Project # COE-2014-01
Strategic Applications of the Community Assets and Attribute Model

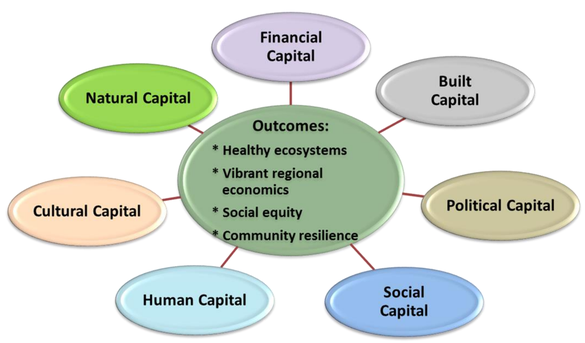
Motivation and Objectives

The Community Assets and Attribute Model (CAAM), derived from the Community Capitals Framework (CCF) (Emery and Flora 2006), helps asses community suitability for biofuel facilities through validated measures of three key social assets: social, human, and cultural capitals. The CAAM model provides the first reliable, nationally available quantitative measures of these social assets to incorporate into decision-making. As such, it is a valuable tool for stakeholders when assessing community suitability for biofuel facilities. In what follows, we describe the model more in-depth, summarize prior applications of the model, and discuss future applications and implications of the CAAM model.

Methods and Materials

The CAAM Model is an extension of the Community Capitals Framework (CCF) that examines community assets which contribute to the success of community-level projects. The capitals work together to cause a community to "spiral up" and achieve community goals. The CAAM model provides measures of three hard-to-measure capitals that have been shown to impact a community's responsiveness to implementation of highly complex technological projects. Due to the difficulties of measuring these assets, they are often left out of important site-selection decisions, yet they are imperative to successful implementation of projects which affect communities.

Figure 1: Community Capitals Framework (Emery and Flora 2006)



Through the combination of several national-level datasets, we developed quantitative measures of each social asset at the county level using the most complete indicators of each asset to date (See Table 1 below). Using factor analysis we developed a single quantitative score for each asset that reflected county ranking on that particular capital. To compare ranking among counties, we created regional benchmarks by calculating the average performance of counties within each Census Region. We argue that counties that rank higher than their regional average in each asset are more likely to be successful developing and implementing highly complex, technological projects.

Table 2: Community Asset and Attribute Model (CAAM)

Community Assets		
Social Capital Rupasingha et al. (2006)	**Cultural Capital** WESTAF	**Human Capital** County Health Ranks
# Rent-Seeking Groups: political, labor, professional and business organizations # Non-Rent Seeking Groups: civic organizations, bowling centers, golf clubs, fitness centers, sports organizations and religious organizations # Non-Profit Organizations % Voter Turnout	Creative Vitality Index including: # Arts related organizations # Arts related business # Occupational employment in the arts $ Revenues of arts related goods and services	% Obese (BMI >30) % Low birth-weight % Premature deaths % Self-reports of poor health condition (physically and mentally) % Poverty (and % children in poverty) % Uninsured % No access to health due to costs % Between age 25 and 44 with some post-secondary education

Past Applications

Since its development, the CAAM Model has been refined and utilized in the Pacific Northwest Region to identify communities with the necessary levels of social assets to be considered in site-selection decisions. Case study analysis of various biofuel facilities in the Pacific Northwest helped refine measures and determine predictive capacity of the model in identifying successful and unsuccessful facilities in the region. The refined model was recently applied in the Pacific Northwest to identify potential locations to develop a retro-fitted biorefinery. The CAAM model was combined with site-specific biogeophysical measures to assess retro-fitting of pulp mill facilities in the Pacific Northwest. After an initial ranking of facilities based on biogeophysical measures, the CAAM model assessed county-level performance on each asset and identified one facility site which out-performed the region on each key asset. The combination of biogeophysical assets and the social assets measured by the CAAM model allowed for better assessment of the pulp-mills in question, and identification of one facility that is more likely to be successful in the retro-fitting process, and future implementation and support of a biorefinery.

Current and Future Application

Case study validation of the CAAM model in the Pacific Northwest illustrates its predictive capacity to explain and identify highly successful and unsuccessful biofuel related projects in the region. While we do not argue that communities that under-perform in these assets should be ignored by key decision makers, initial development of economically viable and environmentally stable biofuel industries will depend on identifying areas that have the highest likelihood of supporting these facilities. The CAAM model successfully identifies these potential communities, and predicts implementation success in those locations, increasing the likelihood of success for the overall supply chain.

Despite the model's predictive capacity in the Pacific Northwest, it is important to note that high-levels of each of these assets do not guarantee success. In particular, high-levels of social capital can contribute to failure in project development and implementation if communities are opposed to the proposed facility. The Pacific Northwest seems to have higher-levels of support for biofuels than other regions, and assessing community support for the project is imperative when considering facility location. Application of the model to other regions, particularly the Midwest, will be greatly impacted by past experiences with biofuels, and projects will likely meet with resistance to these facilities in many communities. Regional application of the model requires biogeophysical assessment based on different feedstocks and processes, but in combination can still enhance the likelihood of implementation success.

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September 27-28, 2016

This work was funded by the US Federal Aviation Administration (FAA) Office of Environment and Energy as a part of ASCENT Project XX [Insert ASCENT Project Number] under FAA Award Number: [Insert ASCENT Award Number]. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the FAA or other ASCENT Sponsors.

Strategic Application

The CAAM Model does not replace the importance of biogeophysical measures in site-selection modeling; biogeophysical measures are a necessary component of adequate site-selection. However, the CAAM Model will provide an assessment of communities based on 4 key assets (see future developments), providing valuable knowledge to project planners on how to approach these communities based their CAAM Attributes. A community strong in each attribute is ideal, but communities vary on all four measures, and the CAAM Model is effective because it provides potential strategic recommendations for approaching communities that have the necessary biogeophysical assets, but do not perform strongly on all CAAM assets.

For instance, if a community is high in social capital, but low in political capital (support for the project), stakeholders will need to educate the community on the project and attempt to garner support through public opportunities to provide comment and express concerns. This information will be especially beneficial in the Midwest region which may have several communities less supportive of biofuels based on their past experiences with ethanol. The CAAM model specifies which communities in this region will need further intervention to increase their support, and informs the strategies for that intervention. Projects that attempt development without taking action by providing education and comment opportunities will be unlikely to succeed.

Additionally, a community that has high levels of bridging social capital is likely to be more accepting and trusting of outside actors developing projects within their communities. However, a community with strong bonding social capital is likely to be suspicious of outside actors necessitating biofuel advocates to identify high-level community members to approach and garner support for the overall project. Without garnering support from a respected, high-level individual within the community, it is unlikely the community will support potential development and implementation.

Further Development of the CAAM

While developing and validating the CAAM has taken place exclusively in the Pacific Northwest, efforts are currently underway to apply the CAAM to the Midwestern US and other regions and to refine the model to improve its accuracy and ability to predict successful biorefinery siting. Current efforts to further develop the CAAM include:

Ongoing Validation Efforts
- Further validating the model by including more in-depth case studies from areas in the Pacific Northwest and Mountain West
- Determining generally how the model can be made more effective (whether there are aspects of community capitals the model is not capturing), and identifying what specific assets of the community contributed to success or failure of biorefinery siting

Types of Social Capital
- Distinguishing between bridging and bonding social capital to provide clear guidelines to stakeholders for approaching communities.

Addition of Political Capital
- Adding measurements for political capital (public support) that enhances the scope of and predictive accuracy of the model.