REPLENISH

DLH800 Landscape Design 8 | Project 3 | Shannon Satherley & Adam McEllister

JASMINE SOLITANA

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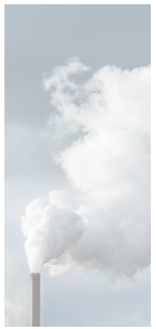
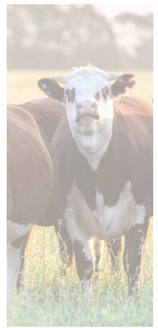
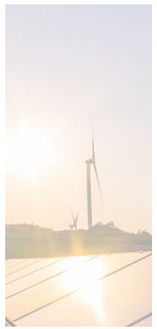
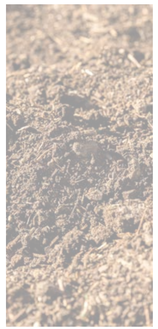
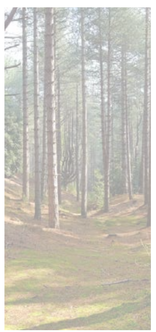
EXHIBITION STATEMENT

Groundwater; a vital resource for both human and non-human systems. As population growth, climate change and socio-economical demands increase, the high dependency and unsustainable extraction rates puts this natural resource in constant risk of depletion.

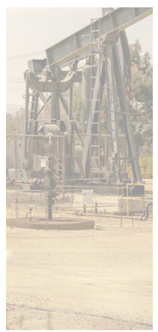
California, one of the world's largest groundwater consumers, has consequently dealt with environmental and cultural degradation as a result of the inadequate water regulation and conduct. Through introducing the theoretical lenses of a circular economy and nonequilibrium paradigm, this project will shift how water should be revalued, repurposed and reused to revitalize the landscape.

The Sacramento Valley, located in the heart of California, has been chosen to represent this issue of groundwater depletion due to its high agricultural value. **The project aims to replenish Sacramento Valley's groundwater system, ultimately restoring the dynamic resilience of natural and cultural systems.** As agriculture is the major cause of groundwater depletion, this project puts forward the concept of 'Regenerative Agriculture' as the major source of groundwater replenishment. The Sacramento Valley will become a model of regenerative agriculture, influencing emerging cultures and representing sustainable water management.

The exhibition piece is a video narrative with animated representations of the story, issue, and design outcomes. Animation plays a key role as it allows an easier way to comparatively display the past, present and future layers; showcasing how the landscape has changed. Audio has been manipulated and layered in order to create the rhythmic atmosphere of the design. The vignettes act like informative snapshots that demonstrates how these interventions represent regenerative agriculture.

Water Resource



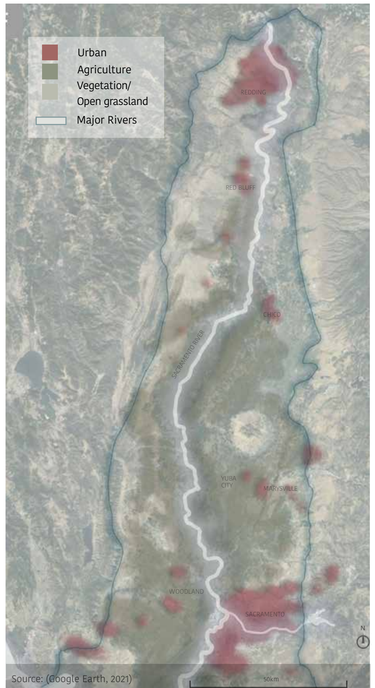
"Humans use natural resources 1.5x faster than ecosytems can regenerate"
(Econation, 2021)

GROUNDWATER DEPLETION

Throughout history, human civilization has depended on the earth's natural resources in order to survive. However, as the world's population and socioeconomic demands are growing, these natural resources have been increasingly exploited and are now depleting. Groundwater is the major resource focus as it plays a significant role in both natural and cultural systems. Naturally, groundwater is a major contributor to hydrological flows and a survival resource for flora and fauna, implying high systematical and survival value. Culturally, humans have extracted groundwater from aquifers as a source of drinking water, as well as for irrigational and agricultural procedures, especially in areas where surface water is scarce or of poor quality. Groundwater is generally used in conjunction with surface water during wet periods (which allows controlled and minimal usage), however, during drier periods when the surface water levels are low, groundwater alone is in high demand, reducing its storage capacity in the long run and thus, causing future water shortages. Thus, this project acknowledges that it is critical for groundwater to gradually be recharged, replenished and stabilized during wet periods to maximize its effects during drier periods; ultimately meeting the needs of both natural and cultural systems.

Project Locus

SACRAMENTO VALLEY



LAND USE

THE CENTRAL VALLEY

CALIFORNIA, THE UNITED STATES OF AMERICA

The project locus will be within the Sacramento Valley in California as it is one of the leading countries of groundwater usage/depletion and high drought risks. The Sacramento Valley is part of California's major drainage system called the Central Valley, that covers up to 20,000 square miles and is made up of intersecting canals, stream beds, sloughs, marshes, and lakes, with the Pacific Ocean as its only outlet. This flat agricultural plain holds significance in producing, storing and distributing groundwater, thus creating high dependency on this natural resource.

Groundwater accounts up to 60% of the state's water supply, with the primary uses of drinking and agriculture. Evidently, while the Central Valley has continued to provide adequate water supplies for humans, the environment is gradually deteriorating as a result of this. According to Erik Stokstad (2020), California's Central Valley is sinking due to the recent intense drought (from 2012 to 2016) in which parts of the valley sank as much as 60cm per year. Therefore, it is important to address the issue of groundwater depletion in California, as the state's growing population, demands, and rates of climate change put further pressure on groundwater dependency, putting California at risk of water scarcity.

AIM

This project aims to replenish Sacramento Valley's groundwater system, ultimately restoring the dynamic resilience of natural and cultural systems

SUBSTITUTE

Raising awareness of this global issue to substitute high dependency from n on-renewable methods towards renewable methods through advocating resource circularity and water conservation/replenishment strategies.

RECHARGE

Recharge groundwater levels during wet periods to supplement high demand during drought seasons.

PROTECT

Stakeholder engagement to influence environmental appreciation and encourage participation in sustainable practices to protect and regenerate the resources that make up the environment.

IDENTITY

Understanding the right of landscape and creating lasting value to this hydrological system

THEORETICAL LENS

CIRCULAR ECONOMY

Natural Resource consumption operates in a linear process in which restricts any form of growth, repurposing and sustainable methods. By practicing resource consumption through the 'Circular Economy' framework, this intends to shift the process of resource usage from a linear to circular process; what humans take out from the environment, they must give back, reuse, or regenerate. Two corroborative concepts, regenerative agriculture and emergent mindsets are introduced to tie the circular economy to be a community-driven practice. As agriculture is the major source of groundwater usage, it should also hold opportunity to become the major source of groundwater replenishment; ultimately creating a loop hole. Regenerative agriculture involves repurposing natural resources in order to increase productivity while reducing environmental impact. Finally, Charles Massy's concept of the "emergent mindset" ties in nicely with the circular economy and regenerative agriculture as it serves as the social-cultural link that holds everything together. In order to encourage cultural and communal shifts in this landscape, it is critical to foster emergent communities.

NON- EQUILIBRIUM PARADIGM

The non-equilibrium paradigm is about embracing that there will always be an imbalance, and instead, mitigate design and methods to become resilient, and therefore progress with the ongoing changes. Kristina Hill (2005, p.143) explains that "human habitat alterations are an integral process in shaping ecosystems, creating both disturbance and regeneration", implying that human and natural disturbances, while they are destructive, are also the key factor in creating a regenerative platform allowing for the formation of new complex organisms, and thus, creating a layer of adaptability. Instead of fighting against flooding and perpetual water pumping, this framework is about understanding that these disturbances will inevitably happen, and therefore incorporate these disturbances as a transformative part of the regenerative process; disturbance will open up opportunities for regeneration.

REGENERATIVE AGRICULTURE

Regenerative Agriculture has gradually gained significance in farming culture over the years as it has a revolutionary impact on how people farm, eat, and think about food production. One of the leading pioneers of regenerative agriculture, Charles Massy, will have a significant impact on understanding how this transformative system works.

This farming system aims to "not push the land beyond what it is naturally capable of sustaining without chemical inputs" (Massy, 2020), promoting a system that prioritizes the ecological health of soils. It is about prioritizing ecological quality, which in the long-run, production levels naturally increase; indicating a sustainable practice. This method of farming aims to replace industrial inputs (chemicals, fertilizers, and heavy machinery) with more natural practices and ingredients, allowing nature to rejuvenate itself. Furthermore, it shifts mechanical thinking to a circular economy approach, emphasizing the importance of repurposing, revaluing, and reusing all land.

Regenerative agriculture will become the major driving force of this project as it acknowledges the reality of droughts, and thus, introduces ways to value ecological quality, to fundamentally create a climate responsive design that will result in long-term and sustaining impacts.

Some of the major techniques that Charles Massy, along with Australian farmers who have practiced regenerative agriculture on their farmlands, will be listed on the right –>

Charles Massy in Regenerative Agriculture Field

ROTATIONAL GRAZING

"Maintaining groundcover by destocking and moving stock on a regular basis is critical to regenerative agriculture because it protects soils, improves health, and allows plants to trap water" (Massy, 2016). Stock is moved during dry seasons to prevent animals from grazing on the crops to bare ground. Through this process, the ground will have a resting period, enabling grass protection and an increase of groundcover.

CROP ROTATION

"Incorporating different crops that grow in different time frames and different root structures to improve weed management, pest control and soil health/conservation" (Moore, 2020).

NATURAL FERTILIZERS

Instead of chemical fertilizers, pesticides and herbicides, "farm machinery will now spray a combination of worm juice and compost extracts to coat the seeds and enrich the soils" (Massy, 2016), ultimately improving the plants immune system.

KEY LINING PLANTING

Keylining is a water management technique that aims to "improve any production system's water efficiency" (Keyline Water Management, 2021). This technique reduces water flow and directs it to drier ridges or conservation zones. Although it will not be able to control intense flood waters, this intervention will be beneficial for initial rainwater harvesting because it will allow for the manipulation of how quickly water flows, sinks, and spreads.

WATER ABSORBING SOILS

Loam will be used as a top soil to allow for water absorption, drainage, and moisture retention. " Loam is nutrient-dense, easy to cultivate, and warms up quickly in the spring. It's the ideal gardening soil" (Margaret, 2021).

EFFECTIVE CROP SELECTION

Carefully selecting crops that will assit in water absorption, and providing the right amount of carbon and nutrients needed for soil health.

Therefore, by understanding the processes and systems of regenerative agriculture, these practices will be included within the strategic plan as the major tactics of groundwater replenishment, improvement of soil health and introducing a transformative farming culture.

METHODS

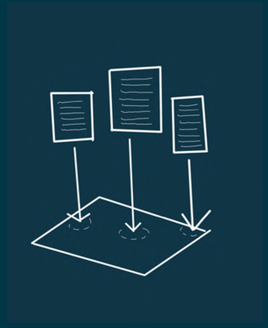
WHAT

There will be a series of iterative steps that will lead to the finalised strategic plan, sections, and exhibition piece.

EXHIBITION PIECE: Video Narrative

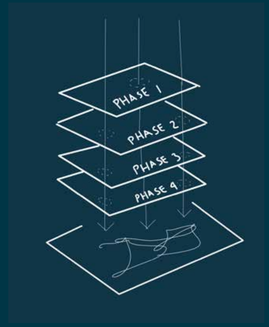
1.

Conduct complimentary research to further strengthen the proposed tactics and design interventions that display regenerative agriculture.



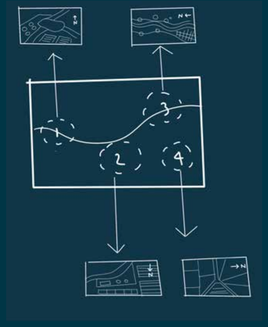
2.

Overview project 2's strategic plan and pin point gaps or areas that need to be refined or redone. Iterative sketches and drawings will be done on top of the phasing plans to further devise more cohesive proposals.



3.

Identify 4 key areas that best represent the implementation of the tactics and create indicative master plans that showcase more detail of the design outcomes.



4.

Create graphics, such as sketches, collages, sections, and vignettes, to show how these interventions fit into the landscape.

5.

Develop a groundwater maintenance strategy that will aid in the creation of a durable, adaptable, and resilient landscape using mapping overlays, policy comparisons, and new techniques/interventions.

6.

Combine all of the drawings, graphics and research into a video narrative in which the issue, concept and design outcomes are illustrated in an animated form. The 2d graphics will have multiple overlays to create the animation of the past, present and future layers.

WHY

These steps are imperative in order to create a resolved and refined strategic plan to maximize long-lasting and valuable design outcomes. This methodology ensures the project will propose interventions that will be in context with Sacramento Valley's landscape, culture and existing policies.

The Sacramento Valley will become a model of **regenerative agriculture**, influencing **emerging cultures** and representing **sustainable water management**.

INCLUSION + IMPACT:
Emergent Communities

EQUITY:
Right to clean water

IDENTITY:
Water is character

PARADIGM SHIFT:
Resilient and valuable Landscape

PAST

TRADITIONAL AGRICULTURE.

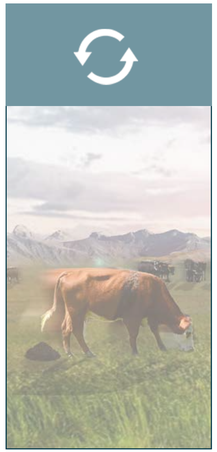
PRESENT

TECHNOLOGICAL AGRICULTURE.

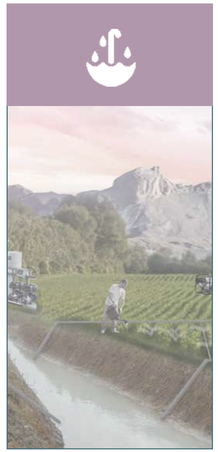
FUTURE

REGENERATIVE AGRICULTURE.

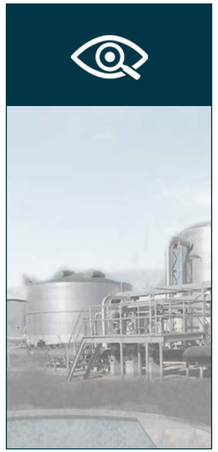
REGENERATIVE AGRICULTURE ELEMENTS.



CROP / ROTATIONAL GRAZING

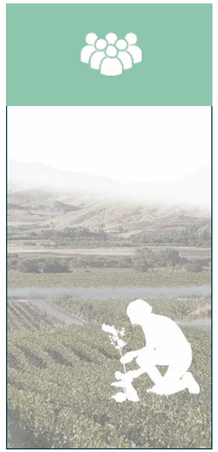


WATER CATCHMENT AND INFILTRATION ZONES



WATER REGULATION AND RECYLCING

EXPANDED WETLANDS



EMERGENT + PARTICIPATIVE COMMUNITIES

COMMUNITY PROGRAMMING.

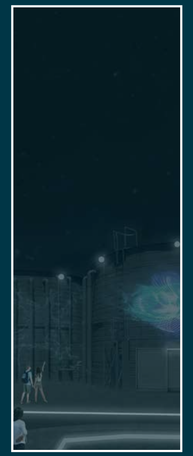
ANNUAL HARVESTING FESTIVAL

FARMERS MARKET

COMMUNITY GARDENS + FRUIT PICKING

ROCK POOLS RETENTION BASIN

BOARDWALK APPRECIATION VIEWS



WATER TANK EDUCATION CENTRE

AIM

This project aims to replenish Sacramento Valley's groundwater system, ultimately restoring the dynamic resilience of natural and cultural systems

OBJECTIVES

RESPONSIBLE WATER USAGE

CREATING AN ADAPTABLE/WASTE-FREE GROUNDWATER SYSTEM THAT WILL WITHSTAND CULTURAL AND ENVIRONMENTAL PROGRESSIONS

EMERGENT COMMUNITIES

ADDRESSING LOCAL WATER CHALLENGES TO STAKEHOLDERS TO ENCOURAGE PARTICIPATIVE DECISION MAKING

REGENERATIVE AGRICULTURE

PROMOTING A NEW AGRICULTURE CULTURE THROUGH A CIRCULAR ECONOMY MINDSET

TACTICS

SUSTAINABLE WATER MANAGEMENT AND RECHARGING STRATEGIES

EDUCATIVE/INTERACTIVE INTERVENTIONS AND EMPLOYMENT OPPORTUNITIES.

PROPOSING ALTERNATIVE WAYS OF AGRICULTURAL TECHNIQUES AND PRACTICES TO IMPACT THE WAY WATER IS USED AND CONSERVED

1 SENSITISE

(2021 - 2026)

A period of acknowledgement, regulation and cultural shift

2 CONSERVE

(2026 - 2036)

A period of intervention, conservation and change

3 ESTABLISH

(2036 - 2046)

A period of adaptability, growth and progression

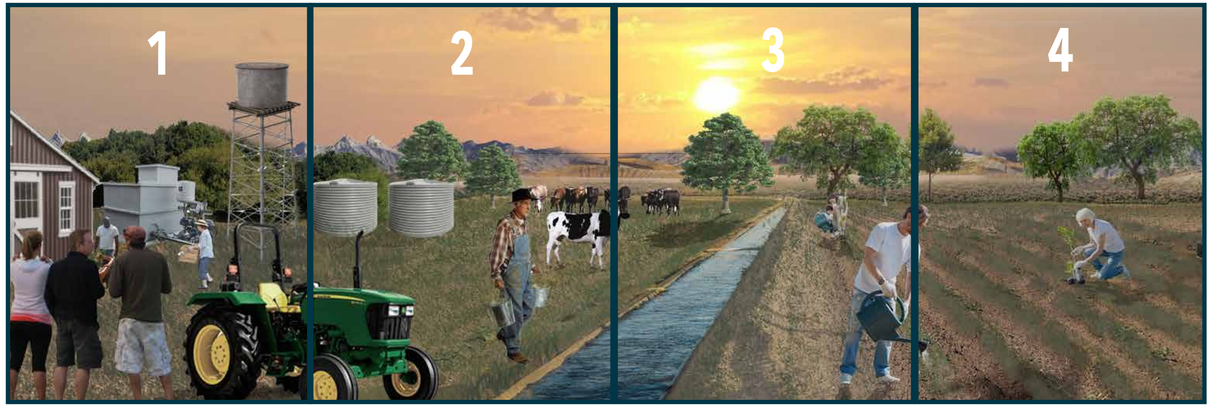
4 RECHARGE

(2060+)

A period of resilience, maintenance and lasting value

SACRAMENTO VALLEY: **PAST**

SACRAMENTO VALLEY: **FUTURE**



1. Acknowledgement, regulation and cultural shift
2. Intervention, conservation and change
3. Adaptability, growth and progression
4. Resilience, maintenance and lasting value

1 SENSITISE

(2021 - 2026)

A period of acknowledgement, regulation and cultural shift

Source: (Google Earth, 2021)

RESPONSIBLE WATER USAGE

> Implement water-monitoring systems, sensors, and water-use restrictions. This will be accomplished by using a controlled water channel instead of water pumps and wells. Artifical sinks will also be included to allow excess water to flow into these systems.

> Initial construction of a water treatment and recycling plant. This will not only act as a water re-pumping mechanism, but also as a water monitoring base.

> Initial water node expansion, landscaping, and monitoring (Sacramento River and Sutter Slough)

> Initial top soil application (Loam Soils) to encourage water asorption qualities.

EMERGENT COMMUNITIES

> Address to farmers and local residents water challenges and encourage active participation in water usage and management decisions (running lectures, seminars or public events in proposed community space)

> Encouraging government funding to shift solely from the flooding control, towards farming equipment and water conservation infrastructure that will benefit in creating a wide-scale community in agriculture

> Proposing farmer incentives (perhaps the new farm equipment and water infrastructure from government funding) when water usage is reduced to at least 10% to enable user engagement

REGENERATIVE AGRICULTURE

> Initial designation of farmland that will serve different purposes of infiltration, cultivation and storage etc.

> Precision agriculture= prioritise water usage on more valuable crops to minimise land cover, but increase production and quality

> Initial proposition for key lining planting techniques to mitigate rain water into the water channel and artifical sinks

> Field levelling to ensure flat land for planting and irrigational flooding

> Initial stages of flooding irrigation and drip pipe construction

> Rotational grazing = Move livestock to different paddy

2 CONSERVE

(2026 - 2036)

A period of intervention, conservation and change

RESPONSIBLE WATER USAGE

Continued construction of water conservation interventions

> At the river node, a reservoir will be built to maximize water collection, strengthen water flow, and allow water to be pumped in and distributed throughout the site and water systems.

> Swales at key lining planting curves to reduce water flows into the river, channel, and wetlands

> Water begins to flow through the water channel

> Water chain pools in the Butte Basin are first landscaped to regulate flow and storage.

> Waste water recycling and treatment will begin pumping freshwater back into aquifers, ensuring a steady recharge.

> Top soil application of loam soils for water asorption qualities

EMERGENT COMMUNITIES

Initiation of community programming

> Replanting of water-efficient plants/crops in the community

> Exposure to California's groundwater and agriculture culture through educational talks, walks, and infrastructure.

> A farmer's market platform will be built at a close proximity to the town to allow communal interaction, economic value and recreation.

REGENERATIVE AGRICULTURE

> Continue developing key line planting techniques and establishing specific crop zones.

> Flooding irrigation begins, with water being absorbed into the soils and aquifers.

> Community mass-planting events

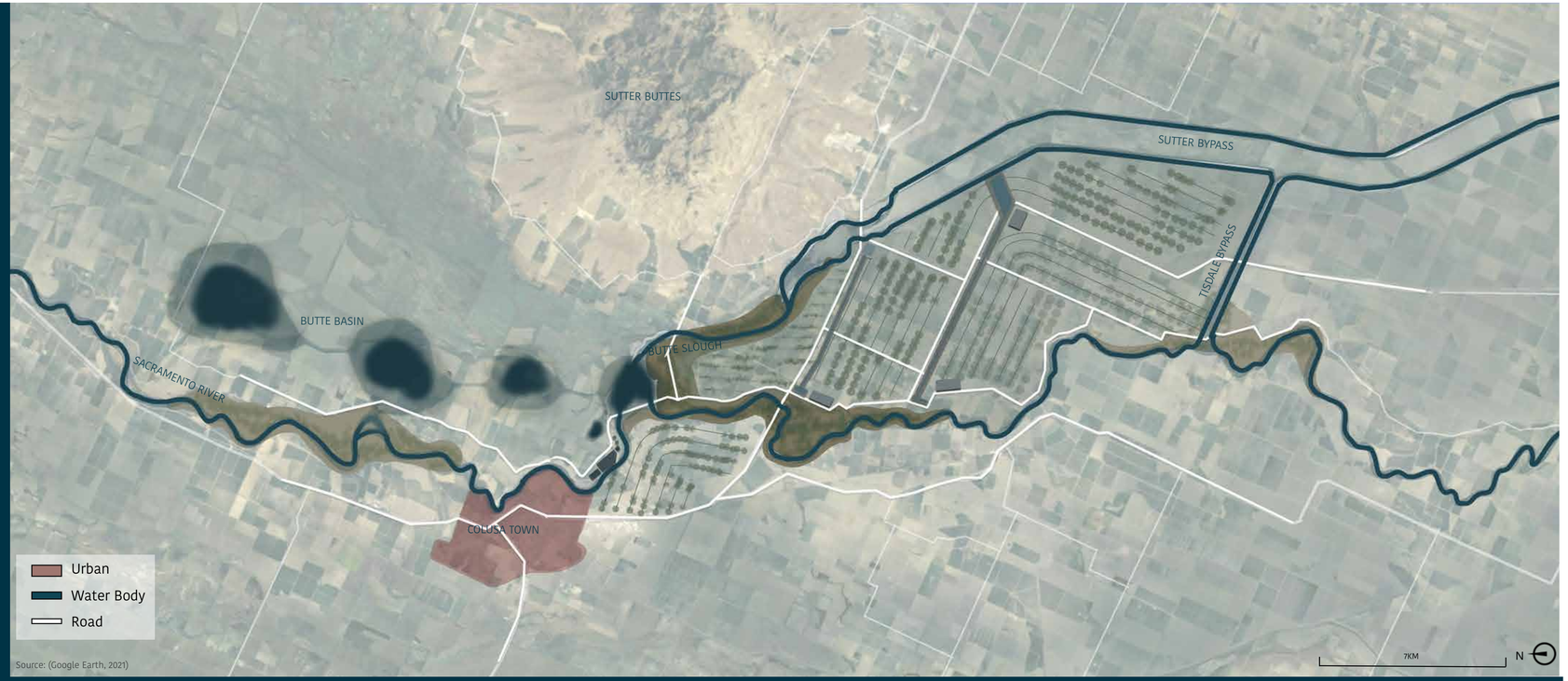
> Expansion of existing wetlands to allow for river edge activation, the growth of flora and fauna, and water infiltration. A first phase of rice paddy construction will begin to allow overflowing water to flow in both directions and serve as absorption mechanisms

> Rotational grazing = Move livestock to different paddy

3 ESTABLISH

(2036 - 2046)

A period of adaptability, growth and progression



Source: (Google Earth, 2021)

> Allowing interventions to take effect gradually to ensure the process of groundwater infiltration and recharging takes place. Natural and cultural shifts will result from interventions, resulting in an adaptability layer.

> As more water is conserved through re-pumping, rain, floods, and snowpack, it will naturally flow into designated storage zones (such as the reservoir, chain pools, and channel), reducing reliance on groundwater.

> Consistent crop maintenance and rotation to influence soil quality, crop production, and soil quality.

RESPONSIBLE WATER USAGE

> Within the landscape mosaic, the reservoir system begins to take shape and function. It serves as a centric storage zone because it is situated in the middle of the water body intersection. This reservoir, like the proposed 'Sites Reservoir' (as stated in the project influences), will act as a metaphorical banking system, depositing water from the Sacramento River during wet seasons and withdrawing water (pumping water back into the river) during dry seasons.

> Chain pooling has been implemented as a linking mechanism between the reservoir and the wetlands, allowing for more water storage and regulating flow from upstream to downstream. It was specifically placed in the Butte Basin to become additional water absorption zones when flood season arrives (the chain pooling system connects together with pumps towards the reservoir). During dry season it can act as

> Top soil re-application and maintenance

REGENERATIVE AGRICULTURE

> Top soil re-application and maintenance
> Regular fertilizer application (worm juice and compost extracts)
> Community mass-planting and maintenance events
> Rotational grazing = Move livestock to different paddy

4 RECHARGE

(2060+)

A period of resilience, maintenance and lasting value

Source: (Google Earth, 2021)

> This landscape will have a long-term effect, gradually recharging and stabilizing groundwater supplies to ensure future supply.

> Influencing a community with an emergent mind= a shift from the mechanical mind of agriculture to a community-driven and regenerative agriculture by managing agricultural land and water usage.

> Revitalizing the agricultural and hydrological identity of California (enabling community to become more self-aware of the significance of both of these systems)

> Government support for the upkeep of this purposeful, cultural, and conservatory agricultural land.

> Farmers are prioritising water for more valuable crops and purposeful farmland, which will decrease land mass, but instead, increase productivity through resource circularity and sustainable water management techniques.

> Rotational grazing = Move livestock to different paddy

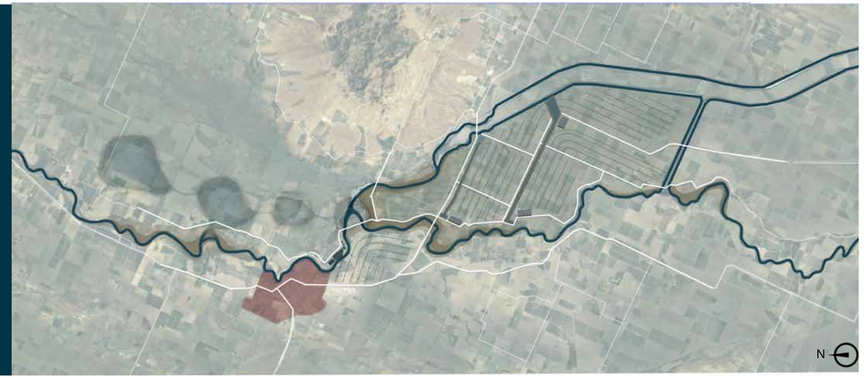
> Providing job opportunities through maintenance work

1 SENSITISE

(2021 - 2026)

2 CONSERVE

(2026 - 2036)



3 ESTABLISH

(2036 - 2046)

4 RECHARGE

(2060+)

ZONES

1 Reservoir + Water Recycling Plant

2 Community Farmland

3 Managed Wetland

4 Crop + Grazing Rotation

Source: (Google Earth, 2021)

WHY WERE THESE ZONES CHOSEN?

Regenerative agriculture elements have been implemented throughout the entire site, but these specific zones best represent how these tactics shift the landscape and influence a cultural shift.

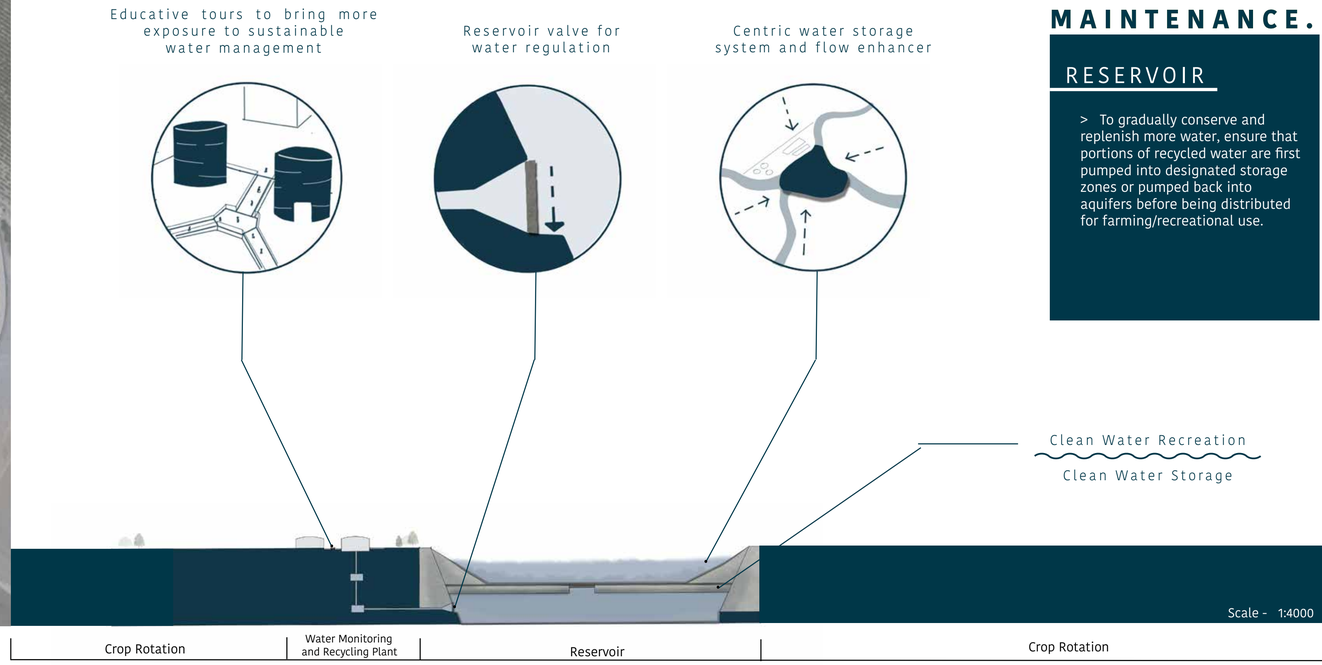
When deciding on these zones, the landform, systems, and adjacent structures were taken into account, with the goal of not only fitting into the sociocultural and environmental context, but also emphasising on ecological health to ultimately revitalise the landscape.

ZONES

1 Reservoir + Water Recycling Plant

The reservoir will link the three intersecting water bodies and create a centralised storage zone, which will function like a banking system, allowing water to be easily deposited and withdrawn as needed. It will not act as a dam, but an enhancer of water flow where the storage system will be located below and the recyled water will be pumped above.

The water recycling plant, storage tanks, and water channels will serve as a major water distribution and monitoring system.



MAINTENANCE.

RESERVOIR

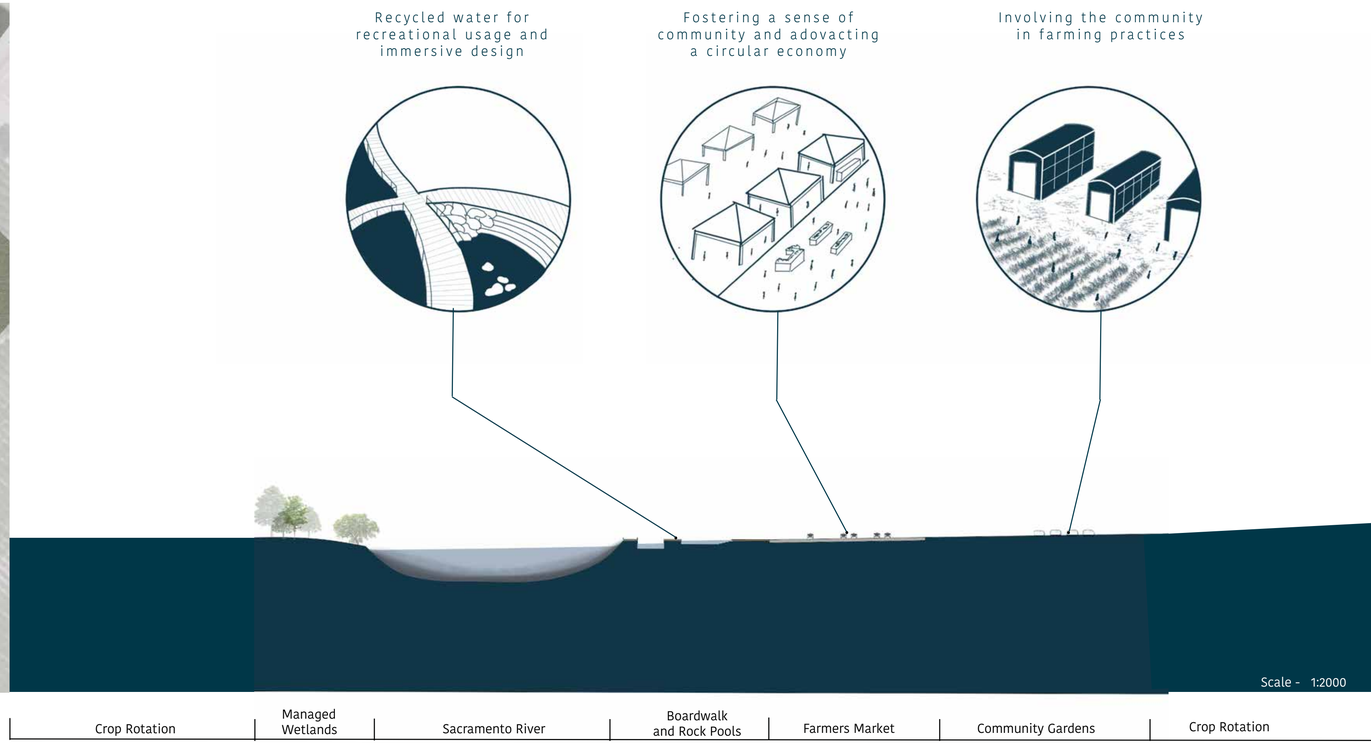
> To gradually conserve and replenish more water, ensure that portions of recycled water are first pumped into designated storage zones or pumped back into aquifers before being distributed for farming/recreational use.

ZONES

2 Community Farmland

All major community programming will take place in this zone, including educational events, farming/ irrigation participation, community interaction, and recreational activities/ platforms to influence appreciation of the environment.

Not only will the general public be able to participate in harvesting and growing crops, but they will also receive discount incentives on produce purchased at the farmers market. Through active engagement with the growing, selling and consuming process, this provides more exposure and appreciation of the farming culture, thus, advocating a circular economy mindset.



ZONES

3 Managed Wetland

This design intends to regenerate, manage, and expand wetlands that have formed along river edges, not only to improve ecological health for flora and fauna, but also to create water catchment and infiltration zones. To ensure that these systems are regularly checked, maintenance buildings will be built in the wetland forests. To foster a close and immersive relationship with the environment, boardwalks are intertwined within the wetland forest and bridging across the Sacramento River. Educative walks and tours will be offered along the boardwalk to raise public awareness of how this zone has practiced sustainable water management and wetland protection.

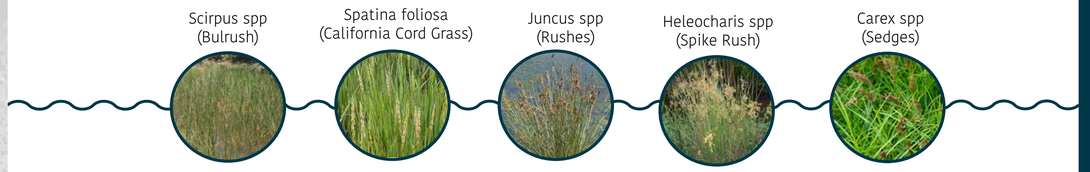
MAINTENANCE.

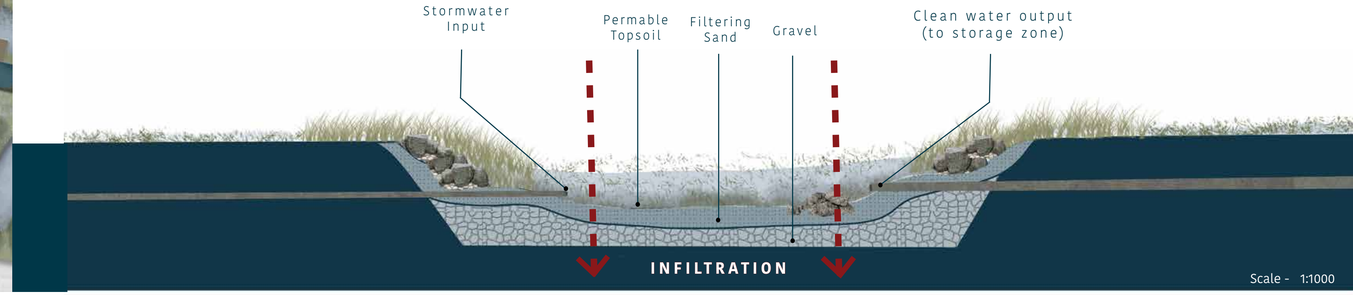
WETLANDS

> Perform water purification and waste detoxification procedures once a month to keep the ecosystem healthy.

> If informal pools or puddled water start to overflow, mitigate those waters into new infiltration zones

> Constantly check and remove invasive species

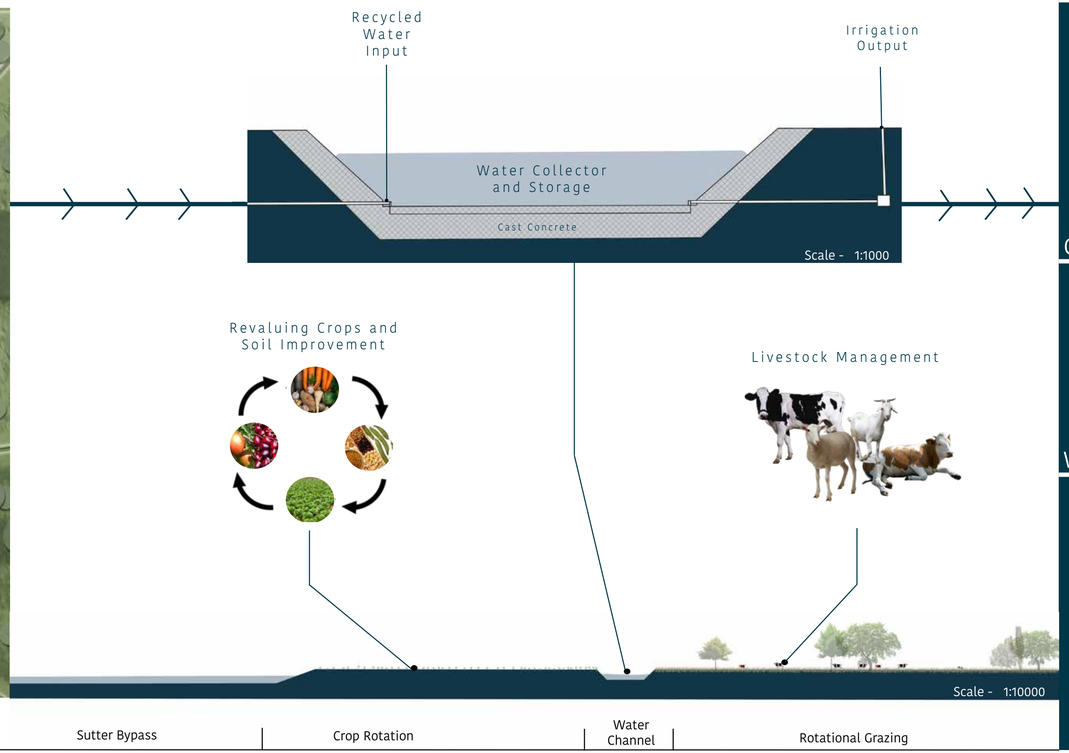




ZONES

4 Crop + Grazing Rotation

Crop and grazing rotation plays a vital role in ecological health as it shifts chemical use to more natural and safe methods to ultimately improve crop quality and production.



MAINTENANCE.

CROP ROTATION

> Providing maintenance job opportunities = Checking up on plants on a daily basis
- Natural fertilizing spray and manual watering
- Consistently changing crops on allocated schedule
- Pruning crops when too long

> Drones to fly above farmland to spot any invasive species, weeds, or diseases

GRAZING

> Prioritize the animal's health by ensuring the right amount of food and water is provided for them daily

> Once 50-70% of the crops have been grazed, move livestock to new paddock

WATER CHANNEL

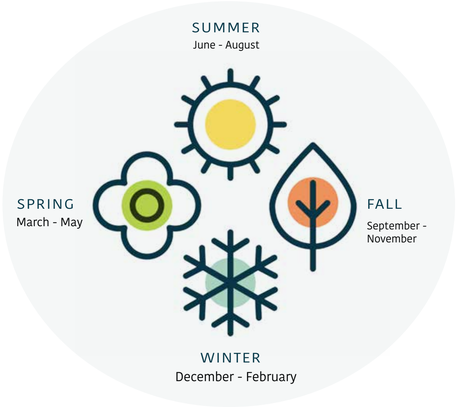
> Ensure clean water is in channel at all times
- Consistently check that there is no bacteria or debris in water

> Only take out a specific amount of water that will be used during the day; do not over-distribute water

> Keeping track of all water usage to ensure that it is used responsibly and sustainably.

PLANTING

SEASONS IN AMERCIA



COLD SEASON IRRIGATION
(September- February)

FLOOD IRRIGATION

HOT SEASON IRRIGATION
(March - August)

DRIP IRRIGATION + CROP ROTATION

FLOODING IRRIGATION

These 3 techniques will be utilised within the designated flooding fields

> Levelling of fields = To achieve an effective flood level, levelling equipment will be used to scrape the field flat before planting.

> Surge flooding = During the winter months (when crops cannot grow as much), water will be distributed into the fields as a method of water absorption and to prepare healthy soils for the next warm irrigation period =replenishing both groundwater and soil health.

> Capture and reuse of runoff – runoff water will be captured in wetlands, ponds, or water channels, allowing it to be reused.

Levelling of Fields → Surge Flooding → Capture + Reuse of Runoff

Bauhinia spp (Orchid Tree)

Papershell almond (Almond Tree)

Alfalfa

Orzya Sativa (Rice)

WETLAND

Existing wetlands will be transformed into an active river edge system to promote the growth of fauna and flora, as well as the extension of flood plains and water infiltration. In this area, ponds and small water pools can form to catch runoff.

Scirpus spp (Bulrush)

Spatina foliosa (California Cord Grass)

Juncus spp (Rushes)

Heleocharis spp (Spike Rush)

Carex spp (Sedges)

RICE PADDY

A rice-cultivating irrigational flooding technique that captures overflowing river/wetlands flows and maximising rice production

Orzya Sativa (Rice)

ROTATIONAL GRAZING

Livestock is rotated through a series of paddocks as a tactic to improve groundcover, soil/plant health, and reduce reliance on large amounts of water. By dividing the land into multiple paddocks, specific zones can be grazed while others rest, allowing for sustainable crop growth. When 50-70 percent of the crops has been removed, livestock is moved, allowing the plant cycle to restart its growing process.

Cow

Goat

Cattle

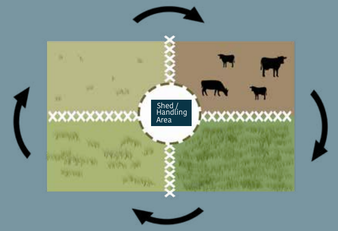
Sheep

PHASE 1 = Every day

PHASE 2 = Every 3 days

PHASE 3 = Every 5 days

PHASE 4 = Every Week



WINTER = 6 Weeks Rest

SPRING = 1 Week Graze, 3 Weeks Graze

CROP ROTATION

Crop rotation is the systematic planting of different crops in the same field in order to improve soil health, fertility, and disease/pest control. This has been proposed as one of the major regenerative agriculture interventions because it prioritizes the responsible use of water on more valuable crops, increasing their productivity and quality; advocating the concept of a circular economy.

LARGE SCALE ROTATION (CROP LANDS)

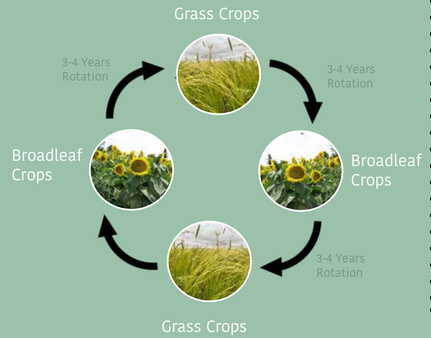
Farmers typically rotate from grass crops (Monocot) to broadleaf crops (Dicot) to enhance soil structure and prevent disease and weeds from spreading. This procedure will be carried out in the Sacramento Valley, where crops have been selected to fit into the landscape and rotation stages. These two stages will alternate every 3-4 years to ensure there is time for development, resting and production. Listed below are the plants that fall into the categories of grass crops and broadleaf crops:

Grass Crops (Monocot)

> Grains
> Corn
> Rice
> Wheat

Broadleaf (Dicot)

> Sunflower
> Rose
> Soy Beans
> Peas/ Alfalfa
> Lettuce
> Hay



SMALL SCALE ROTATION (COMMUNITY GARDENS)

Similarly to the large-scale rotation processes, crop rotation will be practiced on smaller farmland and gardens where fruits, vegetables and nuts will be rotated to improve soil health, and water infiltration. The rotation period will happen every 2 years to ensure constant soil maintenance and production. These are the crops that the community will harvest and irrgigate within the community gardens.

Roots

> Carrots
> Potatoes

Legumes

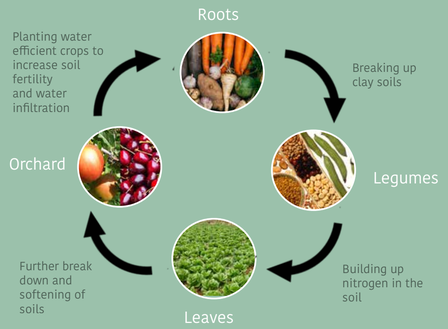
> Peas
> Beans

Leaves

> Lettuce
> Kale
> Radish
> Cauliflower

Orchards

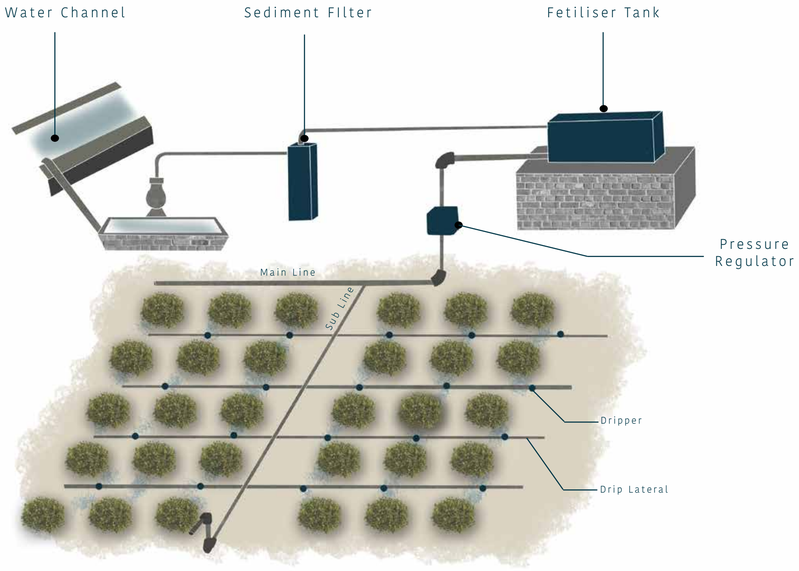
> Jujube
> Loquat
> Pistachio
> Pomegranate
> Kei Apple
> Apricots
> Cherries
> Prickly Pear Cactus
> Prunes
> Grapes



IRRIGATION

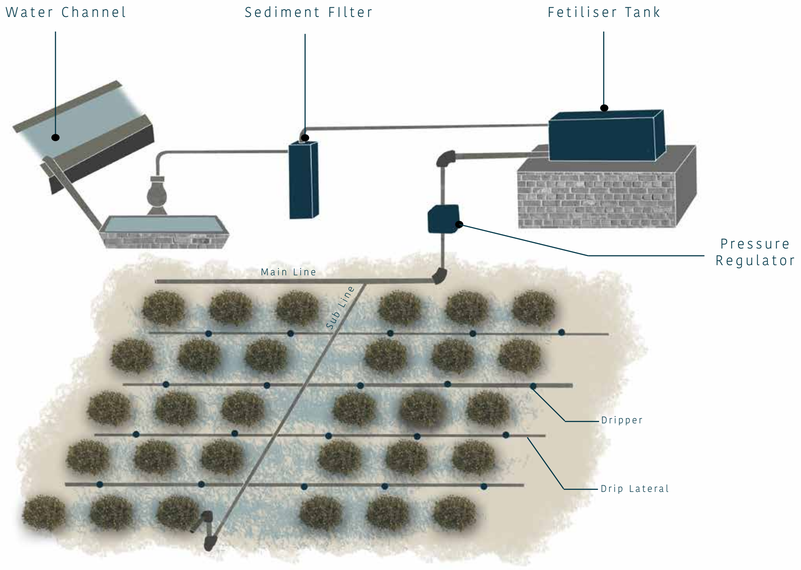
DRIP IRRIGATION
(HOT SEASONS)

A set amount of water is distributed
amongst the crops to ensure equal application.



FLOOD IRRIGATION
(COLD SEASONS)

Purposefully flooding the fields to improve soil fertility
and create water infiltration into the aquifers



IRRIGATION

DRIP IRRIGATION
(HOT SEASONS)

WATER MONITORING
To ensure that water is used responsibly, water monitoring services and stations will be placed throughout the farmland.

WATER CHANNEL
Main water distributor that repurposes the stored water from rainwater runoff, water recycling plants and excess irrigation water.

UNIFORM APPLICATION OF WATER
Drip line pipes enables controlled, equal and responsible usage of groundwater

NATURAL FERTILIZERS
Natural fertilizers are being used to replace chemical fertilizers. Water containing worm juice and compost extracts will be pumped through the pipes and evenly sprayed on the crops.

FLOOD IRRIGATION
(COLD SEASONS)

EXCESS WATER CATCHMENT
Excess irrigational water flows towards water channel and artificial swale/dips

WATER ABSORBANT CROPS AND SOILS
Planting alfalfa trees and applying loam soils to increase water infiltration back into the underground aquifers

FIELD FLOODING
Purposely flooding crop land during the colder seasons (when plant growth is restricted) to improve water infiltration and to prepare nourished soils for the warmer irrigation periods.

COMMUNITY GARDENS + FARMLAND

STRAWBERRY AND CHERRY PICKING

The community will have the opportunity to plant, water and pick the fruits in the gardens.

COMMUNITY PARTICIPATION

Fostering an interactive, educational, and empowering community that will transform California's farming culture.

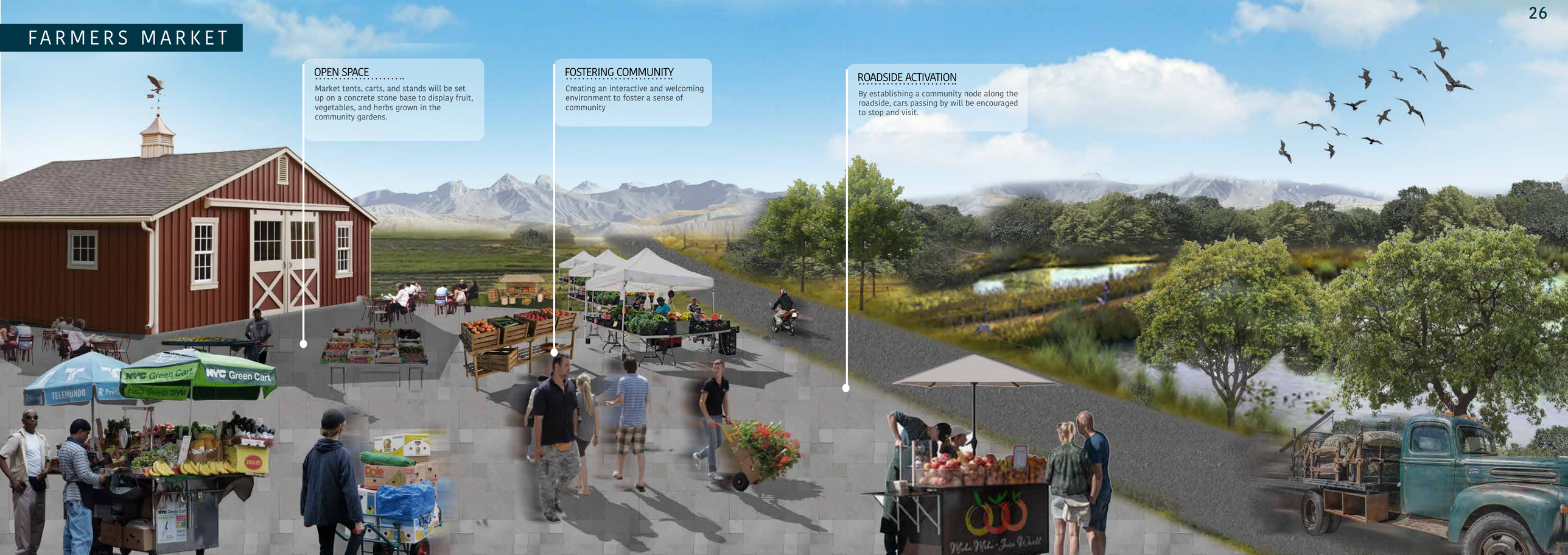
GREEN HOUSE

A sheltered space that will serve as both a growing and nursery hub, magnifying the scorching sun in the summer while also acting as a protective layer in the winter. The Greenhouse will also provide storage space for farming and gardening equipment.

SHARED FARMLAND

To provide more exposure and experience with agriculture and water usage processes, all members of the community will be able to participate in planting, monitoring, and irrigating the crops.

FARMERS MARKET



OPEN SPACE

Market tents, carts, and stands will be set up on a concrete stone base to display fruit, vegetables, and herbs grown in the community gardens.

FOSTERING COMMUNITY

Creating an interactive and welcoming environment to foster a sense of community

ROADSIDE ACTIVATION

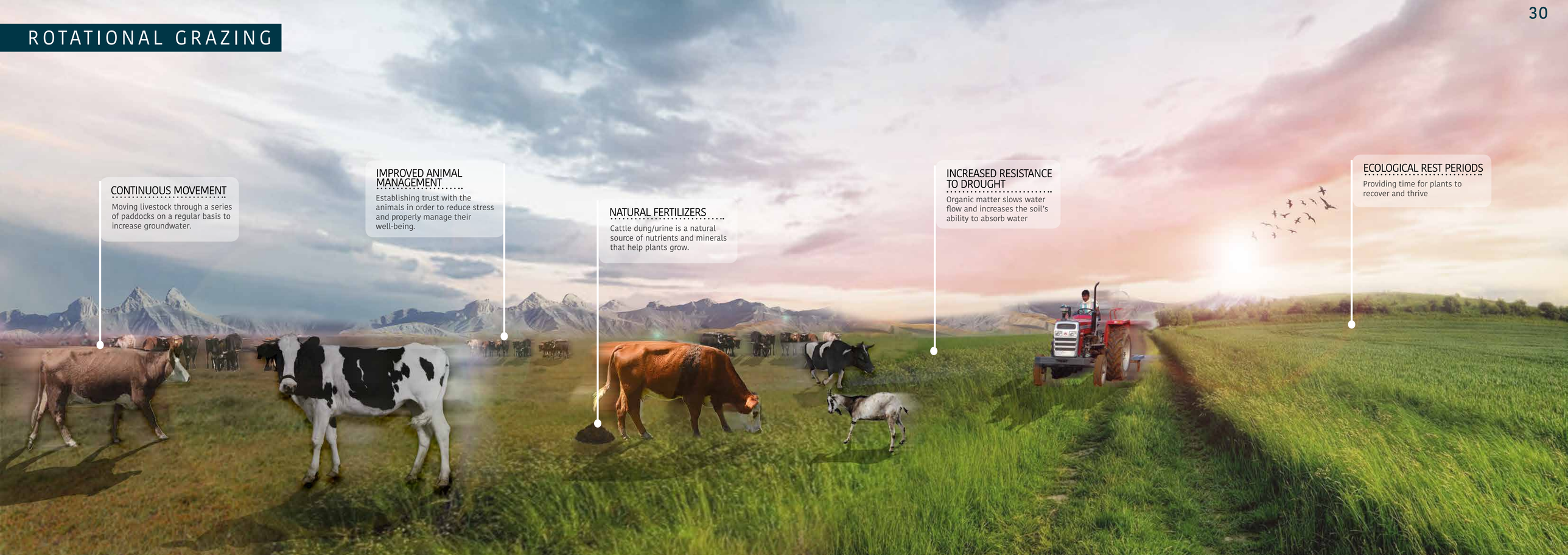
By establishing a community node along the roadside, cars passing by will be encouraged to stop and visit.

COMMUNITY HUB

RESERVOIR AND WATER PLANT

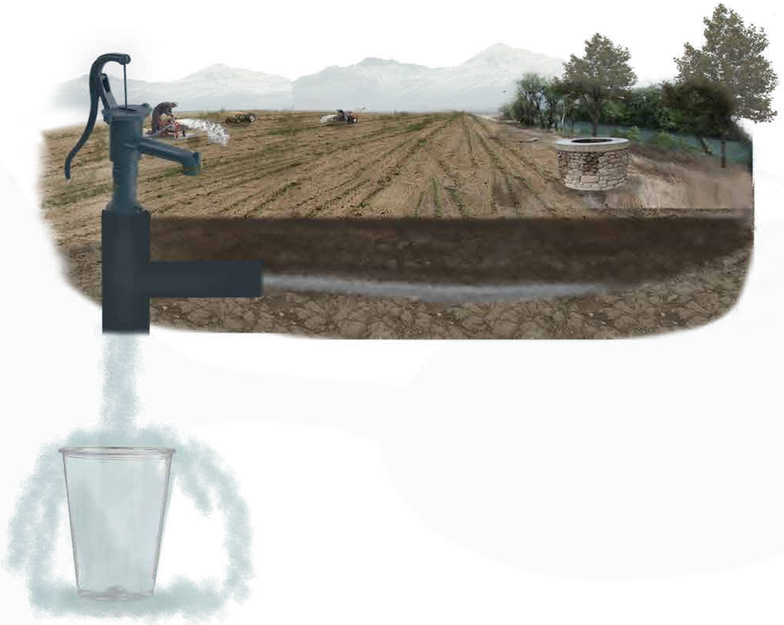
EXPANDED WETLANDS

ROTATIONAL GRAZING



The fundamental shift in Californians' value of water will be through Regenerative Agriculture.

PAST



PRESENT

FUTURE

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