Actions to meet challenges to sustaining our lives on Earth

Session 5 –Agriculture & Food Systems – Mitigation and Resilience to Breakdowns

Monday May 13, 2024, 8 AM Pacific, 11 AM Eastern, 10 PM Indonesia

Agenda

Welcome and Introduction: David Berry, SRRR

Summary of SRRR Mission & History: John Wells, SRRR Co-Chair, Minnesota Environmental Quality Board (retired)

Food Systems Past, Present & Future - What "Rapid Transformation" is needed? Alexander Chikunov, founder & President, Longevica Therapeutics, Inc., and author, 4Waves concept, a framework for understanding fundamental civilizational risks.

Response, Deborah Rogers: Q &A

CSA Farms: Healthy Islands in Stormy Seas of Systems Collapse? Steven McFadden, Chiron Communications, http://www.deepagroecology.org

Response, John Wells: Q &A

A View from Indonesia, the Role of CSAs in Feeding & Sustaining Communities: Catharina Any Sulistyowati, KAIL, Bandung & School of Strategic & Global Studies, Jakarta, Indonesia

Response Anupam Saraph: Q&A

Biomass Opportunities & Constraints: Marianna Grossman, Minerva Ventures, former Executive Director, Sustainable Silicon Valley.

Response, Stan Bronson Q&A

Open Discussion among the presenters, respondents and questions from the chat

Closing Remarks and Adjourn: David Berry SRRR

Welcome and Introduction: David Berry, SRRR
David Berry welcomed the speakers and participants to the SRRR series: Actions to Meet Challenges to Sustaining our Lives on Earth, *Session 5 –Agriculture & Food Systems – Mitigation and Resilience to Breakdowns.*

He acknowledged Marianna Grossman and Rhonda Kranz for supporting the logistics and facilitation of the meeting since he was participating while riding in a car on the New Jersey Turnpike. In spite of the challenges, the team ran the workshop smoothly.

Summary of SRRR Mission & History: John Wells, SRRR Co-Chair, Minnesota Environmental Quality Board (retired)

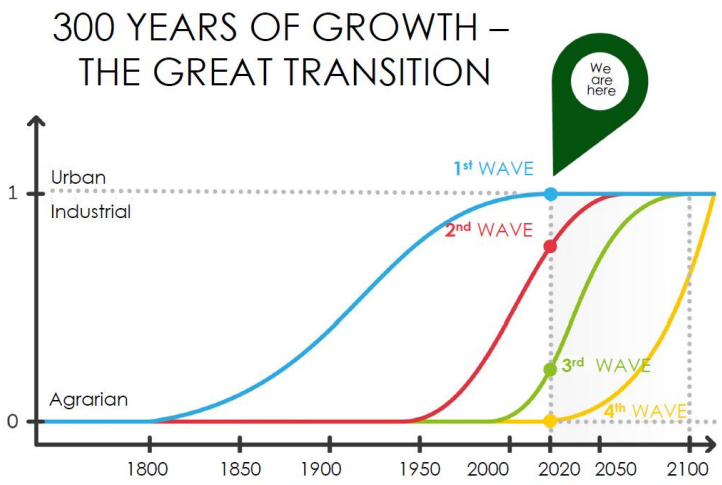
John Wells gave a summary of the history and activities of the Sustainable and Resilient Resources Roundtable. The predecessor of SRRR was the Sustainable Water Resources Roundtable (SWRR), which operated from 2002-2019 and was founded to support water sustainability efforts of the White House Council on Environmental Quality and federal agencies. It became a subgroup of the federal Advisory Committee on Water Information. In 2019, SWRR was reorganized as the Sustainable & Resilient Resources Roundtable, an independent not-for-profit 501(c)(3) corporation,

John said a goal of SRRR is to share lessons of science and best practices with individuals and organizations to solve sustainability and resilience challenges. SRRR provides an open forum for exchange of information, ideas, stories, and lessons about ecosystem and community sustainability and resilience. The group shares interdisciplinary, inter-community collaboration on information, science, policy, planning, and management ideas important to resilience and sustainability. We develop policy guidance and best practices for community and ecosystem advocates, stakeholders, and decision-makers in government and other sectors.

John listed some of the topics covered in SRRR workshops. For all of these, proceedings and links to videos are available on the website. https://sustainableroundtable.org/

New White House Guidance on Indigenous Knowledge, March 2023
Regenerative Approaches to Agriculture & Resource Management, October 2022
Reporting as a Tool to Motivate Change in Climate & Sustainability Performance, April 2022
United States Environmental Protection Agency Climate Change Indicators, September 2021

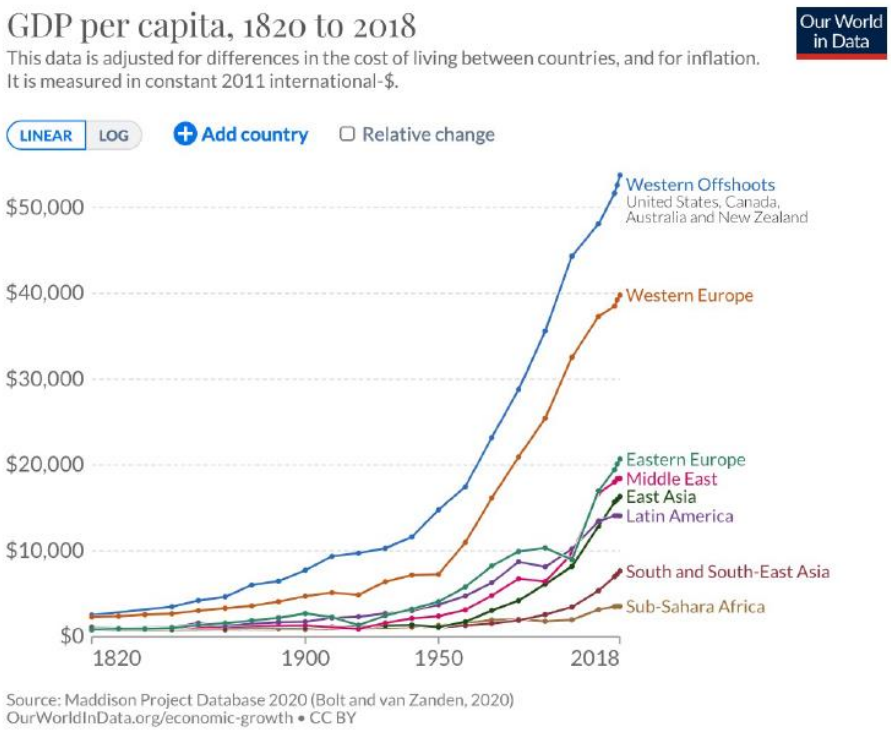
Food Systems Past, Present & Future -What "Rapid Transformation" is needed?
Alexander Chikunov, founder & President, Longevica Therapeutics, Inc., and author, 4Waves concept, a framework for understanding fundamental civilizational risks.



Alexander Chikunov began by speaking about the Great Transition which he described as the transition from the Agrarian era to the Modern, Urban-Industrial era. This began in the 1800s. He said societies go through a series of main transitions and gave a data rich overview:

• We have seen Fertility rate drop from over 8 to about 1.5 or less.
• Energy consumption has risen from 20Gj/cap (500KWh) => to 150 Gj (30,000KWh)
• Industrialization has continued to accelerate all over the world.
• Urbanization grew from 10% of population to 80% in Industrial Societies.
• GHG Emissions –grew from less than 1 ton per capita to over 5 tons in Industrial Societies.
• GDP/capita has grown from $1K to over $20K.
• Population growth PLUS shift to "Urban Diet" are the 2 main factors in the growth of food demand during the Great Transition:
    • Agro Diet – 300-400 kg/cap/yr = 200-300 kg (Cereals +Roots) +100 kg "other's local food" (seasonal vegetables, fruits, animal products)
    • Urban Diet – 900 kg/cap/yr =300 kg "Agro" +200 kg Vegetables + 80kg Meat +200 kg "other animal products" +100 kg Plant Oils, Sweeteners, Alcohol =900 kg

4 Waves – GDP/cap, 1820-2018 (Maddison project)



Alexander presented some dramatic data bout the trend toward doubling the need for food before the end of this century:

Population growth PLUS "Closing the GAP" in the shift to Urban diet
– 2 main factors in DOUBLING FOOD demand
• "DOUBLING" of FOOD PRODUCTION = +10Gt
• 7x growth in Africa - from 1Gt in 2021 to 8Gt by 2100 = +6-7Gt PLUS
• +2-4Gt in the 3rd Wave (from 2.5Gt to 4Gt to6-8Gt)
• "Closing the Gap" (up to 900 kg/cap*2) – even without Population growth need to produce 3 billion additional tons of food
• Every newborn needs +2t of Food Production (+3B people Africa +500M in SSEA = 3.5B*2 = +7Gt)

DOUBLING of global Urban population by 2100 (+4B people) due to population growth and massive Urbanization in the 3rd and 4th Waves (from 10-40% to >80% by 2100)

Alexander presented information on where the doubling of food demand would come from over the next 80 years. The data show the main areas are Africa and South and Southeast Asia due to both population growth and the shift to urban diets. The increase in food demand presents major challenges to societies and to the environment.

- How to achieve ZERO GHG emissions from Food Sector and "Negative emissions" technology in other sectors.
- How to produce Healthy Food and a Healthy Human Diet.
- How to reduce Food Waste by half.
- How to reduce the biodiversity and Species crisis in which most large animals live to benefits humans.
- How can food be Eco Friendly.
- How can our food systems operate within planetary boundaries.
- How can we solve the challenge of hunger and malnutrition of 800 million people.
- How do we meet the need to double world food production without continued deforestation.

After laying out the stark challenges, Alexander discussed strategies and solutions.

1) Rapid Animal agriculture phase-out (8Gt CO2e/yr) Or-decrease MEAT consumption ("The Humanity Diet")
2) Stop Logging/Deforestation (4-5Gt CO2/yr)! Rapid massive A- and Re-forestation => + 1 trillion trees, +2Bln ha of forests
3) Halve Food Waste => -500M tons in Production
4) Nitrogen fertilizers – use substitute? (3Gt CO2e)
5) "Negative" emissions "natural technologies":– forests, soil, swamps,

Alexander also discussed efforts at innovative disruptive technologies.

RethinkX https://www.rethinkx.com/food-and-agriculture
- New technologies - **Precision Fermentation**, **Cell Based** tech's (**cultured meat**, fish, milk products, etc.) (PF&CB)
- "**Second Domestication**" – microorganisms (bacteria)

"During the next 20 years everything will change in Food technologies, especially in techs of Animal products production" **BUT**
Today there are **NO economically reasonable technologies** - after 10 years
and $3B ln of investments

Alexander concluded by saying that most popular solutions are ideas and wishful thinking. We need to continue searching for solutions for food system transformation. "Even if collapse is inevitable, the best thing we can do is fight to the end!"

Respondent, Deborah Rogers: My background is in evolutionary biology, human and cultural evolution, and experience in systems and how systems function. That was an incredibly interesting talk we just heard but it was also terrifying.

I coordinate a global network of over 2000 partners around the world. Our most active partners are in Africa so I get feedback from both East and West Africa on a daily basis. What they are telling me is that the support systems for food supply are collapsing right now. In particular, soil fertility is being lost there because of so many decades of using chemical fertilizers, pesticides and herbicides. The farmers are reporting that their production diminishing because soil fertility is so poor.

Alex, thank you so much for all the statistics and the way in which you project those into the future. The question I want to ask you is what if the projections are wrong because unexpected things happen such as a rapid drop in food production?

Alexander Chikunov: I have been asking the same question since I began to study the problem of global catastrophe in 2010. Prior to that, I was CEO of a very large company in Russia and I thought everything was going well and that we were moving toward great abundance and so on. And then I read Limits to Growth. That was shocking and was how I met Dennis Meadows and how my journey started.

My idea is simple. We need to understand the long term megatrends. They are the moving power of the world. For example, we know for sure that the population of Africa is booming. But we don't know when and where and how elements of the system will crash. We have been living in a catastrophe for the last several decades. For example, in the 1990s there was concern that fish yield would go to zero, but since then fish production has doubled. How? Aquaculture. China has been the largest aquaculture producer over the last 60 years.

I believe we will have a series of crises and we cannot predict exactly what the responses will be. Humanity is not just one thing. Different countries take different paths and some like Afghanistan may take low tech ways to approach the problems.

David Berry: Alexander, thank you so much for that wonderful presentation and Deborah thank you for that response. You know, if we are really moving into a bad situation, it is a positive thing to know that so we can work on adaptations and solutions. To articulate the challenges is not pessimistic, it is realistic.

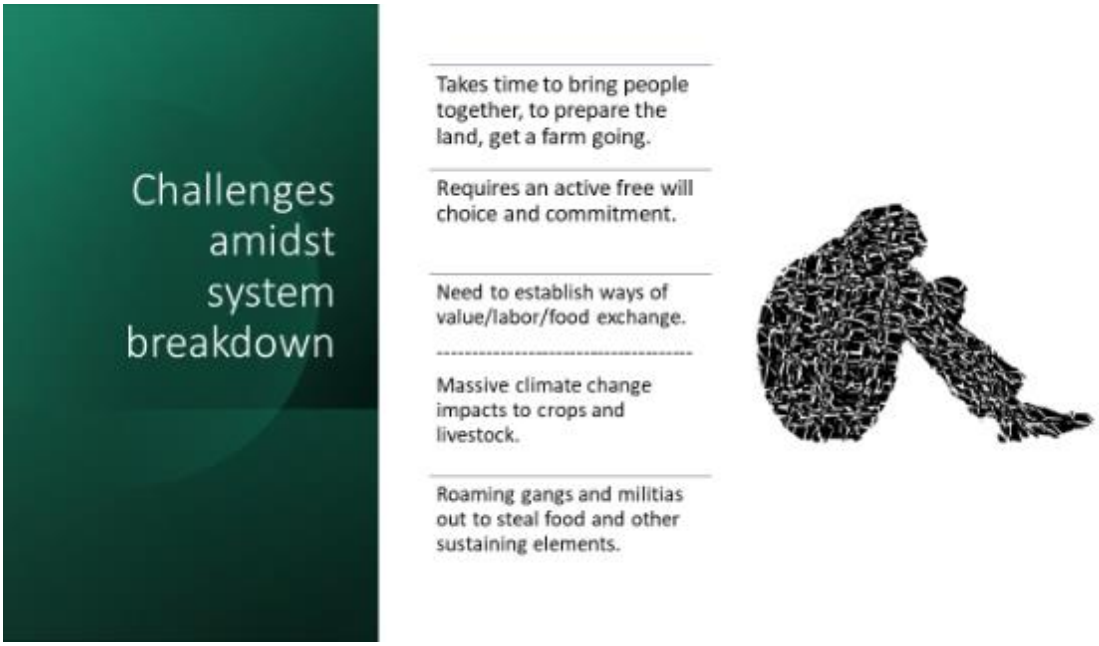
Community Farms (CSAs) as Healthy Islands Amid Collapse? Steven McFadden, Chiron Communications, http://www.deepagroecology.org

Steven McFadden started his presentation with two central questions. Can Community Supported Agriculture (CSA) serve as way to mitigate the already manifesting effects of systems collapse? What steps might people take to employ CSA strategically amidst disruptive changes in climate, economics, and food systems?

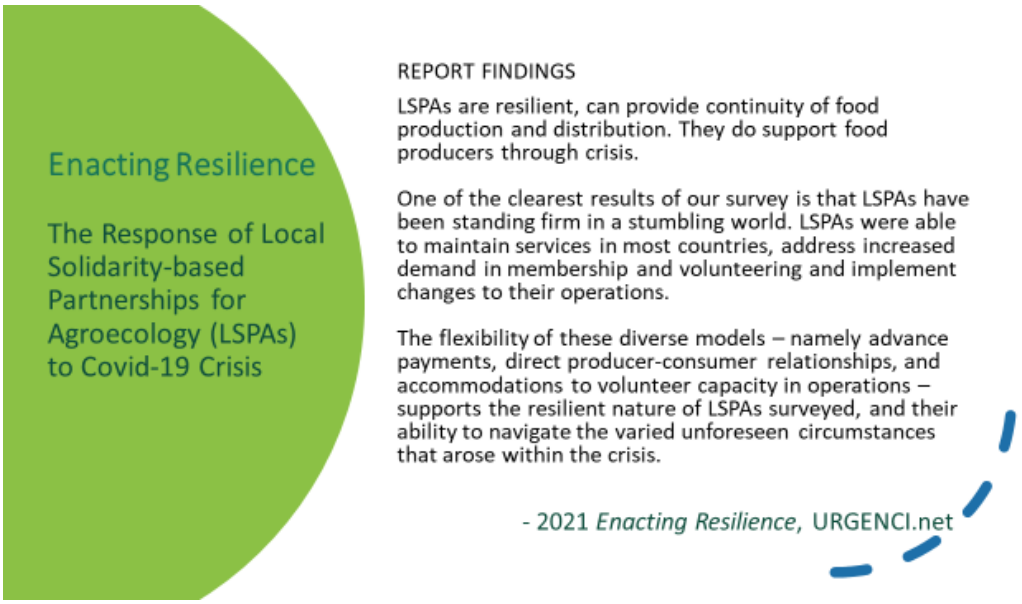
Steven described his initial resistance to the idea of systems collapse. He didn't see it in own community but now realizes it is happening various stages and ways around the world. He sees CSA's as a flexible and realistic way of mitigating the impact of systems collapse. Mitigating being to ease the harshness, not a complete solution. A way to make life easier for a given group of people, perhaps even in to the realm of survivable.

A CSA is not so much a systems approach but a neighborhood approach, religious community, or business operation way to respond to systems collapse. He described these fundamentals behind the CSA idea.

- Farms are a foundation upon which the other elements of civilization stand. We must have food: farms and fishing waters are our sources.
- Human beings have had a great many forms of relationship with land and waters, and many ways to draw our sustenance from it.
- LSPA initiatives (Local Solidarity-based Partnerships for Agroecology) — including CSAs, food coops, and community kitchens — are models and forms that can help mitigate the consequences of system collapses.
- LSPAs — producers and consumers alike — see the vital importance of social connections, in addition to technological solutions. This requires increased commitment of members through support, farm visits, work on the farm, etc.



Steven noted that the current global focus is on technological solutions. Corporate food systems are undergoing profound profit-driven change: consolidation, vertical integration, tech revolutions, including genetics and AI. Yet, alongside are ideas such as CSAs.



CSA is a community of practice, a free-will association of households with a farm or farms. The community supports the farm so it can support the community. The benefits they provide include clean fresh food, honorable work, and enhancing the health of soil, animals, and human beings while responding intelligently to changes in climate and finance. A CSA is adaptable to local resources and circumstances. In a situation of system collapse, neighborhoods, businesses and religious institutions (churches, mosques, temples, synagogues, etc.) stand as pre-existing communities. They can turn attention and resources to food production through a CSA.

Steven ended with a quote from Nobel Laureate, Iiya Prigonine that forms the base of his own vision. “When a complex system is far from equilibrium, small islands of coherence in a sea of chaos have the capacity to shift the entire system to a higher order.”

Suggested resource: “Food System Resilience Guide, A Planning Guide for Local Governments”, from The Johns Hopkins Center for a Livable Future.
A resource guide created to help local governments build food system resilience in a way that promotes equitable and just food systems.
The guide is available as a PDF at
https://clf.jhsph.edu/projects/food-system-resilience/resilience-planning-guide

Respondent, John Wells: How can we take what we learn from CSAs to beyond small islands.

Steven McFadden: CSA’s are not the answer to all the problems of systems collapse. Just being there as a model and sharing info and idea more broadly is helpful. It’s sharing and learning using median forms, such as through this presentation, to educate about CSAs. It is wise to get started before systems collapses completely.

A View from Indonesia, the Role of CSAs in Feeding & Sustaining Communities: Catharina Any Sulistyowati, KAIL, Bandung & School of Strategic & Global Studies, Jakarta, Indonesia

Any Sulistyowati explained to the group that the CSA idea is not yet popular in Indonesia. The project she will talk about is special; it started in the city and, involves youth. She worked with the group for three years for her Ph.D., she supports them and hopes that they will become a big movement in their city.

The Seni Tani Community Supported Agriculture (CSA) project is in Bandung City, the capital of West Java Province, Indonesia. Bandung city is 2-3 an hour's train/car trip from Jakarta, in a valley surrounded by mountains. It has a population of 2.5 million with a creative food culture and small artisans. The city struggles with vacant land, organic waste, and youth unemployment. 96% of its food comes from other places.

Sani Taint was started in 2020 by a youth group that began to cultivate urban vacant land in a residential area in the eastern part of Bandung. It is currently supported by an average of 20-25 active members monthly. By 2022 it had several urban garden plots, spread out through an area of 2.500 m2. They have access to public and private land – each with a separate agreement. It produces various kinds of food continuously for members every week. They called their practice "regenerative farming".

The CSA faces problems with land access and soil quality. Access to the land is insecure and they need to rely on good relations with owner and communities. There is a significant time and money to clean and recover the soil. And collecting organic material to nurture the soil is complicated and difficult. Any also described the lack of farming skills as an issue. The city youth do not have experience in farming so they have developed internships and bring profession farmers to teach the younger generation.

One of their biggest problems is recruitment and retention of CSA

members. Membership has been increasing but is not enough. They tracked the change in the goals of the youth involved in the CSA. In 2022, most were concerned with the ecological crises and support of youth. The areas of focus changed in 2023. For example, it changed to include lonely elders. In response, they started a program bringing children and the elderly together.

Any recalled that when she asked the group why they didn't want to include more fertile soil in the suburbs. They explained to her that the idea is to regenerate the soil in the city. It's ethical view not an economic one.

For more information
https://www.instagram.com/kamisenitani https://www.facebook.com/kamisenitani/

Respondent, Anupam Sarah: Given the challenges with existing agriculture and land use practices, what do you think we on the outside can do to help encourage groups doing the work.

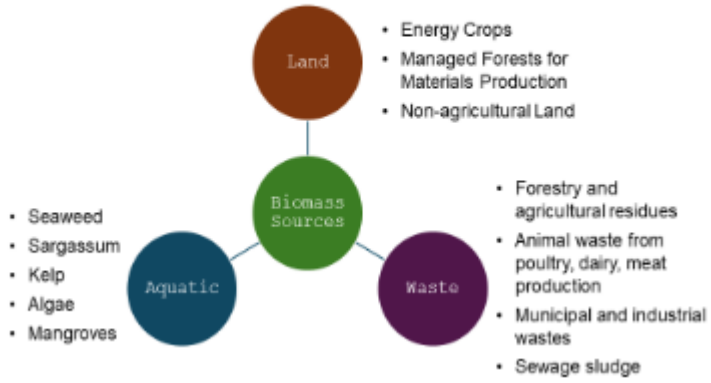
Any Sulistyowati: They are trying to work outside the system. They need a lot of organization to get consumers to support farmers. They need to grow the awareness and the willingness to support their work. They have recently started on one strategy to work with schools to develop school gardens. The parents become involved and become members of the CSA. The school organizes the program and gets income through fees.

Biomass Opportunities & Constraints: Marianna Grossman, Minerva Ventures, former Executive Director, Sustainable Silicon Valley.

Marianna Grossman began by reminding us that we are already at the 1.5 Celsius climate threshold. We need to end Fossil Fuels now and biomass has a role to play. Historically, biomass was used almost exclusively. Pre-industrial societies relied on biomass for energy, fibers, food, and building materials. With industrialization, fossil fuels replaced biomass in //many applications.

Marianna described some of the many opportunities to use biomass as a climate solution.

Sources of Biomass for Energy and Materials



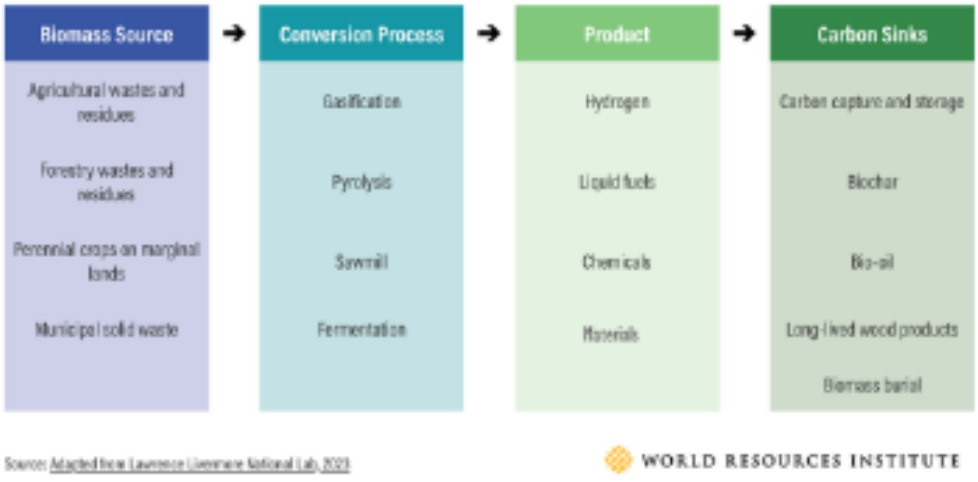
A replacement for fossil fuels

- "Renewable" electricity
- Liquid fuels
- Plastics and other materials
- Chemicals and fertilizers

A method to draw down and sequester carbon

- Soils and forests
- Long-lasting materials
- Geological formations

Biomass Carbon Removal Pathways



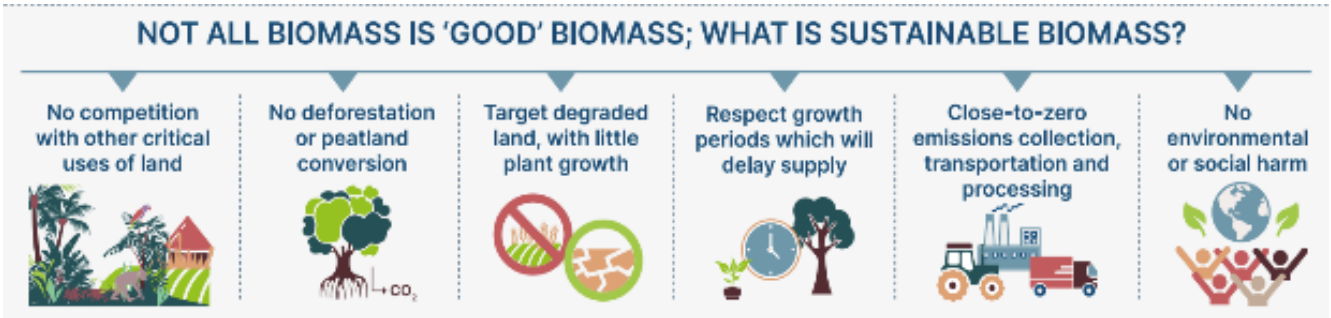
Companies are working on interesting ways to transform biomass. Marianna gave an example of Sargassum algae transformed into sustainable aviation fuel and as graphite for batteries. Abundant in the Sargasso Sea, the algae have become a serious problem, washing up on beaches as far away as Florida and Central America.

Since biomass appears to be renewable, abundant, and cheap, why don't we just substitute fossil fuels with biomass? There are constraints on the use of biomass: demand is greater than supply; there is little control of land (tragedy of the commons); environmental justice concerns; competing uses; lifecycle emissions; and pricing for optimal usage and to deter worse uses.

Marianna referred to a report put out by ETC (The Energy Transitions Commission), a coalition of groups such as the Rocky Mountain Institute, energy businesses and others. The report looks at issues of supply and demand of bioresources, https://www.energy-transitions.org/ wp-content/uploads/2021/07/ETC-bio-Report-v2.5-lo-res.pdf. They estimate that by 2050, if all sectors where to convert energy and material to biomass, the demand for biomass would be around ten times the available supply.

Biomass is a key to the new restorative economy

- Must be grown, processed and transported in a sustainable way
- Policy & pricing to prioritize use for highest value applications
- Tradeoffs in land use and siting decisions:
  - Environmental justice
  - Soil, forest, and ecosystem health
  - Optimize land use for food and biodiversity
- Circular economy to create less waste and to sort and reuse waste more effectively
- Clean electrification



Marianna ended by emphasizing that although biomass is a key component, it is only one of many decarbonization options we need to combine to reach a net zero emissions economy.

Respondent, Stan Bronson: There is a biomass plant near Sarasota Florida that is thinking about how to address the consequences of issues such as transportation cost and CO2 produced in getting the finished product to where it will be used. The company took the approach of looking for usable things in the waste stream such as glass for development to concrete. Are there resources, such as a holistic menu of things for companies to use?

Marianna Grossman: We don't have governance or political systems ready for a transition to a green energy economy and to make those tradeoffs. Right now we have to trust companies to do what is right for nature and for humanity. But they don't have a great track record in doing that. I would be interested in hearing from those of you in government management if there are tools already out they, or if they will need to be invented.

Open Discussion

Alexander Chikunov was asked to follow up on his comment that before he crunched the numbers he believed that industrial systems would lead to prosperity. He responded that he, like millions of others managers, was very naive. He was educated, but not on how the world works; he didn't think about agriculture or population, or long term. He read two books, *Human Quality* and *The Limits to Growth: The 30-Year Update*, that had a profound impact on him and decided that he needed to come up with proactive action plan.

He went on to say that even now when he tries to communicate about these ideas with friends from business, they don't accept it. They have no ability to think about long term trends. They are thinking about money etc. Less than three percent of the population has the ability to think long term.

The group had several questions about CSAs and the importance of relationships. Steven McFadden was asked if connections between urban residents and the rural suppliers are included in the models he spoke of. He explained that CSA's belong to networks with other sustainable farms and can provide a wider range of food offerings, such as grains and beans. In the cities there are connections as rural farmers come to the city once or twice a week with their produce for people to collect.

A member of the group noted that this issue links to a bigger question of how people choose the companies they purchase from. How do people relate their values or even the fact they are being impacted by climate change to what they buy and to the values of the companies they are supporting.

The discussion turned to the need to nurture and scale up what works at the local level. Given that less than 2% of the population is serviced by CSAs, what will shift the markets to focus on relationships rather than profit engines. Steven McFadden noted that when Covid started there was an increased interest in CSA. So if we talk about these shifts and about systems collapse it is a motivating factor. It's will be a necessity to have ways to supplement food supplies.

Any Sulistyowati shared with the group that for her it is easy to be frustrated with the current situation. We need to start with something, even if it is just a small fraction the population and a food small portion of the food they buy. We can learn from other movements. A century ago women did not have the right to vote but now almost everywhere they do. It seems impossible, but what we do now can lead to changes in the future. We need to show people that it is the right thing to and pass on awareness to the next generation. There is no single solution. If we can't do through government or business, maybe it will be people to people. We need to say no to power systems not aligned with our value systems.