2020 Corporate Water Risk and Strategy Workshop Syllabus

Center for Business and the Environment at Yale University

Mondays 4:30-7:30 PM | Fall-2* | ONLINE | 1.5 credit YSE | 1 credit SOM

**Follows SOM academic calendar*

COURSE OVERVIEW

The Corporate Water Risk and Strategy Workshop (YSE 1153-05) is a six-week, student-run course that provides a platform for groups of students from across Yale to collaborate and work with a client on a current water-related business or supply-chain question. In past years, the majority of students have been from the School of Management and the School of the Environment, leading to teams with a strong mix of business and sustainability knowledge; however, students from all schools across Yale are encouraged to participate. This workshop was created out of a need to better understand the complexity of water-related risk and to integrate water risk awareness into corporate and supply chain practices and decision-making. It has been student-run since 2015.

Over the 6-week course, students will strengthen their understanding of water risk and management through presentations from experts in the field and conversations with the client and stakeholders. Students will analyze the topics of water resource materiality and risk through a holistic lens, with the end goal of developing solutions that address the shared risk water challenges pose to a supply-chain, from agricultural to corporate operations. The case study present by the client will provide students with a basic fluency in the terminology of water risk, as well as the relevant tools, ideas and processes needed to improve stakeholder communication and water resource management. At the end of the course, student groups will present their findings and proposals to the client.

This year's client is **Califia Farms**. Califia Farms was founded in 2010 and has since become one of the fastest-growing, independent, natural product companies in the U.S. Renowned for its plant-based beverages, packaged in an iconic curvy bottle, the Los Angeles based company continues to disrupt the dairy category with plant-based alternatives that make it easy for people to choose food that is delicious, nutritious, and good for the planet.

Califia produces about 75% of its product volume at its own plant in Bakersfield, CA. While long term water risk to regional almond production has prompted the company to innovate with other crop commodities in recent years (oat, coconut) the most direct water impacts to the bottom line are from incoming and outgoing water quality at their facility. The two main challenges to the business have been sulfide levels and discharge quality attributes with a focus on chlorine, conductivity and sodium levels. Meanwhile, the company is in the early stages of evaluating its sustainability reporting options as it scales and gains more visibility in the market.

Students will be assigned to one of three projects based on interest and experience:

1. Mitigating the Impact of Sulfide Spikes in Califia's Inbound Water Supply
2. Identifying Opportunities for Improving Califia's Outbound Water Quality
3. Developing a Roadmap to Sustainability and Water-Use Reporting for Califia Farms

The workshop will be held over six Monday sessions in the Fall-2, 2020 semester.

PROJECT DESCRIPTIONS

Project 1: Mitigating the Impact of Sulfide Spikes in Califia's Inbound Water Supply

Califia has taken a variety of actions in its mission to improve product quality and environmental impact. In 2017 they drilled their own well to reach deeper levels of the local aquifer though the incoming quality has remained unpredictable with periodic spikes in sulfide. Sulfides are introduced into the water system from bacteria that can adhere to surfaces in the well and treatment systems. Sulfides can also be introduced as a result of natural decay and chemical reactions with soil and rocks. Sulfur dioxide produces a sulfurous aroma, "rotten egg" that primarily affects Califia's juices resulting in an off odor that is noticeable when opening the bottle. While these sulfide levels are low and do not impose a health risk, the affect is undesirable to the finished product. The team has been able to mitigate the impact on its products using chlorine dioxide and sodium hypochlorite, but chemical treatments can be expensive and managing proper inventory levels has been challenging. The team has also increased internal sulfide testing prior to water usage for finished product juices.

Understanding the true cause of these sulfide spikes and being able to predict occurrences would be instrumental in designing a proactive water management plan. Student teams will have the opportunity to work with local water system experts as well as Califia's Sustainability Manager and Quality Assurance Team.

Number of Student Teams: 1-2

Format of Final Deliverable: PowerPoint presentation + short summary report of findings and recommendations

Guiding Questions:

- How does regional hydrology/environmental context impact the quality of Califia's inbound water supply?
- What are the major drivers of sulfide spikes in Califia's water supply?
- What are some potential resolutions available on the market for mitigating the impact of sulfide in Califia's inbound water supply?
- How might Califia Farms predict future occurrences of sulfide spikes?

Project 2: Identifying Opportunities for Improving Califia's Outbound Water Quality

The Califia facility discharges its process water into the local canal, which goes on to supply mostly grape and almond farms. While the County deems the quality and quantity of process water acceptable, Califia is charged a discharge and treatment fee by the County based on the chlorine, conductivity, and sodium levels present in the process water. Process water passes through an oxidation pond, although these levels are primarily influenced by the chemicals used in the plant cleaning process. Since 2017 Califia has put actions in place that decreased the conductivity levels from over 2000 umho/cm to an average of 1500 umho/cm and sodium levels of over 500 mg/L to an average of 300 mg/L. Actions taken by Califia include changing from potassium chlorite to chlorine dioxide as a more effective sanitizer. Califia has replaced its Reverse Osmosis (RO) system with a Nano system which still cleans the water effectively but passes on acceptable low levels through to their products rather than sending the difference to the discharge stream. The plant has also increased the amount of turbidity and chlorine testing on incoming water going into the plant and out to the waste stream. Improvements to the holding temperatures in the finished product silo have also been implemented to significantly reduce large losses of raw materials into the waste stream that affect discharge quality.

In the spirit of continuous improvement, Califia would like to explore how they can improve these metrics to improve the suitability of process water for irrigation and reduce charges to Califia. Student teams will have the opportunity to work with local growers, vendors of clean chemical systems, as well as Califia's Sustainability Manager, Quality Assurance Team, Core Team, and Water Consultant.

Number of Student Teams: 2-3

Format of Final Deliverable: PowerPoint presentation + short summary report of findings and recommendations

Guiding Questions:

- What levers exist to improve the quality of Califia's process water?
- What opportunities exist for Califia to improve the suitability of process water for irrigation?
- What is the quality of process water surrounding almond and grape farmers would be willing to receive for irrigation purposes? What is the wastewater quality they should be receiving for irrigation purposes?
- Who are the key vendors of cleaning chemicals? How do competitors compare to Califia's current vendor in terms of controlling systems outputs?

Project 3: Developing a Roadmap to Sustainability and Water-Use Reporting for Califia Farms

Sustainability has always been a core value of Califia's, and as the company grows internationally, they are taking on a range of initiatives to improve their environmental footprint. From improving their packaging materials to using renewable energy, and recycling process-water to local agriculture and developing Direct Trade relationships, they are working to develop a comprehensive program that will also include new ways to communicate their goals and progress. A key part of this initiative is identifying opportunities for environmental reporting, something that Califia does not currently formally participate in.

For this project, Califia is interested in exploring opportunities to adopt official reporting programs or devise a streamlined and catered approach towards reporting. Students will explore the guidelines of the CEO Water Mandate—a UN Global Compact initiative that mobilizes business leaders on water, sanitation, and the Sustainable Development Goals—to determine its applicability to the Califia model, explore alternative water and emissions reporting opportunities, and identify the reporting efforts undertaken by competitors. Using this information, students will create a potential roadmap to environmental metrics reporting for Califia. Student teams will have the opportunity to work with Califia's Sustainability Manager.

Number of Student Teams: 1

Final Deliverable Format: A summary chart outlining sustainability metric reporting opportunities, required levels of engagement, what competitors are undertaking, and recommendations given Califia's resources and constraints.

Guiding Questions:

- What are the key reporting elements of the CEO Water Mandate; are the six mandate areas relevant to Califia's size and production?
- What are the sustainability reporting/pledge alternatives to the CEO Water Mandate?
- What kinds of commitments/metrics reporting are other competitors undertaking?
- What is a potential roadmap to environmental metrics reporting for Califia?

DATES AND DELIVERY FORMAT

Students from across Yale are invited to participate, allowing for a wide breadth of knowledge and experience within the teams. The workshop will be held online over six sessions in Fall-2 on Mondays from 4:30-7:30PM:

Session 1: October 26th - Kickoff Meeting and Introduction from Califia Farms (STAFF TBD)

Session 2: November 2nd – TOPIC TBD

Session 3: November 9th – TOPIC TBD

Session 4: November 16th – TOPIC TBD

Session 5: November 30th – TOPIC TBD

Session 6: December 7th – Final Presentations

December 17th – Deadline for Final Deliverables

FACULTY SUPPORT

The faculty support for this course are Todd Cort, Yale School of Management (todd.cort@yale.edu), and Stuart DeCew, Yale Center for Business and the Environment (stuart.decew@yale.edu).

TEACHING FELLOWS

Jeamme Chia (jeamme.chia@yale.edu)
Kristen Wraithwall (kristen.wraithwall@yale.edu)

COURSE MATERIALS

Readings will be made available in advance online through the Canvas course website and are strongly recommended. Presentations by guest speakers will also be added to Canvas after each session.

COURSE REQUIREMENTS

There are no prerequisites for the course. All students are expected to come to class sessions prepared, having reviewed the material for each week's session as each speaker will build on rather than reiterate the material posted on the course website.

In order to obtain the full credit, students will be required to:

- Attend every class (this includes the first and final class) and be actively engaged with in-class exercises and discussions. If students miss more than one class, credit will not be granted.
- Complete all required assignments with your team and submit them on time to Canvas.

COURSE GRADES

This course will be graded Pass/Fail

REGISTRATION INFO

If you are interested in joining the workshop, please fill out this short application by 11:59PM on Friday, October 2nd. Enrollment in the workshop will be limited to approximately 20 students.

This workshop is offered for 1.5 credits at YSE and 1 credit at SOM. Once you are accepted into the workshop, you will need to register for the project course by submitting the below add/drop form to F&ES Registrar's office by October 19, 2020.

Add/Drop Form: https://yse.to/coursechangeform

QUESTIONS?

Questions about the workshop? Please contact Jeamme Chia (jeamme.chia@yale.edu) or Kristen Wraithwall (kristen.wraithwall@yale.edu)

READINGS

TBD