control, meanwhile, the ducks produce a better quality of meat. In Zhejiang, the experiments show that the rice paddies with ducks have less 94.2% weeds, and 77.3% of planthoppers and leafhoppers reduced after 42 days. There are systems based on similar theories but which utilize different animals such as fish and frogs (Huang et al. 282). Many of these Integrated Farming Systems, e.g. the rice-fish system, mulberry fish pond system, have been proclaimed to be one of the Global Important Agricultural Heritages, by the Food and Agriculture Organization of the United States, which means these systems carry the agricultural biodiversity and work with their associated landscape, have been sustained for generations, and have a profound relationship with nature ("Globally Important Agricultural Heritage Systems"). As mentioned in the introduction, the IFS views the environment holistically and creates an agricultural system that can sustain itself (Li 13). In Calendar Valley's gameplay, the player is encouraged to build up her IFS.

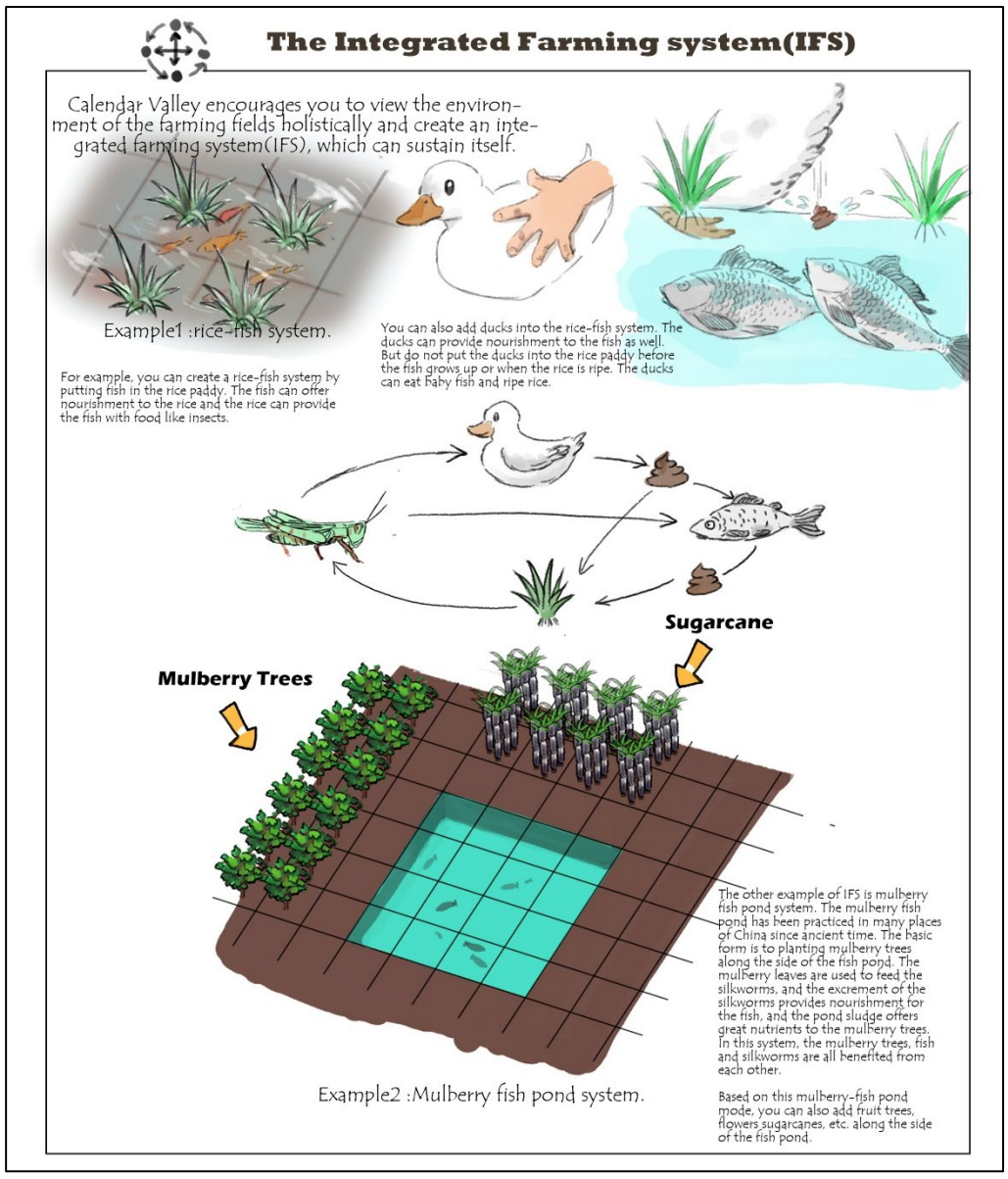


Figure 20 The gameplay concept: The Integrated Farming System

Chapter 6 Public Reception

6.1 The exhibition

The exhibition of Calendar Valley was held in Dr. Foster James Foster Penny Building in Lethbridge from April 15th to April 19th.

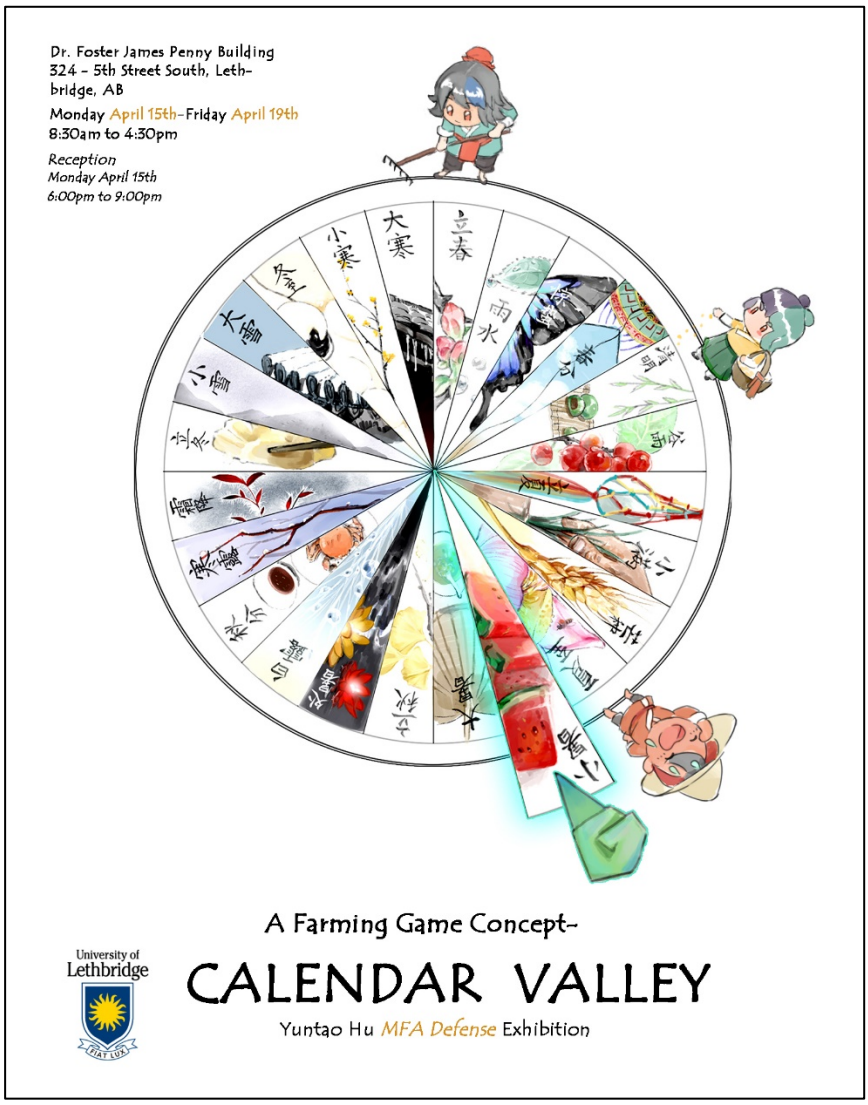


Figure 21 The poster of the exhibition

I presented the concept of Calendar Valley to the audience in five sections. The first section is the introduction part. I post a brief introduction of Calendar Valley to help the visitors learn the reason for me developing this game concept and what the game is within

a short time. I also post several signs made of foam board in this section to introduce the basic control of Calendar Valley. The second section displays the art concepts, including the characters and buildings. I printed the artworks off, framed the prints, and hung them on the wall for the audience to look closer into the details. The third section is the two graphic novel books which describe the story and gameplay respectively. The graphic novel books were made in the style of thread-bound Chinese books. The fourth section displayed how I finally came up with the current version of the concept of Calendar Valley- including the previous versions of ideas and designs, the pictures of the places I visited in China, and a stage model showing how I was imaging the virtual world of Calendar Valley. The fifth section was only displayed on the reception night. It was an animated 24-solar term plate projected on the wall, spinning around and introducing the information of each solar term. I also prepared many keychains and buttons as souvenirs for people to take, which can remind them of the exhibition and the game concept later.

The movable wall and the second section functioned as guiding the visitors' steps. With the movable wall, the visitors will not go directly behind the wall, where I wanted to show them at last. The visitors can follow the trail of the framed artworks on the left side of the wall (they enter the gallery from the left side) and be guided to the third section, which is the gameplay and narrative graphic novels. The section two on the left side introduces the characters' concepts so they can get to know the main characters of the graphic novels before they read the graphic novels. The visitors can go to the right side, where the rest part of section two was after viewing the third section. The second section on the right side is the artworks of the buildings. The visitors then can follow the trail of these artworks to the fourth section and get to know the inspirations and process behind

this game concept. When the visitors walk out of the exhibition area, they will see the fifth section and then pick up some souvenirs.

Figure 22 The installation of the exhibition

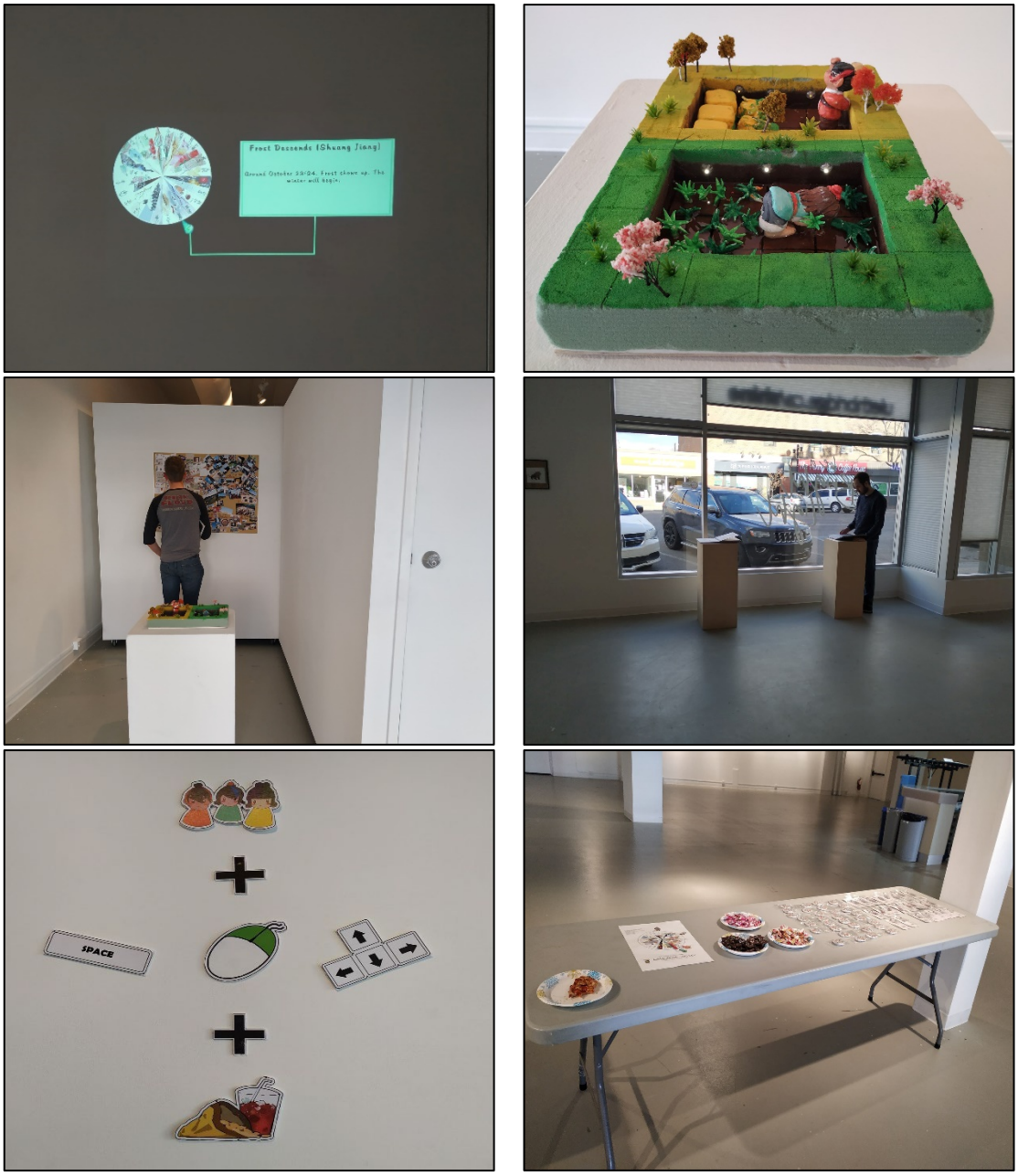


Figure 23 The details of the exhibition

6.2 The wall painting

The first exhibition, which opened on April 15th, 2019 and ran until April 19th, displayed the four main design components concept of Calendar Valley including:

character design, architecture design, story design, and the gameplay design. The purpose of the exhibition was to provide an immersive experience for the viewers, allowing them to see first-hand the many artistic and conceptual elements needed to make an aesthetically-appealing and engaging educational game. However, in my subsequent discussions with the supervisory committee, it was agreed that the small scale of the individual artworks, combined the physical separation of those drawings, paintings, and sculptures, hindered the cohesiveness and immersiveness of the exhibition. To remedy this, after the fact, I created a wall painting of which the scale was large enough to allow the visitors to feel as though they were inside of the painting when they viewed it. The hand-painted mural was created over two days, and specifically for the purpose of the exhibition during my thesis defense (the scale of the painting is indicated in Figure 24)."

Figure 24 The scale of the wall painting

As shown in figure 25, the wall painting described Feng and Song planting rice seedlings. Yah comes over to the field to deliver food to Feng and Song in the painting.

This scene indicated the strategy of arranging the characters' work in Calendar Valley and the ducks indicated the integrated farming system. This wall painting also indicated the peaceful atmosphere the player will be having in the game by using bright and warm colors.

Figure 25 The wall painting

Chapter 7 Conclusion

The concept of Calendar Valley which involves the work of art and gameplay conceptual designs depicts a farming simulation game that simulates the environment of ancient China and allows the player to farm with traditional farming practices.

Modern farming has caused the disconnection between farmers and traditional farming practices which makes traditional farming become gradually forgotten. Moreover, modern farming practices cause environmental issues, for example, the application of plastic greenhouses is linked to heavy green gas exhaust; the usage of chemical pesticide can damage human health and disrupt species distribution; chemical fertilizer can unbalance soil pH and structure. Compared to modern farming practices, traditional farming is sustainable and ecological-- the application of multiple cropping and crop rotation can benefit soil nutrients and control pests without damaging the environment; the Integrated Farming Systems such as rice-duck, rice-fish, and mulberry fishpond systems are the biological-economic systems that benefit both the profit of human and environment.

Simulation games are great for learning, which can help people learn about traditional farming practices by simulating the Chinese environment. However, the current farming simulation game market only highlights North America and European farming and lacks Chinese traditional farming. Out of these two concerns, I proposed the concept of Calendar Valley, which is a farming simulation game that can help the player learn about Chinese traditional farming practices through its gameplays. The cultural background of the game is set in the Song dynasty when agricultural technology achieved great advancement. The historical fact of the migration from the North to South dynasty is a reasonable background to create an isolated village as the stage of the game.

Inspired by the classical landscape painting, “Along the River During the Qingming Festival”, I used an art style which is a combination of isometric view and watercolor. These two factors can help the audience feel a space out of the 2D plane and the aesthetic of ancient China at the same time.

I used graphic novels, a form that consists of both pictures and texts to help the audience understand and read the gameplays of Calendar Valley fast and easy. The two most featured gameplays are making a farming plan with the 24-solar terms and creating the Integrated Farming System. This expresses the main thinking of traditional Chinese farming, which is staying in harmony with nature rather than in conflict. The art concepts of the characters and buildings deliver the atmosphere of a lively ancient Chinese village, which helps the audience understand and imagine the world of Calendar Valley.

There are still things that I want to learn and add to the concept in order to make the content of the game richer. For example, more folk tales or historical stories behind the conventions of the 24-solar terms and combine them with the gameplays. Adding this content can make following the convention suggestions more meaningful and understandable to the player. I could also research more Chinese myths and legends to build up the story of Calendar Valley. I have established the beginning of the story, which is the three main characters stealing the flat-peaches from the Queen Mother and them getting demoted to be human, but I have not thought about the development and the end of the story. How Feng, Yah, and Song learn about farming gradually, how they challenge Nian and find the secrets of what Nian fears, and what interactions they make with the villagers, can be added to the story. I could also consider if the characters could age. Aging can give the gameplay more potentials. For example, if the characters can age, they should be allowed to have kids too, which means the family size will grow. So, the player will need

to make a decision between having more family members to make the farm more efficient or to limit the family size to secure sufficient food.

In summary, the concept of Calendar Valley offers a blueprint of developing a farming simulation game that helps the player learn traditional farming practices. By playing the game, the player can learn about the sustainability of traditional farming and Chinese culture.

References

Adams, Ernest. *Fundamentals of Game Design*. New Riders, 2014.

"Agricola." *BoardGameGeek,* https://boardgamegeek.com/boardgame/31260/agricola. Accessed 8 May 2019.

Alverson, Brigid. "Teaching with Graphic Novels." *School Library Journal*, 8 September 2014, https://www.slj.com/?detailStory=the-graphic-advantage-teaching-with-graphic-novels. Accessed 7 May 2019.

Archer, David W., et al. "Integrated Farming Systems." *Elsevier*, 2018. *ResearchGate,* https://www.researchgate.net/publication/322189833_Integrated_Farming_Systems

Ba, Qing-Xiong, et al. "Traditional Farming and Sustainable Development of an Indigenous Community in the Mountain Area—A Case Study of Wutai Village in Taiwan." Sustainability, vol. 10, no. 10, 2018, pp. 3370. *MDPI,* https://doi.org/10.3390/su10103370

Barker, Randolph. "The Origin and Spread of Early-Ripening Champa Rice: Its Impact on Song Dynasty China." *Rice*, vol. 4, no. 3-4, 2011, p.184. *Springer Link,* https://doi.org/10.1007/s12284-011-9079-6

Bing, Long Y. L. "The Ethical Representations and Enlightenments of 'Peach Blossom Spring' in Contemporary Literature." *Forum for World Literature Studies*, vol. 7, no. 4, 2015, p. 643. *Literature Resource Center,* http://link.galegroup.com/apps/doc/A445750320/LitRC?u=leth89164&sid=LitRC&xid=e763fa53. Accessed 8 May 2019.

Cavin, Rachel M., and David R. Butler. " Chapter 8 - Animal Hazards—Their Nature and Distribution." *Biological and Environmental Hazards, Risks, and Disasters*, 2016, pp. 153-180. *ScienceDirect,* https://doi.org/10.1016/B978-0-12-394847-2.00011-5

CCTV English. "Qingming food: Sweet green rice balls popular in east China." *YouTube*, 4 Apr. 2017, https://www.youtube.com/watch?v=thvMHcAj03w. Accessed 21 Apr. 2019.

Cheremisinoff, Paul N. "Chapter 7 - Industry Profile—Fertilizers." *Waste Minimization and Cost Reduction for the Process Industries,* 1995, pp. 222-284, https://doi.org/10.1016/B978-081551388-9.50009-9

"Climate Change: How Do We Know?" *Global Climate Change: Vital Signs of the Planet,* 9 July 2019, https://climate.nasa.gov/evidence/. Accessed July 10 2019.

Chi, Zihua. “The historical investigation of rural migration in China 中国 “民工潮” 的历史考察.” *Sociological Studies,* no.4, 1998, http://oa.shxyj.org/UploadFile/20130926008/2015-08-29/Issue/3bvmodif.pdf

Cho, Hyerim, et al. "Art in an Algorithm: A Taxonomy for Describing Video Game Visual Styles." *Journal of the Association for Information Science and Technology*, vol. 69, no. 5, 2018, pp. 633-646. *Wiley Online Library*, https://doi-org.ezproxy.uleth.ca/10.1002/asi.23988

“Crop Rotation.” *Encyclopedia Britannica*, Encyclopedia Britannica, Inc., 2018. *Encyclopedia Britannica,* https://www.britannica.com/topic/ crop-rotation. Accessed 7 May 2019.

“Crop Rotations.” *Sustainable Agriculture Research &Education,* https://www.sare.org/Learning-Center/Books/Building-Soils-for-Better-Crops-3rd-Edition/Text-Version/Crop-Rotations. Accessed 7 May 2019.

Donatti, Camila I., et al. “Vulnerability of smallholder farmers to climatechange in Central America and Mexico: currentknowledge and research gaps.” *Climate and Development,* 2018, pp. 264-286. *Taylor&Francis Online,* https://doi.org/10.1080/17565529.2018.1442796

Farrar, Peter. “China’s New Generation of Urban Migrants.” *The Diplomat,* June 29 2016, https://thediplomat.com/2016/06/chinas-new-generation-of-urban-migrants/. Accessed 8 May 2019.

“Farming Simulator 17.” *Steam,* https://store.steampowered.com/app/447020/Farming_Simulator_17/. Accessed 7 May 2019.

“Finca.” BoardGameGeek, https://boardgamegeek.com/boardgame/40628/finca. Accessed 8 May 2019.

Gobet, Fernand, et al. *Moves in Mind: The Psychology of Board Games*. Psychology Press, New York;Hove, UK;, 2004, doi:10.4324/9780203503638.

“Globally Important Agricultural Heritage Systems.” *Food and Agriculture Organization of the United Nations*, http://www.fao.org/giahs/background/en/. Accessed 5 Nov. 2018.

Harvey, Celia A., et al. “ Extreme vulnerability of smallholder farmers to agricultural risks and climate change in Madagascar.” *Philosophical Transactions of The Royal Society B,* vol. 369, no. 1639, 2014, pp. 1-12. *The Royal Society,* https://doi.org/10.1098/rstb.2013.0089

He, Feifei, et al. "Nitrous Oxide Emissions from an Intensively Managed Greenhouse Vegetable Cropping System in Northern China." *Environmental Pollution*, vol. 157, no. 5, 2009, pp. 1666-1672. *ScienceDirect,* https://doi.org/10.1016/j.envpol.2008.12.017

"Hearts, Clubs, Diamonds, Spaces: Players Who Suit MUDS". *MUD. Co. UK*, http://mud.co.uk/richard/hcds.htm. Accessed 20 Apr. 2019.

Hu, Dongfang. "The Philosophical Origin of the Black-White System of Chinese Painting." *International Journal of Politics, Culture, and Society*, vol. 8, no. 3, 1995, pp. 453-465. *Springer Link,* https://link.springer.com/article/10.1007%2FBF02142895

Huang, Shiwen, et al. "Nonchemical Pest Control in China Rice: A Review." *Agronomy for Sustainable Development*, vol. 34, no. 2, 2014, pp. 275-291. *Springer Link,* https://link.springer.com/article/10.1007%2Fs13593-013-0199-9

"Hui-style Architecture, Representative of Ancient Chinese Buildings." *CITS*, China International Travel Service Limited, http://www.cits.net/china-travel-guide/hui-style-architecture-representative-of-ancient-chinese-buildings.html. Accessed 5 Apr. 2019.

Jamshidi, Omid, et al. "Vulnerability to Climate Change of Smallholder Farmers in the Hamadan Province, Iran." *Climate Risk Management*, vol. 23, 2019, pp. 146-159. *ScienceDirect,* https://doi.org/10.1016/j.crm.2018.06.002

Khan, Malik Anwar, et al. "Chapter12 Integrated Rice-Duck: A New Farming System for Bangladesh." *AGRO Insight,* https://agroinsight.com/downloads/innovations-in-rural-extension/Innovations-in-Rural-Extension-Chapter12.pdf

Li, Wen-Hua. *Agro-Ecological Farming Systems in China*, vol. 28, UNESCO, New York;Paris, 2001.

Lowe, Keith. "Heaven and Earth—Sustaining Elements in Hakka Tulou." *Sustainability*, vol. 4, no. 11, 2012, pp. 2795-2802. *MDPI*, https://doi.org/10.3390/su4112795

Lucie-Smith, Edward. "Projection." *The Thames & Hudson Dictionary of Art Terms*, 2nd ed., Thames & Hudson, 2003. *Credo Reference,* http://ezproxy.uleth.ca/login?url=https://search.credoreference.com/content/entry/that/projection/0?institutionId=2649. Accessed 8 May 2019.

Marten, Gerald G. "Traditional Agriculture and Agricultural Research in Southeast Asia." *Traditional Agriculture in Southeast Asia: A Human Ecology Perspective*, Westview Press, June 1986, pp. 326-336. *Gerald Marten,*

http://gerrymarten.com/traditional-agriculture/tableofcontents.html

Mostafalou, Sara, and Mohammad Abdollahi. "Pesticides and Human Chronic Diseases: Evidences, Mechanisms, and Perspectives." *Toxicology and Applied Pharmacology*, vol. 268, no. 2, 2013, pp. 157-177. *ScienceDirect,* https://doi.org/10.1016/j.taap.2013.01.025

Mencius. "*The Works of Mencius".* Translated by James Legge. *The Chinese Classics*, vol.2. Clarendon Press, 1895. *Internet Archive*, https://archive.org/details/chineseclassics02minggoog/page/n142

"Multiple Cropping." *Food and Agriculture Organization of the United Nations*, http://www.fao.org/3/x3996e/x3996e36.htm. Accessed 8 May 2019.

Mitchell, Alice, and Carol Savil-Smith. "Why Use Computer Games for Learning?" *The Use of Computer and Video Games for Learning*, the Learning and Skills Development Agency, 2004, p. 17, 20. *Utah Department of Health,* http://health.utah.gov/eol/utc/articles/use_of_games_for_learning.pdf

Okami HD, developed by Capcom, 2017.

Oliver, Marie Elizabeth. "Join the party: Board game popularity just keeps growing." *The Seattle Time,* 14 Feb. 2014, https://www.seattletimes.com/explore/shop-northwest/join-the-party-board-game-popularity-just-keeps-growing/. Accessed 13 Apr. 2019.

Padilla-Zea, Natalia, et al. "Modeling Storytelling to be used in Educational Video Games." *Computers in Human Behavior*, vol. 31, 2014, pp. 461-474. *ScienceDirect,* https://doi.org/10.1016/j.chb.2013.04.020

"Pathogens and Organic Matter." *UNL Water,* https://water.unl.edu/article/animal-manure-management/pathogens-and-organic-matter. Accessed 10 July 2019.

Poon, Pauline. "The Cultural Meaning of Hakka Architecture in Hong Kong and Guangdong." *Journal of the Royal Asiatic Society Hong Kong Branch*, vol. 49, 2009, pp. 21-55. *JSTOR,* https://www-jstor-org.ezproxy.uleth.ca/stable/23891834?pq-origsite=summon&seq=1#metadata_info_tab_contents

Schuman, Michael. "China's Small Farms Are Fading. The World May Benefit." *The New York Times*, 5 October 2018, https://www.nytimes.com/2018/10/05/business/china-small-farms-urbanization.html

She, Wei, et al. "Potential use of Foamed Mortar (FM) for Thermal Upgrading of Chinese Traditional Hui-Style Residences." *International Journal of Architectural Heritage*, vol. 9, no. 7, 2015, pp. 775-793. *Taylor & Francis Online,* https://doi.org/10.1080/15583058.2013.855839

Salaheen, S., et al. "Zoonotic Bacterial Pathogens and Mixed Crop-Livestock Farming 1." *Poultry Science*, vol. 94, no. 6, 2015, pp. 1398-1410. *Oxford Academic,* https://doi.org/10.3382/ps/peu055

Salen, Katie, and Eric Zimmerman. *Rules of Play: Game Design Fundamentals*. MIT Press, 2004.

Salen, Katie, and Eric Zimmerman. *The Game Design Reader: A Rules of Play Anthology*. MIT Press, 2006.

Sanga, Gody Jonathan, et al. "Small Scale Farmers' Adaptation to Climate Change Effects in Pangani River Basin and Pemba: Challenges and Opportunities." *Social Science in China*, vol. 2, no.3, 2013, pp. 169-194. *ResearchGate,* https://www.researchgate.net/publication/259363447

Savci, Serpil. "Investigation of Effect of Chemical Fertilizers on Environment." *APCBEE Procedia*, vol. 1, 2012, pp. 287-292. *ScienceDirect,* https://doi.org/10.1016/j.apcbee.2012.03.047

Singh, Shrawan, et al. "Chapter 23 - Coping with Climatic Uncertainties Through Improved Production Technologies in Tropical Island Conditions." *Biodiversity and Climate Change Adaptation in Tropical Islands,* pp. 623-666. *ScienceDirect,* https://doi.org/10.1016/B978-0-12-813064-3.00023-5

Snelder, D. J., et al. "Risk Assessment of Pesticide Usage by Smallholder Farmers in the Cagayan Valley (Philippines*)." Crop Protection*, vol. 27, no. 3, 2008, pp. 747-762. *ScienceDirect,* https://doi.org/10.1016/j.cropro.2007.10.011

Song, Yang, et al. "Long-Term Plastic Greenhouse Cultivation Changes Soil Microbial Community Structures: A Case Study." *Journal of Agricultural and Food Chemistry*, vol. 66, no. 34, 2018, pp. 8941-8948. *ACS Publications,* http:// 10.1021/acs.jafc.8b01829

"Song Dynasty." *Encyclopedia Britannica*, Encyclopedia Britannica, Inc., 2016. *Encyclopedia Britannica,* https://www.britannica.com/topic/Song-dynasty. Accessed 15 Apr 2019.

Stardew Valley, developed by ConcernedApe, 2016.

Stewart, V, et al. "Computer Games and Fun in Farming-Systems Education?: A Case Study." *The Journal of Agricultural Education and Extension*, vol. 7, no. 2, 2000, pp. 117-128. *Taylor & Francis Online,* https://doi-org.ezproxy.uleth.ca/10.1080/13892240008438812

Jakuboski, Samantha. "The Dangers of Pesticides." *Green Science*, 25 July 2011. *Scitable,* https://www.nature.com/scitable/blog/green-science/the_dangers_of_pesticides. Accessed 7 May 2019.

Jamshidi, Omid, et al. "Vulnerability to Climate Change of Smallholder Farmers in the Hamadan Province, Iran." *Climate Risk Management*, vol. 23, 2019, pp. 146-159. *ScienceDirect*, https://doi.org/10.1016/j.crm.2018.06.002

"Tabletop vs. Video Gaming. " *Orgre's Den Gaming,* 26 Apr. 2018, https://theogresdengaming.com/tabletop-vs-video-gaming/. Accessed 8 May 2019.

"Top Pesticide Using Countries." *Worldatlas*, 25 Apr. 2017, https://www.worldatlas.com/articles/top-pesticide-consuming-countries-of-the-world.html. Accessed 7 May 2019.

Tong, Shilu, et al. "Climate Change, Food, Water and Population Health in China." *Bulletin of the World Health Organization*, vol. 94, no. 10, 2016, pp. 759-765. *Nation Center for Biotechnology Information,* http:// doi: 10.2471/BLT.15.167031

"2.5D (visual perception)." *Wikipedia*, 8 July 2019, https://en.wikipedia.org/wiki/2.5D_(visual_perception). Accessed 22 July 2019.

Vignola, Raffaele, et al. "Ecosystem-Based Adaptation for Smallholder Farmers: Definitions, Opportunities and Constraints." *Agriculture, Ecosystems and Environment*, vol. 211, 2015, pp. 126-132. *ScienceDirect,* https://doi.org/10.1016/j.agee.2015.05.013

Wang, Xiaozhong, et al. "Environmental Costs and Mitigation Potential in Plastic-Greenhouse Pepper Production System in China: A Life Cycle Assessment." *Agricultural Systems*, vol. 167, 2018, pp. 186-194. *ScienceDirect*, https://doi.org/10.1016/j.agsy.2018.09.013

Wiggins, Steve, et al. "The Future of Small Farms." *World Development*, vol. 38, no. 10, 2010, pp. 1341-1348. *ScienceDirect,* https://doi.org/10.1016/j.worlddev.2009.06.013

Xiao, Lingbo, et al. "Famine Relief, Public Order, and Revolts: Interaction between Government and Refugees as a Result of drought/flood during 1790–1911 in the North China Plain." *Regional Environmental Change*, vol. 18, no. 6, 2018, pp. 1721-1730. *SpringerLink,*

https://doi.org/10.1007/s10113-018-1298-6

Ye, Jingzhong. “Land Transfer and the Pursuit of Agricultural Modernization in China.” *Journal of Agrarian Change*, vol. 15, no. 3, 2015, pp. 314-337. *Wiley Online Library*, https://doi-org.ezproxy.uleth.ca/10.1111/joac.12117

Zeng, Zhao-Hai, et al. “Legume-cereal Crop Rotation Systems in China.” *Crop Rotation*, edited by Ma Bao-Luo, Nova Science, 2016. *ResearchGate,* https://www.researchgate.net/publication/308724028_Legume-cereal_crop_rotation_systems_in_China

Zhang, Chao, et al. "Overuse or Underuse? An Observation of Pesticide Use in China." The Science of the Total Environment, vol. 538, 2015, pp. 1-6. *ScienceDirect*, https://doi.org/10.1016/j.scitotenv.2015.08.031

Zhang, Sarah. “Pig-Manure Fertilizer Linked to Human MRSA Infections.” Scientific American, 17 Sept. 2013, https://www.scientificamerican.com/article/pig-manure-fertilizer-linked-to-human-mrsa-infections/. Accessed 10 July 2019.

Zhu, Xinrong, et al. "Energy Performance of a New Yaodong Dwelling, in the Loess Plateau of China." *Energy & Buildings*, vol. 70, 2014, pp. 159-166. *ScienceDirect*, https://doi.org/10.1016/j.enbuild.2013.11.050

Appendix A: the concepts of Calendar Valley

Section 1: the art concepts of the characters

Song-The mortal Form

Yah- The mortal form

Feng- The mortal form

The Villager I

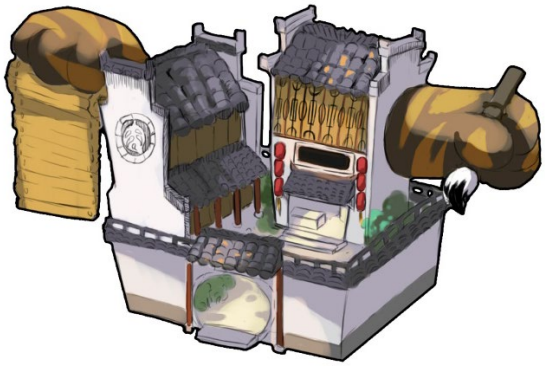
The Villager II-Old Sun

The Villager III

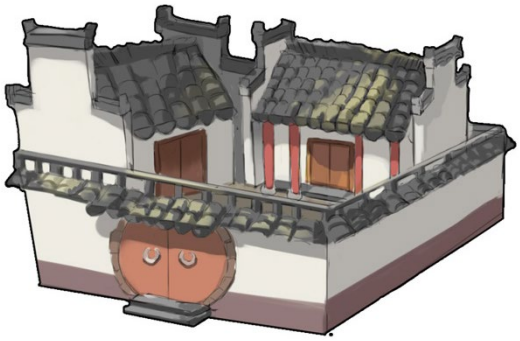
Nian

Section 2: the art concepts of the buildings

The Variety Store



The Book Store



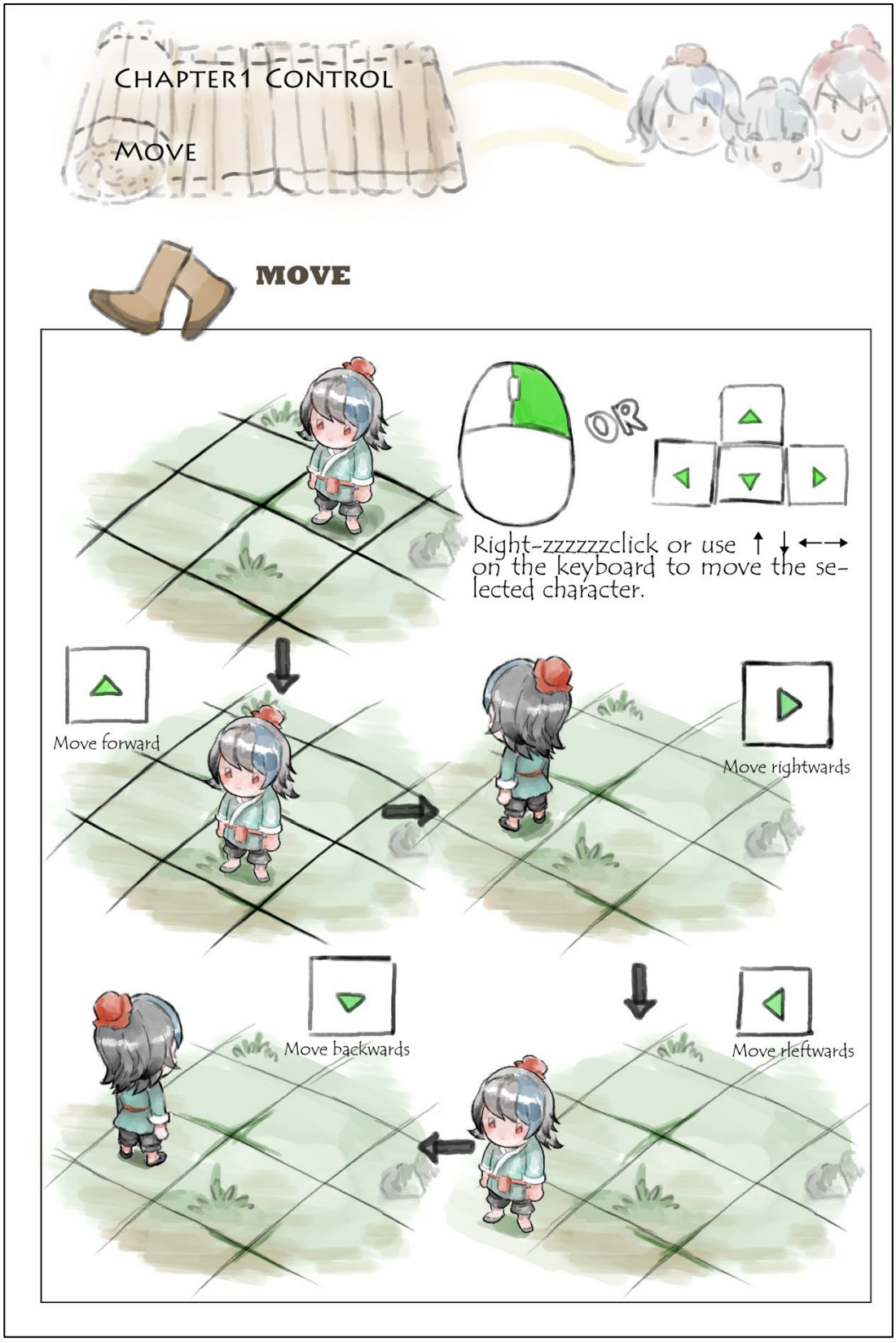
The Dwelling II

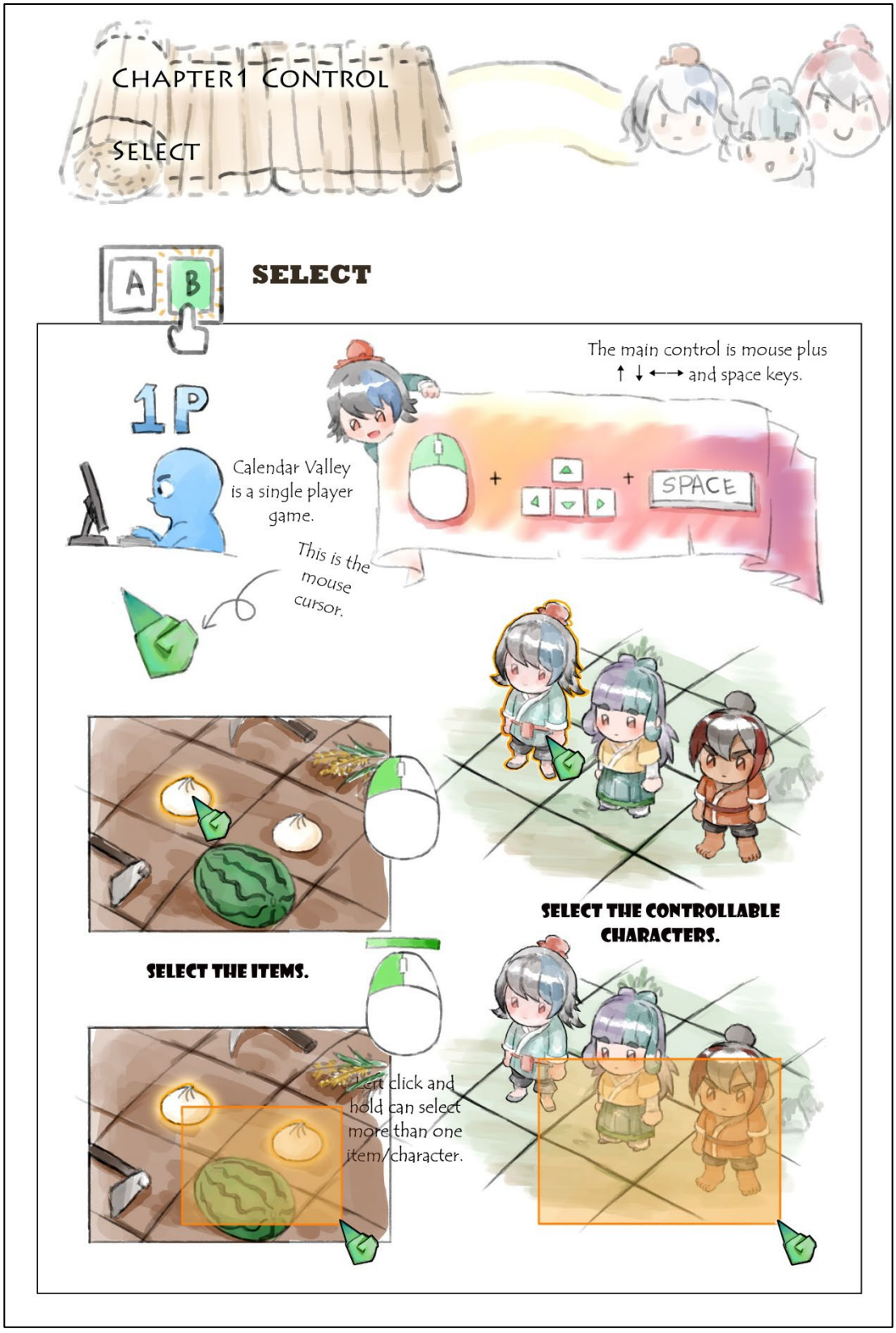
The Dwelling I

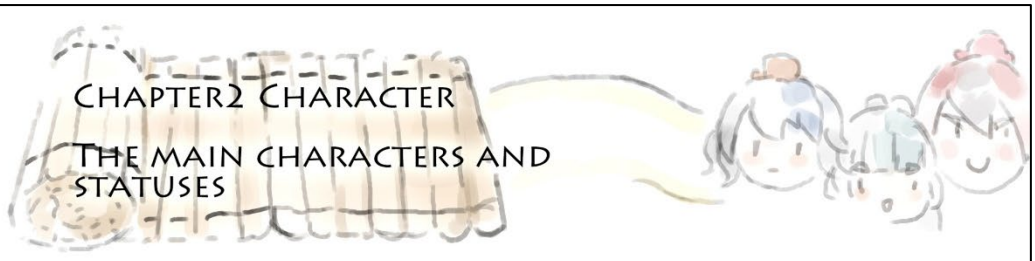
The Grocery

The Statue in Calendar Valley-Rabbit Man Fighting Nian

Section 3: the gameplay concepts


CHAPTER1 CONTROL
MOVE
MOVE
OR
Right-zzzzzzclick or use ↑ ↓ ←→ on the keyboard to move the selected character.
Move forward
Move rightwards
Move backwards
Move rleftwards


CHAPTER1 CONTROL
SELECT
A
B
SELECT
1P
Calendar Valley is a single player game.
The main control is mouse plus ↑ ↓ ← → and space keys.
SPACE
This is the mouse cursor.
SELECT THE ITEMS.
SELECT THE CONTROLLABLE CHARACTERS.
Left click and hold can select more than one item/character.



The main characters and status

Feng, Yah ,and Song are siblings. They have different characteristics.

FENG
- Great strength
- Great endurance in bad weathers
- Get satisfied and proud after helping others(finishing a task);get sad when failed

YAH
- Fast learner
- Good eyes
- Great cook
- Gluten
- Competitive
- get buffs after eating a lot

SONG
- Lucky
- Good eyes
- Always welcome
- More energy
- Get buffed in sunny days

Feng, the big brother, cares about the family most. He has great strength, which allows him to do heavier work than the other two siblings. But he is not good at thinking, sometimes can be a hothead.

Yah is fascinated by human food since she comes to Calendar Valley. She stays smart and wise as long as there's no food in front of her. She can learn and finish things much faster than Feng and Song. Her status gets buffed after eating good food or lots of food.

Song, the youngest who loves sunny days. Song is polite and friendly, so he becomes friends with NPCs much faster. He is lucky which means he can always get a better result from finishing an action, for example, he can get more good seeds from the harvests. His good eyes allow him to find more valuable stuff and detect the pests faster.

Tired. Lower efficiency.

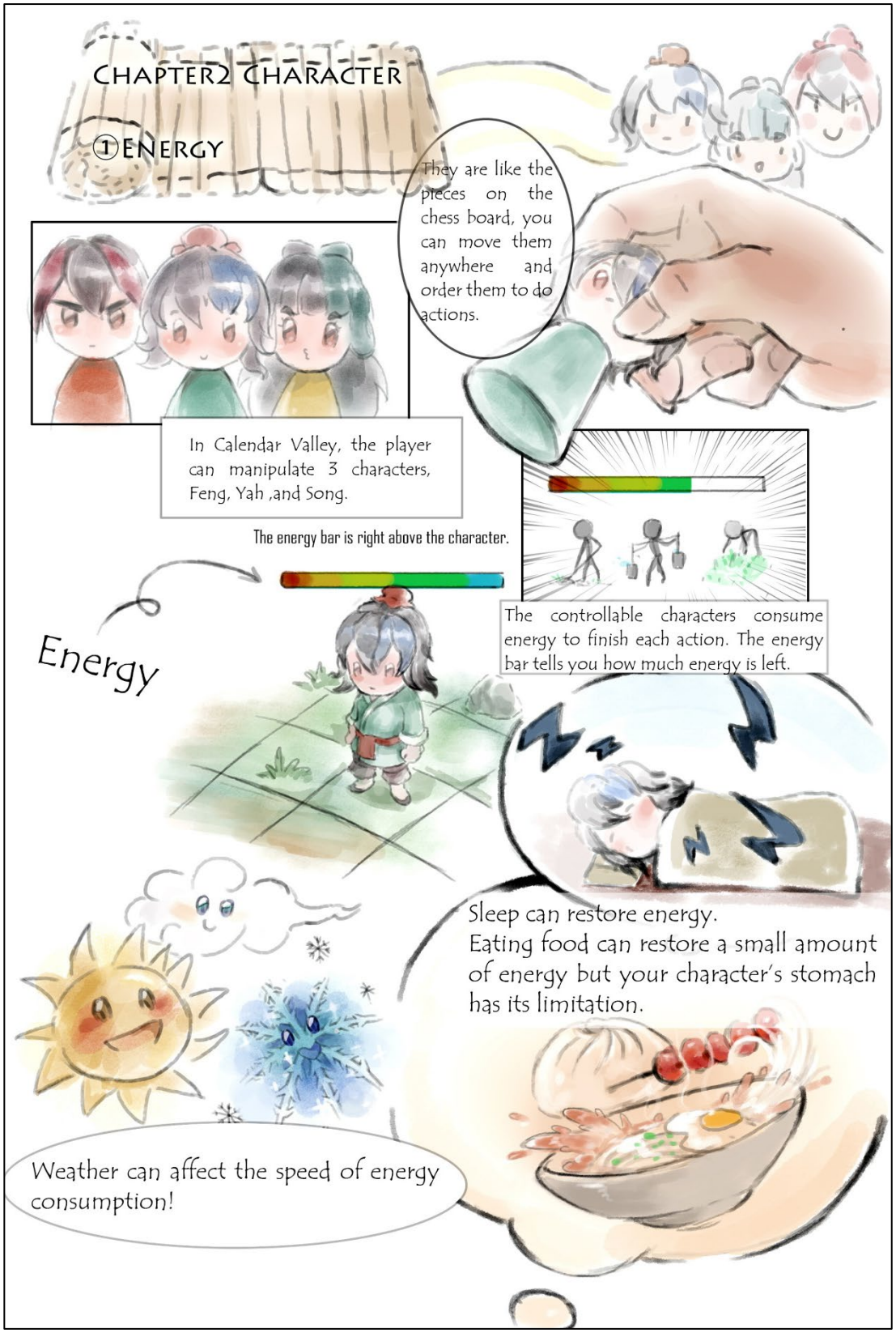
Sick. Can't work.

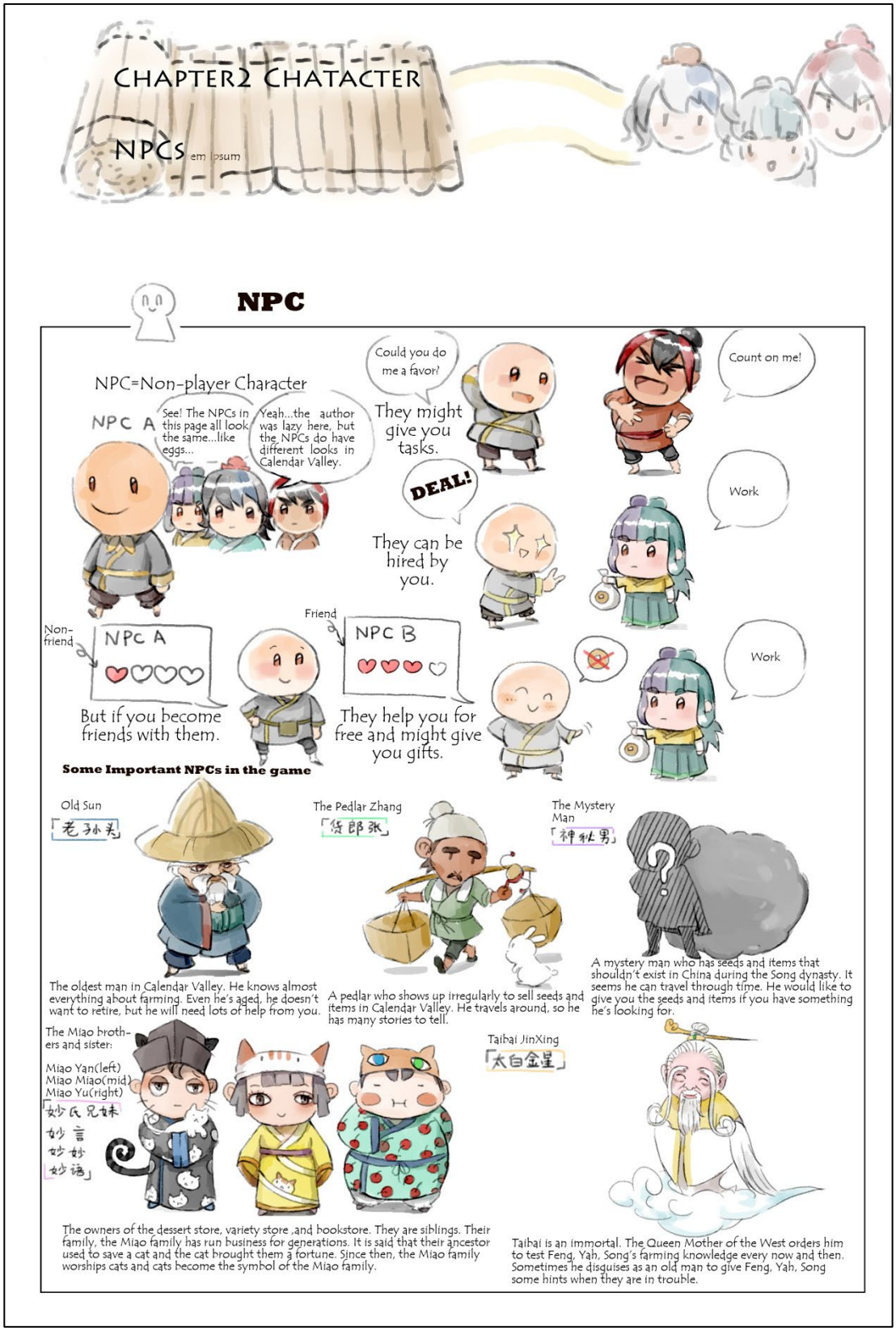
The main characters can be under a different statuses. The statuses of the characters influence their work efficiency.

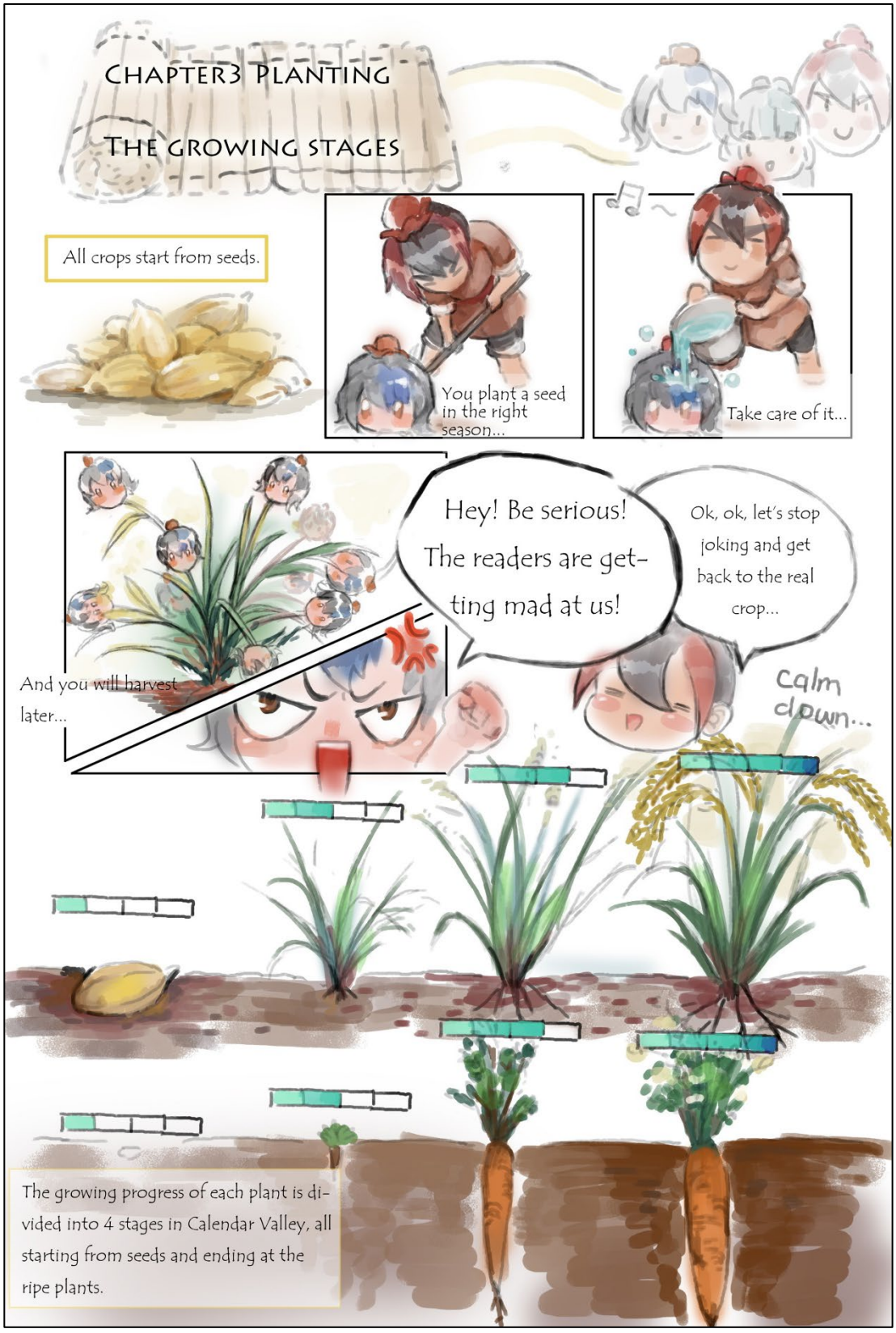
Hot. Lower efficiency.

Cold. Lower efficiency.

Comfortable. Higher efficiency.

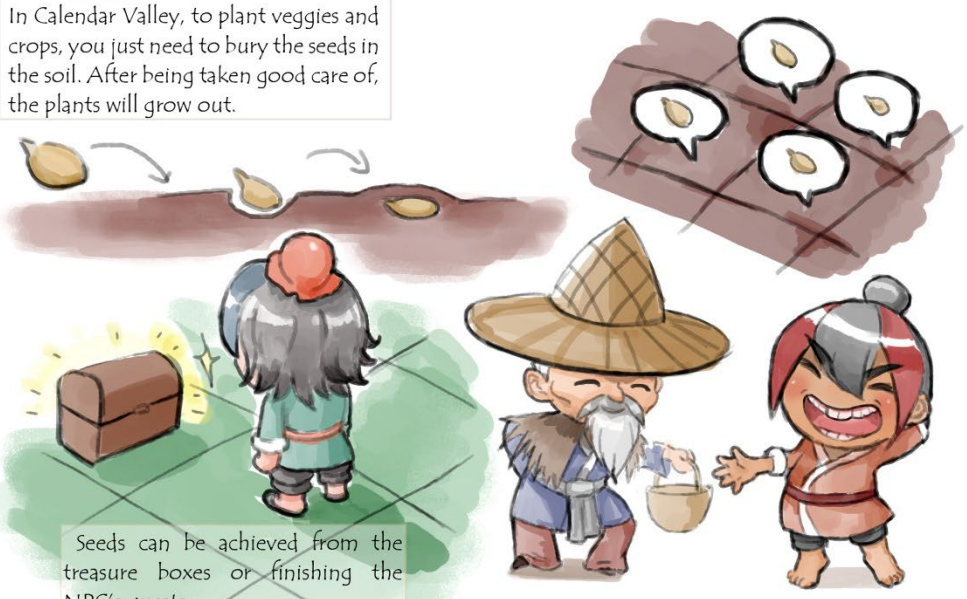

CHAPTER2 CHARACTER
①ENERGY
They are like the pieces on the chess board, you can move them anywhere and order them to do actions.
In Calendar Valley, the player can manipulate 3 characters, Feng, Yah ,and Song.
The energy bar is right above the character.
The controllable characters consume energy to finish each action. The energy bar tells you how much energy is left.
Energy
Sleep can restore energy.
Eating food can restore a small amount of energy but your character's stomach has its limitation.
Weather can affect the speed of energy consumption!


CHAPTER2 CHATACTER
NPCs em ipsum
NPC
NPC=Non-player Character
NPC A
See! The NPCs in this page all look the same...like eggs...
Yeah...the author was lazy here, but the NPCs do have different looks in Calendar Valley.
Could you do me a favor?
They might give you tasks.
Count on me!
DEAL!
They can be hired by you.
Work
Non-friend
NPC A
But if you become friends with them.
Friend
NPC B
They help you for free and might give you gifts.
Work
Some Important NPCs in the game
Old Sun
「老孙头」
The oldest man in Calendar Valley. He knows almost everything about farming. Even he's aged, he doesn't want to retire, but he will need lots of help from you.
The Pedlar Zhang
「货郎张」
A pedlar who shows up irregularly to sell seeds and items in Calendar Valley. He travels around, so he has many stories to tell.
The Mystery Man
「神秘男」
A mystery man who has seeds and items that shouldn't exist in China during the Song dynasty. It seems he can travel through time. He would like to give you the seeds and items if you have something he's looking for.
The Miao brothers and sister:
Miao Yan(left)
Miao Miao(mid)
Miao Yu(right)
「妙氏兄妹
妙 言
妙妙
妙语」
The owners of the dessert store, variety store ,and bookstore. They are siblings. Their family, the Miao family has run business for generations. It is said that their ancestor used to save a cat and the cat brought them a fortune. Since then, the Miao family worships cats and cats become the symbol of the Miao family.
Taibai JinXing
「太白金星」
Taibai is an immortal. The Queen Mother of the West orders him to test Feng, Yah, Song's farming knowledge every now and then. Sometimes he disguises as an old man to give Feng, Yah, Song some hints when they are in trouble.


CHAPTER3 PLANTING
THE GROWING STAGES
All crops start from seeds.
You plant a seed in the right season...
Take care of it...
Hey! Be serious! The readers are getting mad at us!
Ok, ok, let's stop joking and get back to the real crop...
Calm down...
And you will harvest later...
The growing progress of each plant is divided into 4 stages in Calendar Valley, all starting from seeds and ending at the ripe plants.

Seeds

In Calendar Valley, to plant veggies and crops, you just need to bury the seeds in the soil. After being taken good care of, the plants will grow out.



Seeds can be achieved from the treasure boxes or finishing the NPC's quests.

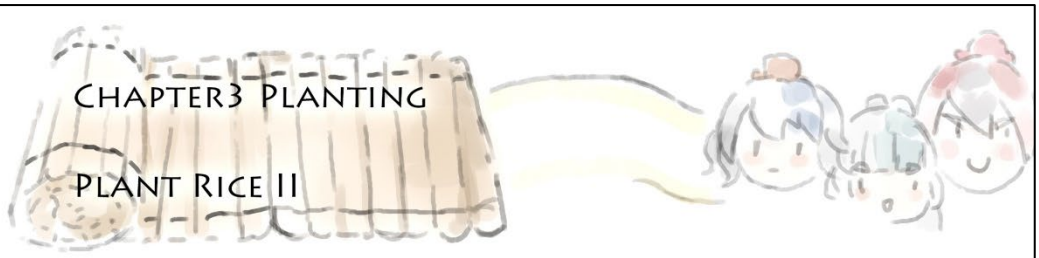
Seeds have different levels. The levels influence the quality and quantity of the harvests.

But in Calendar Valley, some crops are planted in more complex ways, like rice.

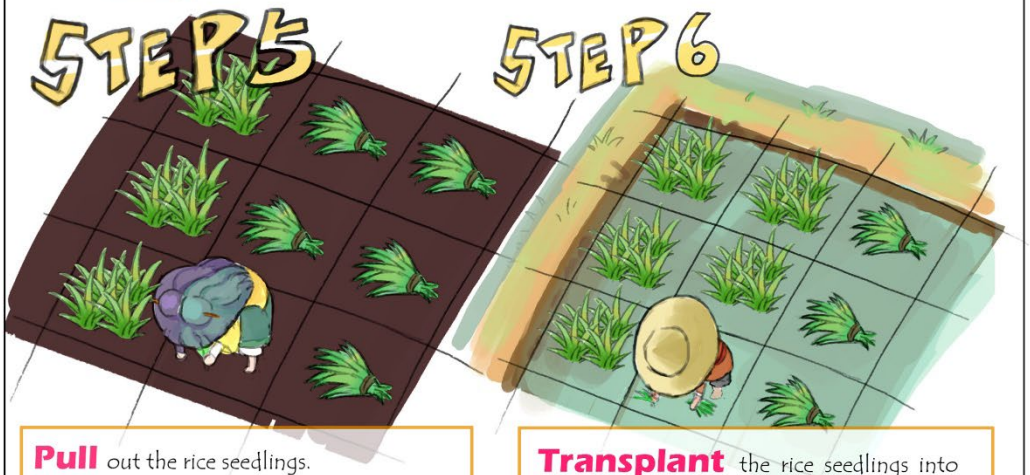
Rice is delicious, but do you know how rice is planed?

The next page will tell you!


CHAPTER3 PLANTING
PLANT RICE I
Plant Rice I
STEP 1
STEP 2
Plowing before sowing can make the soil loose and soft, which is good for the seeds to sprout. The loosen soil can also absorb more air and water.
Soaking the seeds in warm water can stimulate the activity of the enzyme in the seeds, to help the seeds sprout. The blighted seeds can be removed easily because they float on the water.
STEP 3
STEP 4
The soil must contain lots of water.
SOWN
SOWN
SOWN
SOWN
Accelerate Germination. Put the pre-soaked seeds in a container and wrap the seeds with straw to keep them warm. Seeds sprout in step 3.
Sowing the sprouts. Sow the sprouted seeds in a small field until they grow into rice shoots.

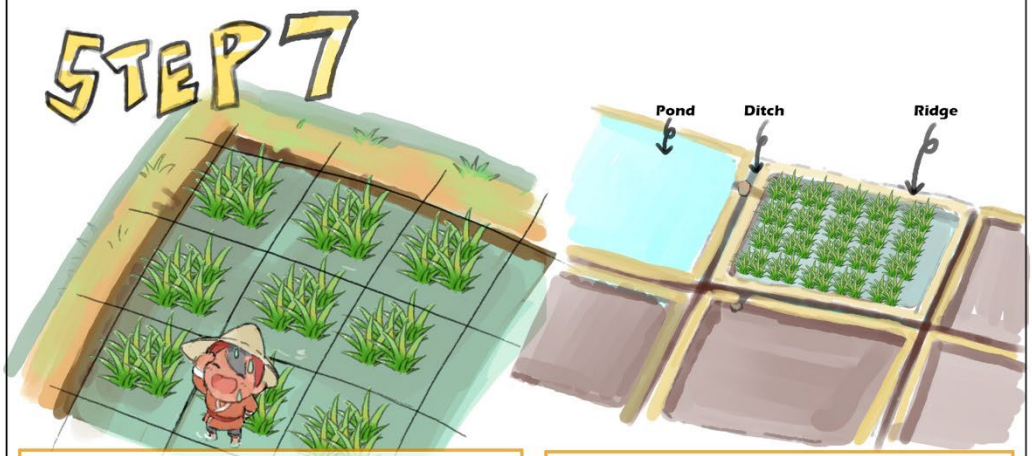


Plant Rice II



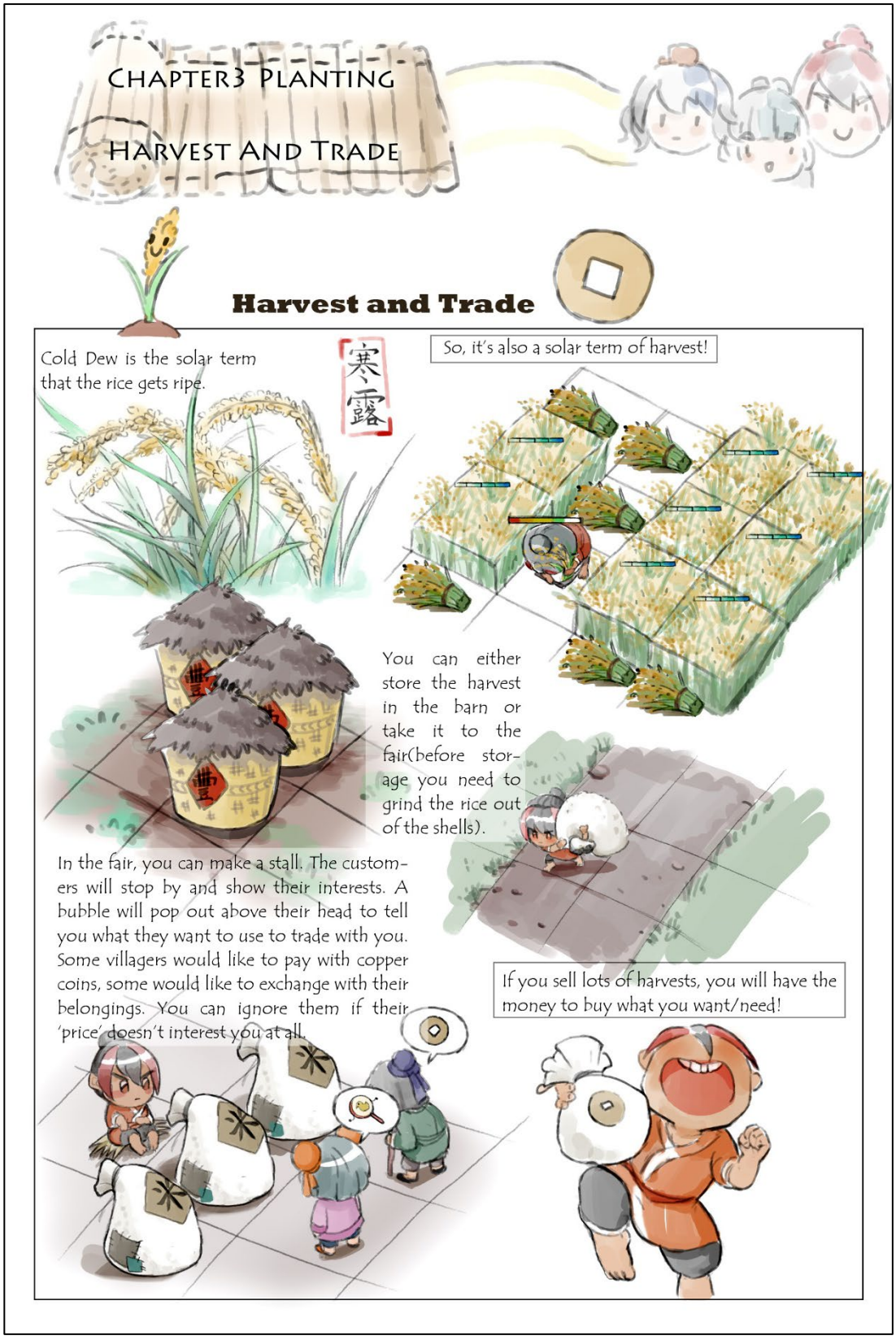
Pull out the rice seedlings.

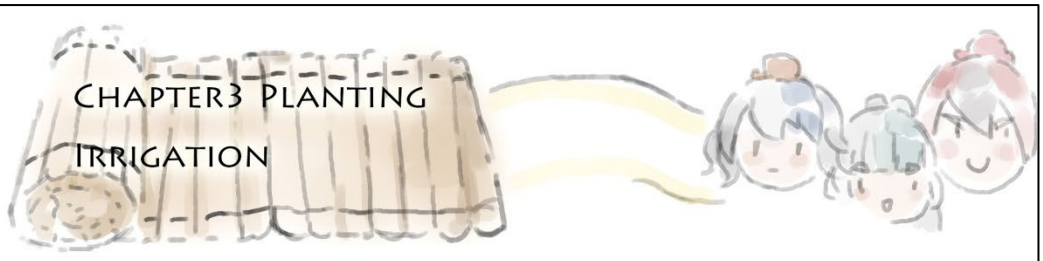
Transplant the rice seedlings into the paddy fields.



Finished!

You might need to drain up the paddy fields and refill them, depending on the weather changes.


CHAPTER3 PLANTING
HARVEST AND TRADE
Harvest and Trade
Cold Dew is the solar term that the rice gets ripe.
寒露
So, it's also a solar term of harvest!
You can either store the harvest in the barn or take it to the fair(before storage you need to grind the rice out of the shells).
In the fair, you can make a stall. The customers will stop by and show their interests. A bubble will pop out above their head to tell you what they want to use to trade with you. Some villagers would like to pay with copper coins, some would like to exchange with their belongings. You can ignore them if their 'price' doesn't interest you at all.
If you sell lots of harvests, you will have the money to buy what you want/need!



Irrigation

Plants need water to grow.

There are two ways for plants to get water in Calendar Valley.

1. Rainfall

2. irrigation

To irrigate, you need to collect water from a water source.

Efficiency

But the efficiency of carrying water and using a well is too low to flood the rice field.

Well can offer water, also can be built close to your house. But well can't be used to flood the rice paddy.

Efficiency

Waterwheel can be used to flood the rice field. Waterwheel has different types.

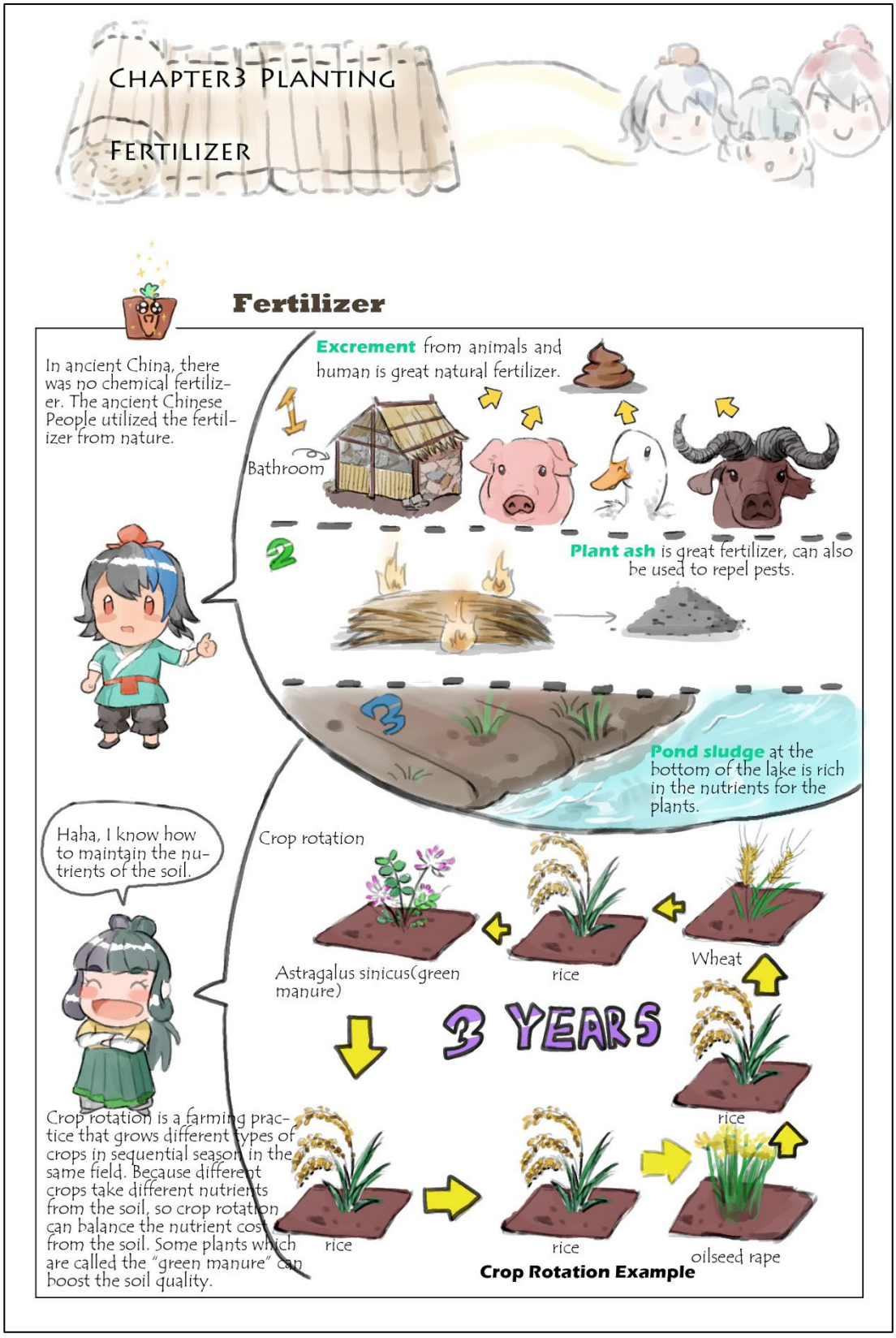
rice field

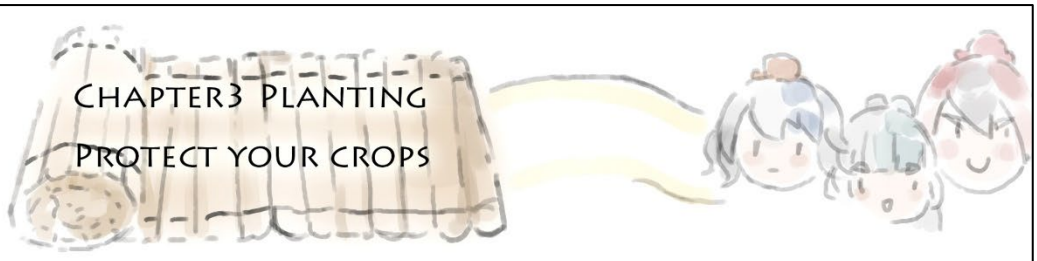
Efficiency

This kind of waterwheel needs 4 people to work perfectly. If less than 4 people, the efficiency is much lower.

rice field

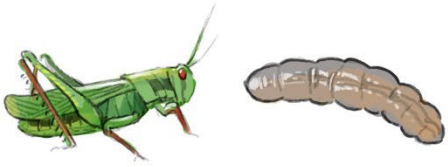
Efficiency


CHAPTER3 PLANTING
FERTILIZER
Fertilizer
In ancient China, there was no chemical fertilizer. The ancient Chinese People utilized the fertilizer from nature.
Excrement from animals and human is great natural fertilizer.
1
Bathroom
2
Plant ash is great fertilizer, can also be used to repel pests.
3
Pond sludge at the bottom of the lake is rich in the nutrients for the plants.
Haha, I know how to maintain the nutrients of the soil.
Crop rotation
Astragalus sinicus(green manure)
rice
Wheat
3 YEARS
rice
Crop rotation is a farming practice that grows different types of crops in sequential season in the same field. Because different crops take different nutrients from the soil, so crop rotation can balance the nutrient cost from the soil. Some plants which are called the "green manure" can boost the soil quality.
rice
rice
oilseed rape
Crop Rotation Example

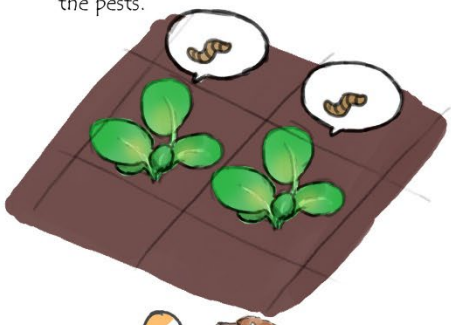


Protect your crops

Pest is always a concern for farmers because they damage the crops and veggies. In ancient China, there was no chemical pesticide available, but the ancient Chinese farmers had their methods. You can find these methods in Calendar Valley.



When this sign pops up, it means your cops and veggies are suffering from the pests.



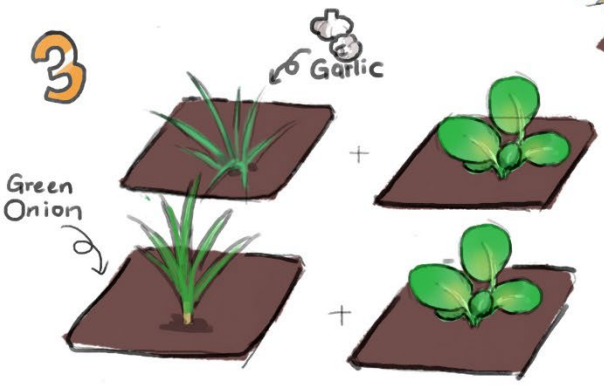
1

The frogs feed on insects which are mostly pests. They can offer your fields a little protection from the pests. Since the Awakening of Insects, the frogs start to show up in the fields. In summer, you can find lots of frogs in Calendar Valley. From autumn, they become inactive and in winter, they hibernate.

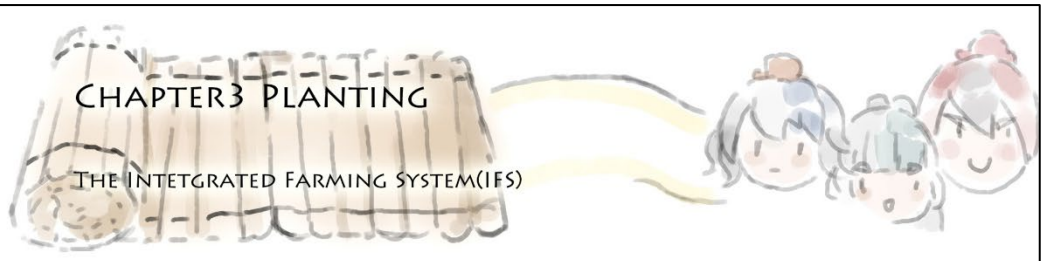
2

When the crops are ripe, the birds can eat them. Putting a scarecrow in the field can scare the birds away.

3

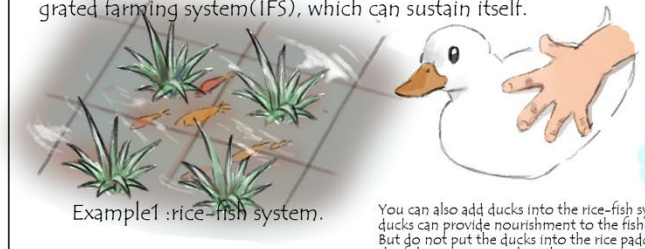


Plant garlic and green onions along with other veggies can prevent pests.



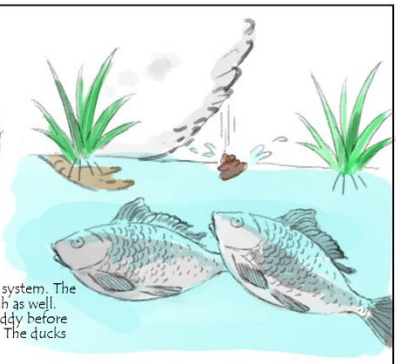
The Integrated Farming system(IFS)

Calendar Valley encourages you to view the environment of the farming fields holistically and create an integrated farming system(IFS), which can sustain itself.

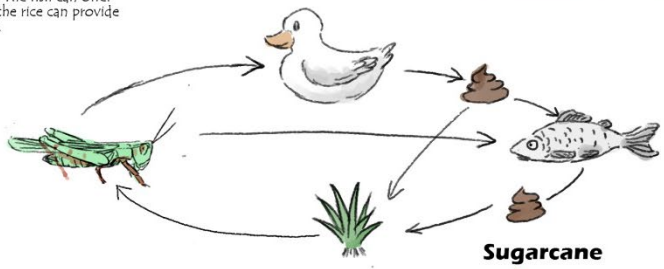


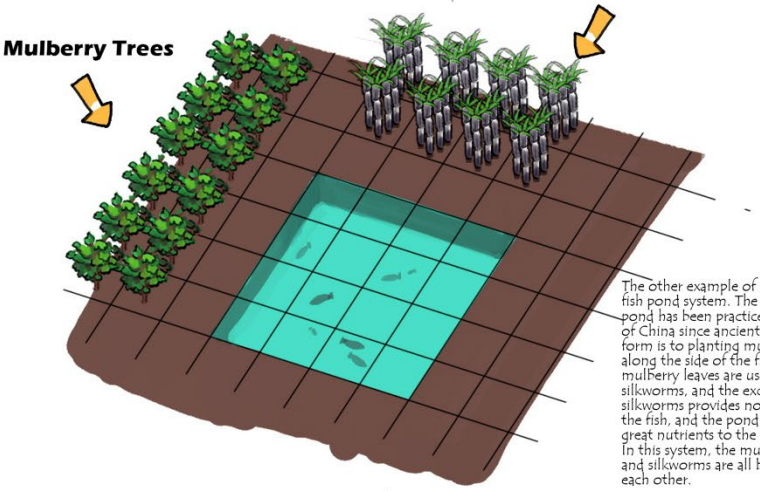
Example1 :rice-fish system.

For example, you can create a rice-fish system by putting fish in the rice paddy. The fish can offer nourishment to the rice and the rice can provide the fish with food like insects.



You can also add ducks into the rice-fish system. The ducks can provide nourishment to the fish as well. But do not put the ducks into the rice paddy before the fish grows up or when the rice is ripe. The ducks can eat baby fish and ripe rice.



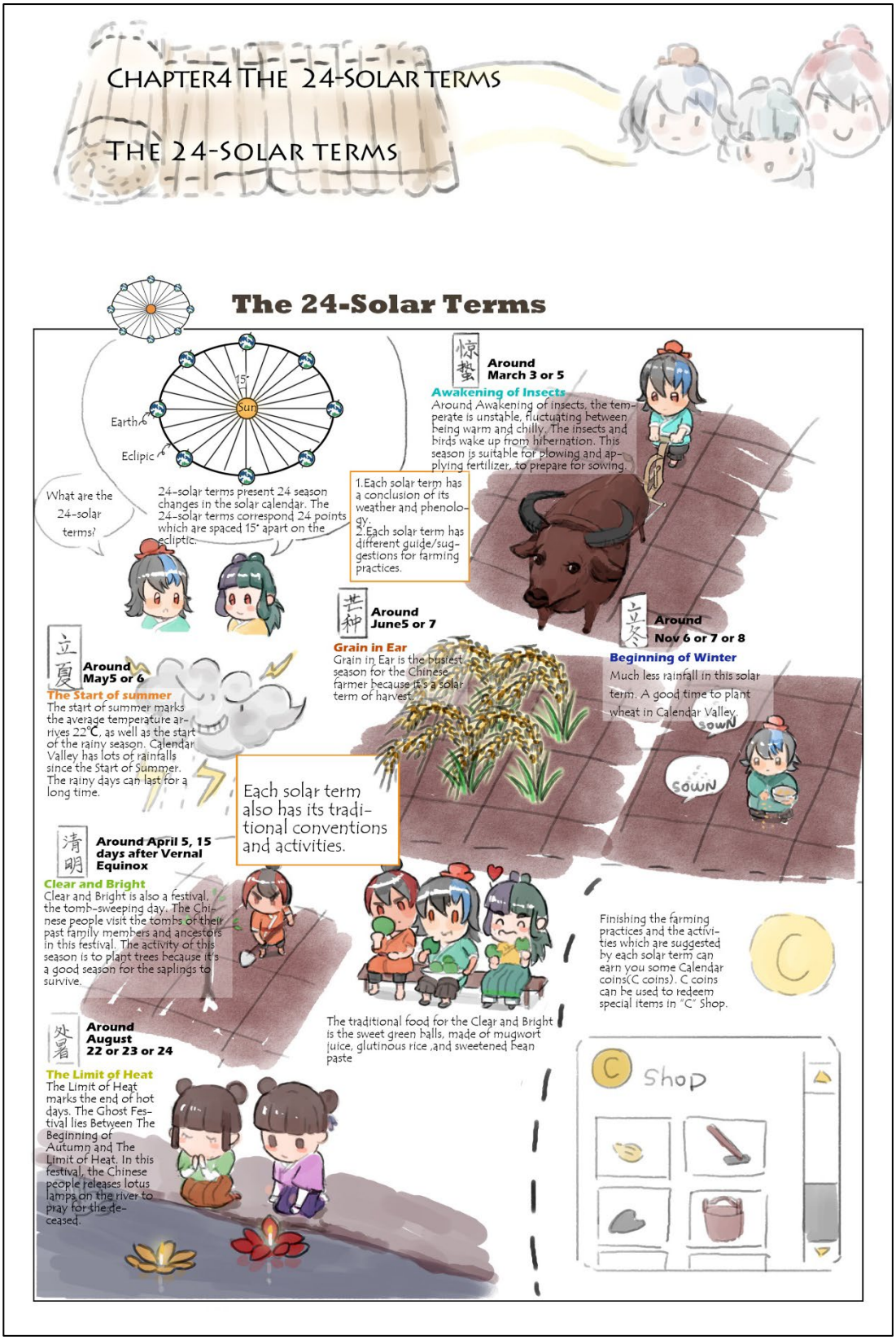


Example2 :Mulberry fish pond system.

The other example of IFS is mulberry fish pond system. The mulberry fish pond has been practiced in many places of China since ancient time. The basic form is to planting mulberry trees along the side of the fish pond. The mulberry leaves are used to feed the silkworms, and the excrement of the silkworms provides nourishment for the fish, and the pond sludge offers great nutrients to the mulberry trees. In this system, the mulberry trees, fish and silkworms are all benefited from each other.

Based on this mulberry-fish pond mode, you can also add fruit trees, flowers sugarcanes, etc. along the side of the fish pond.

The 24-solar terms


CHAPTER4 THE 24-SOLAR TERMS
THE 24-SOLAR TERMS
The 24-Solar Terms
15°
Sun
Earth
Eclipic
What are the 24-solar terms?
24-solar terms present 24 season changes in the solar calendar. The 24-solar terms correspond 24 points which are spaced 15° apart on the ecliptic.
1.Each solar term has a conclusion of its weather and phenology.
2.Each solar term has different guide/suggestions for farming practices.
惊蛰
Around March 3 or 5
Awakening of Insects
Around Awakening of insects, the temperate is unstable, fluctuating between being warm and chilly. The insects and birds wake up from hibernation. This season is suitable for plowing and applying fertilizer, to prepare for sowing.
芒种
Around June5 or 7
Grain in Ear
Grain in Ear is the busiest season for the Chinese farmer because it's a solar term of harvest.
立夏
Around May5 or 6
The Start of summer
The start of summer marks the average temperature arrives 22℃, as well as the start of the rainy season. Calendar Valley has lots of rainfalls since the Start of Summer. The rainy days can last for a long time.
立冬
Around Nov 6 or 7 or 8
Beginning of Winter
Much less rainfall in this solar term. A good time to plant wheat in Calendar Valley.
SOWN
SOWN
Each solar term also has its traditional conventions and activities.
清明
Around April 5, 15 days after Vernal Equinox
Clear and Bright
Clear and Bright is also a festival, the tomb-sweeping day. The Chinese people visit the tombs of their past family members and ancestors in this festival. The activity of this season is to plant trees because it's a good season for the saplings to survive.
The traditional food for the Clear and Bright is the sweet green balls, made of mugwort juice, glutinous rice ,and sweetened bean paste
Finishing the farming practices and the activities which are suggested by each solar term can earn you some Calendar coins(C coins). C coins can be used to redeem special items in "C" Shop.
C
处暑
Around August 22 or 23 or 24
The Limit of Heat
The Limit of Heat marks the end of hot days. The Ghost Festival lies Between The Beginning of Autumn and The Limit of Heat. In this festival, the Chinese people releases lotus lamps on the river to pray for the deceased.
C Shop

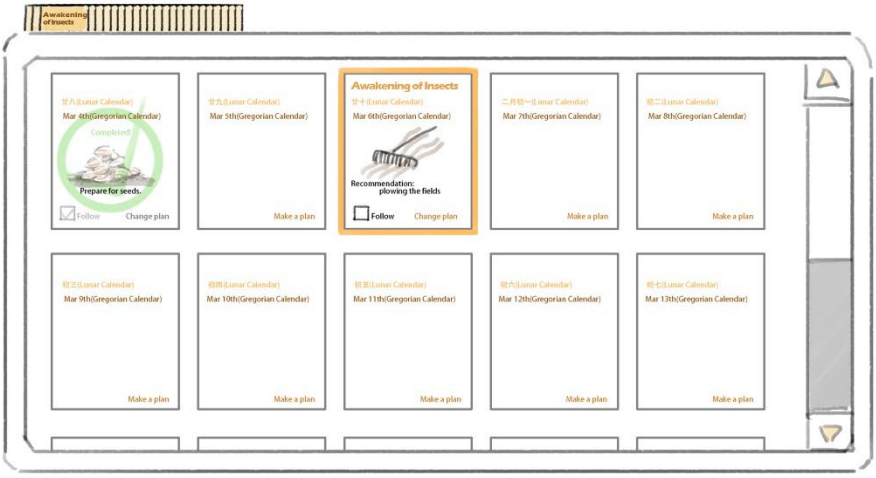
CHAPTER4 THE 24-SOLAR TERMS

PLAN AND CALENDAR

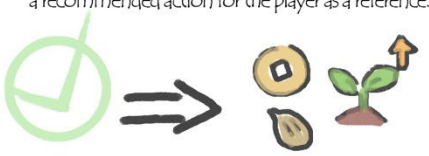
Plan and Calendar

Calendar Valley is a small village where the generations are farmers. They take 24-solar terms as the ancestral treasure. So they follow the guide of 24-solar terms to farm all year round.

Villagers of Calendar Valley like making plans: they use a piece of stone writes their farming plans on a wall in their houses. The plans are made based on the 24-solar terms.

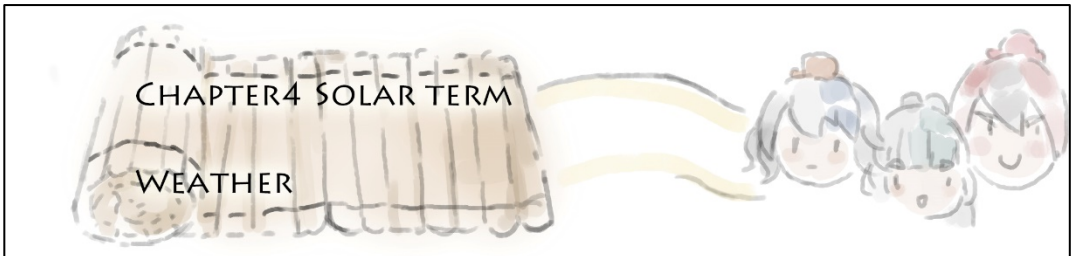


You can make your own plan with a calendar in the game. Each solar term has a recommended action for the player as a reference.



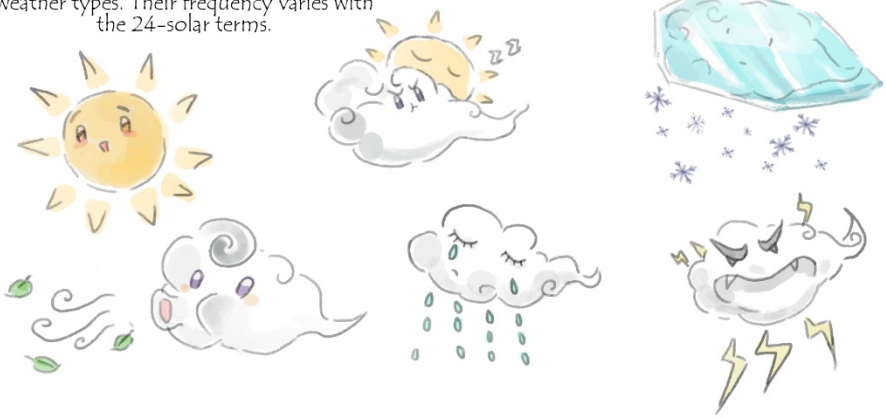
If you follow your plan and complete it, you will receive some rewards.

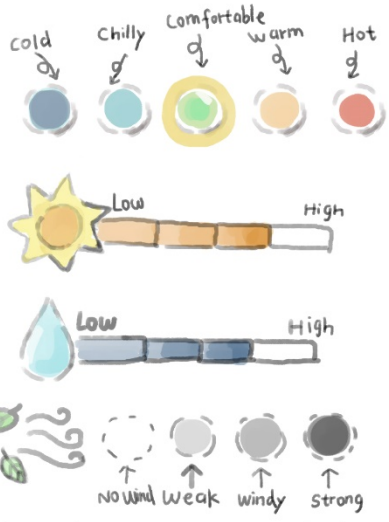
If you do not, there is no punishment, but you get no rewards.



Weather

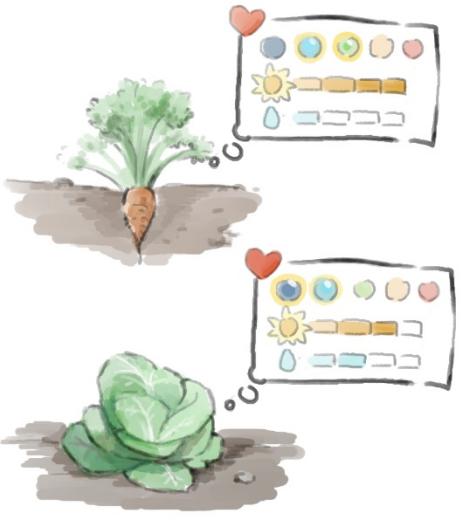
In Calendar Valley, there are different weather types. Their frequency varies with the 24-solar terms.





The weather situation is presented by four elements: sunlight, temperature, rain-fall,wind. Sunlight, temperature, rainfull influence the grwoing speed of the plants.

Different plants have different favourite weather situation. When they are under their favourite weather situation, their growing speed reaches the maximum.

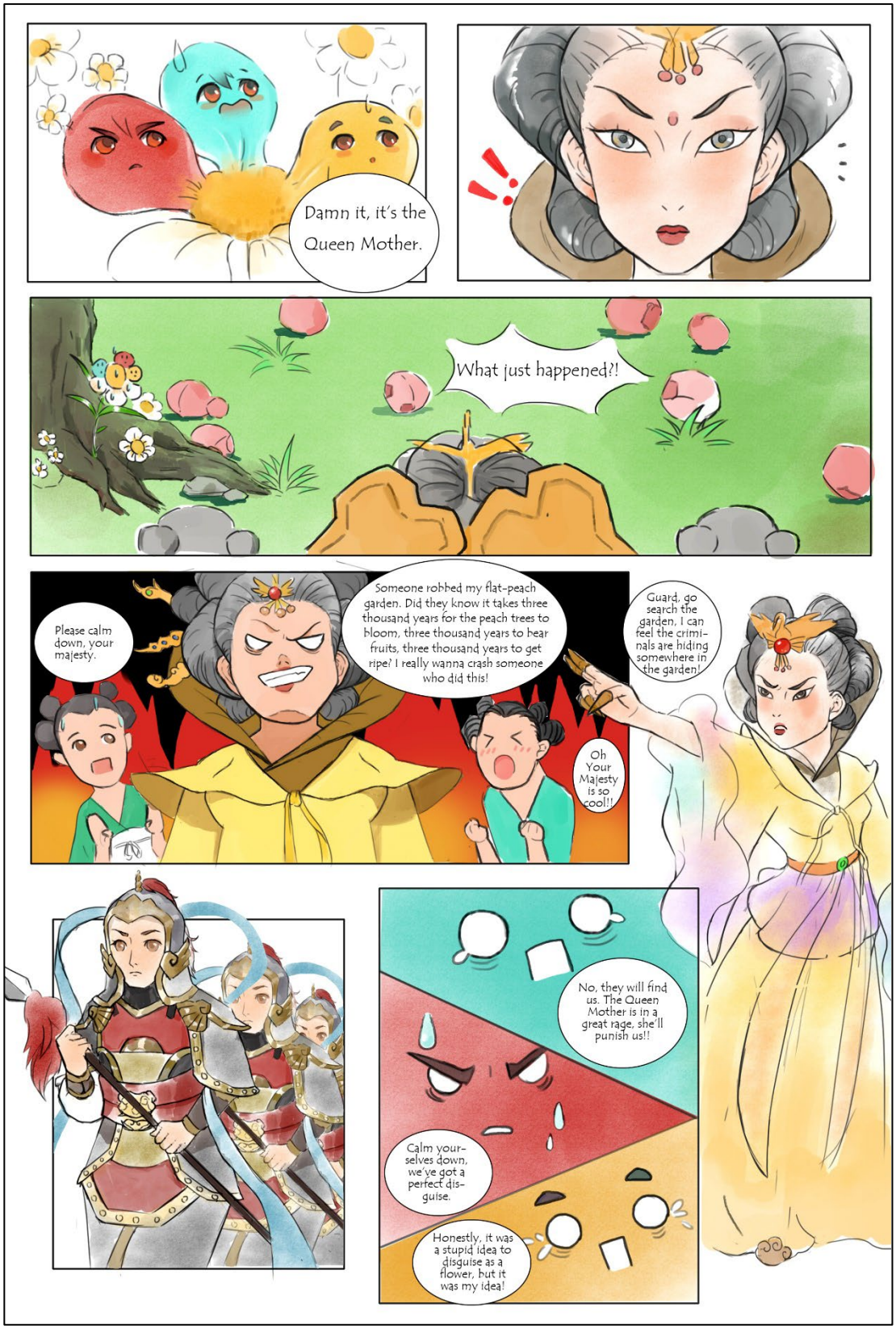


Section 4: the story concepts


Chewing...

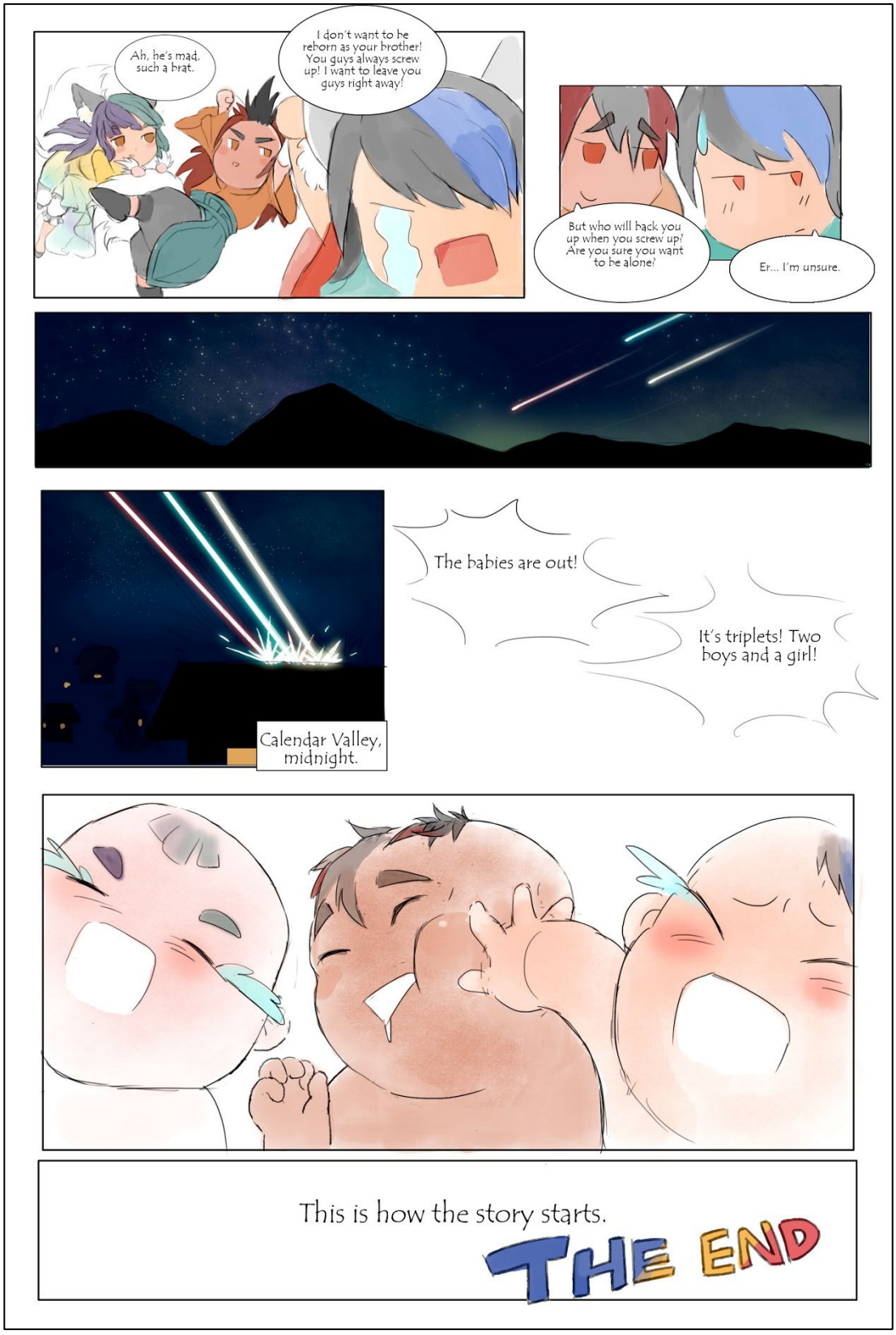

I'm Song, one of the most common immortals in the land of immortals. We sneaked into the Queen Mother's peach garden to steal some delicious peaches.
This one looks really juicy.
Can you guys hurry up, I don't want to get caught.
This is my older brother, he always tries to look calm and cool.
This is my older sister, she always loves good food.
The peaches taste so good! I want to live here forever!


Somebody's coming! Hide, hide, hide!


Damn it, it's the Queen Mother.
What just happened?!
Please calm down, your majesty.
Someone robbed my flat-peach garden. Did they know it takes three thousand years for the peach trees to bloom, three thousand years to bear fruits, three thousand years to get ripe? I really wanna crash someone who did this!
Oh Your Majesty is so cool!!
Guard, go search the garden, I can feel the criminals are hiding somewhere in the garden!
No, they will find us. The Queen Mother is in a great rage, she'll punish us!!
Calm yourselves down, we've got a perfect disguise.
Honestly, it was a stupid idea to disguise as a flower, but it was my idea!


Oh I found them. They- disguised as a strange flower.
Oh no, the Queen Mother will kill us!
Let us go!
Oh calm down.
How dare you sneak into my peach garden and waste so many peaches!! I can't let you go as nothing happened. You all shall be punished!
I'm so sorry, Your Majesty, we won't do it again, please let us go...
What kind of punishment should I give them? They are still kids, I don't want to be cruel but either too kind to them. Ah, such a troublesome thing.
Does anyone knows how to punish them for the mistake they have made!
Your Majesty, I have an idea.
Taibai Jinxing
太白金星
Send them to the mortal world and let them reborn as the mortals.


Let them experience a life as mortal farmers. So they will know the efforts and tiredness of planting. Thus they will treasure the harvests.
Also there is a monster called "Nian" threatening the mortal farmers around the Lunar New Year's Eve. We can't help the mortals directly, but as mortal farmers, Feng, Yah and Song will be able to challenge Nian. I believe they will make it.
Hmm...Sounds like a wonderful punishment. This should be executed right away!
Hey this punishment doesn't sound too bad... we were so lucky. But we know nothing about the mortal's world. I'm worried.
There's nothing to worry about. I have heard the mortal's world has lots of good food! Yay!
Nooooo, we will be eaten by the monster Nian! Ah, I shouldn't have suggested stealing the Queen Mother's peaches.


Ah, he's mad, such a brat.
I don't want to be reborn as your brother! You guys always screw up! I want to leave you guys right away!
But who will back you up when you screw up? Are you sure you want to be alone?
Er... I'm unsure.
The babies are out!
It's triplets! Two boys and a girl!
Calendar Valley, midnight.
This is how the story starts.
THE END

Appendix B: the game document

Section 1: Game Overview
1.Game Concept
The traditional way of farming reveals the wisdom of the ancients in how they get along with nature. To display this wisdom, the game project will provide a detailed demonstration the old-fashioned agriculture by bringing the player into a self-sufficient and agriculture-based world, under the guidance of the Chinese 24 solar terms. Being friendly to the surrounding environment and animals will be an essential value that the player must obey.
2.Basic story
The two brothers and sister, Feng, Ya and Song used to be the immortals but were demoted to humans because they wasted and stole the Queen Mother's flat-peaches. To help them understand the hard work of planting, they are sent to the mortal world to live as farmers.
3.Genre
Farming simulation game
4.Age group
All ages. No violent or sexual content involved.
5.Look and Feel
Watercolor and isometric view.
6.Levels and maps
Only one level, but with 24-solar terms, so the map must present the changes of the 24-solar terms.
7.Buildings:
The player's house interior
The player's farm
The houses of villagers
The village fair
The stores:
The book store The convenience store
The grocery
8.Characters
3 main characters: Feng, Yah, and Song
NPCs:
Old Sun (the gameplay guide)
12 Villagers
Three owners of the three stores
Nian
The Queen Mother
Taibai Jinxing
The mystery man
The pedlar

Section II-items

1.Plants:
Vegetables:
Legume
Leafy Vegetable
Root Vegetable
Stalk Vegetable
Fruit Vegetable
Inflorescent Vegetable
Fruits
Flowers
Rice (Champa rice is the best choice, but not easy to be obtained.)
2.Livestock
Livestock can offer meat.
The player can use a pig, ox, horse or donkey to do plow work. Their strength, appetite, and price are different. The player can also let the livestock work for the farm, and then the livestock become work friends. The work friends no longer offer meat to the player.
Pig
Ox
Horse
Donkey
Mule
Chicken
Duck (The player can get eggs from chicken and duck).
3.Pets
Dog
Cat
4.Fertilizer
Manure
Plant Ash
5.Farming tools
The stereotypes of the farm tools are all referenced from Chinese traditional farm tools.
For single user:
Rake, hoe, pickaxe, shovel, pedal plough, foot-powered irrigation device
For two users or one user with one or two livestock:
Bending ploughs
Crafting:
Barn
Fence
Silo
Scarecrow
Paddy field
Well

Section 3: Gameplay and Mechanics
1.Basis

The player needs to arrange the 3 characters according to their abilities, follow the rhythm of the 24-solar terms, build IFS for the best usage of fields, and collect items to defeat Nian.

2.Quests/ Challenge Structure

2.1The main quests offer the player a piece of the final puzzle of the main story line every time the player finishes one, and leads the player to discover the way to defeat Nian. It runs through the whole game, and the player can find the clues in each stage in the game.

2.2The side quests: The side quests show up to either guide the player into learning the gameplays or help the player obtain money and items. A side quest can have a short story, which consists of a few parts for the player to finish and

2.3Repeatable quest is a type of quest that the player can accept and finish it repetitively, for its award.

2.4Objectives

For the side quests: it can be the required items that the player has to give the NPCs, can be a certain crop, or flowers, or clothes, etc.

For the main quest: it is the knowledge which relates to the clues of Nian.

3.Mechanics

3.1Time system:

The minimum time unit in the game is a minute. 1 minute in the game equals to 1 second in the reality, so a day in the game ends in every 24 minutes in reality.

3.1.1Estimated time span

The estimated time span is an ideal length of time that would be taken by a crop to get ripe.

3.1.2The actual time span

The estimated time span is an actual length of time that would be taken by a crop to get ripe, since the crop's growth is influenced by the environment elements.

3.2Status System

Main Character Demands/ Status

Each controllable character has a certain amount of energy. Working consumes energy; eating and resting can restore energy.

Different status influences the character's working efficiency

Energetic	Boosted working efficiency
Healthy	100% working efficiency
Uncomfortable	50%working efficiency
Sick	cannot work

Getting too hot, too cold, or too tired all influence the health level.

3.3Crop growing conditions& status & life stage

Three elements influence the speed of a crop's growing, so it also impacts the time span for a crop to get ripe.

Sunshine

Temperature

Humidity

The plant can have different status:

Great	Growing speed boosted
Fine	100% growing speed
Sick	Slowly growing
Dying	Stop growing, and it will be die if being ignored

Dead	Can only be removed or made into compost

All the plants have 4 growth stages and it displays in the game visually.

3.4Livestock/ work friends demands & status & life stage

The livestock also has different status:

Great	Growing speed boosted
Fine	100% growing speed
Sick	Slowly growing
Dying	Stops growing, and might die if gets ignored for a long time
Dead	Can only be removed or make into compost

Life stage: baby→adult

The player can buy baby livestock from the fair in the village.

3.5Action system

The characters gain experience from leveling up a skill.

Basic character actions and related Objects/conditions

3.5.1Reading and Books

Read the billboard or books to gain the knowledge and the notifications. Different books offer different knowledge.

3.5.2Eating and Food

Eating can deal with hunger, and gain some buffs/debuffs

3.5.3Resting and Energy

The maximum energy from lv1 is 60. Leveling up gets it increased.

Resting is the way to restore the character's energy and there are different options for Three different types of resting:

Short break: to restore a part of the energy.

Sleep until the energy is 100% restored: to restore all the energy and get to the next day. It usually takes 8 hours.

Sleep until the sickness gone: to restore part of the energy and get rid of a light sickness. It takes 16 hours.

Waking up: the player can set up an alarm for the characters to set up a specific time to wake them up.

3.5.4Improvable character actions (skills) & related Objects/conditions

The improvable actions are the skills that can be leveled up by each character by practicing or learning. Leveling up can improve the quality of the results of doing things and shorten the time cost.

Farming and Tools

Ploughing

Sowing

Irrigation

Fertilizing

Harvesting

Weeding

Pest controlling

Crafting

Cooking and Food and Recipe

In the kitchen, adding the ingredients into the pot can make the food.

The player can buy the recipe book from the book store or from quests or by experiment.

3.5.5Interactive actions

Talking and Neighbors
The way to communicate with the NPCs.
Improvable interactive action and Sociability &Social points
Improvable interactive action is reflected in a skill which is called communication/sociability. It can be leveled up by helping the NPC to finish their quests. When finishing a NPC's quest, some social points can be obtained.
3.5.5.1Hiring
With the already prepared materials, having a NPC to do work for you, but the player has to spend money and social points for it, moreover, it requires sociability level 3 to unlock this function.
3.5.5.2Asking for help
With the already prepared materials, asking a NPC to do any work for you for free if the player is a friend to the NPC.
Cost and Requirement:
The player needs to spend money.
3.5.5.3Co-op work
Some specific tools need two characters to use together, for example, the plow and foot-powered irrigation pump.
3.6Harvest and Quality and Freshness
When a crop is ripe, a noticeable sign appears on the top of it to remind the player to harvest. If the player does not harvest it within the certain time, the ripe crop goes bad and becomes compost to nurture the soil.
The freshness of a harvested plant can only last for a limited time. But there are some crops that can last for a very long time. Storing in the silo can last longer.
The quality of a crop depends on the status of the plant before it gets ripe.
3.7Selling & Price
The player can carry the harvest to the fair to set up a stall and sell it. The player can trade with NPCs for items or money.
The better quality, the higher price the crop is valued at.
3.8Environment System
3.8.1Environment elements
Humidity
Water can be available from the rain, well and pond.
Temperature
Temperature in the game fluctuates from 40℃ to -10℃.
Suitable temperature& burning/frozen:
Each type of plants has its own suitable temperature. When it reaches the suitable temperature, it's much easier to get the plant into a great status.
Oppositely, when the temperature goes too high or too low, it does damage to the plants.
3.9Soil situations
The fertility of a soil is limited during a year. When the soil is low on fertility, there are two options:
plating some legume plants to restore the fertility.
Covering it with organic fertilizer for a while.
3.10Pest
Pests destroy the crops. Ways to keep pests away: Multiple-cropping or use "huo fen".
3.11The weather prediction

For example, when there is morning glow, it is likely to rain this day, but if there is sunset glow, the next day is going to be a clear day. Also, from watching the dragonflies and ants can get to reveal the following weather situation. The weather can be viewed by finding these hints.

3.12Game Failure and Saving

The player can save the game in the menu anytime. The only situation for the player to fail the game is when the energy of the three controllable characters run out.