

Crucial FEWSION Episode 2 – script draft

[Opening music/sound and teaser sound]

Ben Ruddell: Crucial FEWSION.

Ben Ruddell: Most food comes to us from factories – not farms. If the dairy is in your town – but the cows feed comes from the other side of the world ... would you say that cows milk is local?

Richard Rushforth: Flagstaff does produce food – but its dog food and ice cream cones. In Flagstaff we like to think of ourselves as being separate from the water problems that occur in Phoenix and Tucson, but we're very much connected to those water issues.

Narrator: Hello - and welcome to Episode 2 of Crucial FEWSION. In our first episode we ended with a question ... what's the most energy-consumptive part of modern life? Well there was a big clue in those sounds you just heard

Ben Ruddell: The largest single user of electrical power in the modern world is water. Water. The production, pumping and treatment of water. The main feature of modern water systems is that we use electric pumps to move water uphill and pull it out of the ground and pull it out of rivers. Electricity runs pumps and the typical electric pump is several hundred horsepower. That's a lot of power.

Narrator: Also in the first episode of Crucial FEWSION we heard from shoppers and growers at the Sunday Flagstaff Farmers Market. All committed to the "local food" movement – where there's just a single-link in the food supply chain – from the grower straight to the shopper. Everyone we asked there was surprised that FEWSION data shows metro Phoenix topping the local food supply rankings for large US cities. One person in particular questioned *how* FEWSION researchers got that whopping 85% local food figure for Phoenix.

Shopper: *"Until I know the methodology that was used, I would be suspect that Phoenix has the highest proportion of local food in the country."*

Narrator: That was Art Babbitt, the man responsible for running Flagstaff's Farmers Market for over a decade. And it's a very astute question... .. *exactly how DO* the FEWSION team work out what's local? FEWSION project Director Professor Ben Ruddell explains that there are THREE really important things to know about the FEWSION project's data. FIRST is HOW they define "local" ...

Ben Ruddell: The FEWSION project data uses the county or Metro Statistical Area boundary level. That means cities containing large agricultural areas and lots of farms within their county boundaries come out ahead of cities that are in small counties or where there aren't any farms in the county. OR - cities where they overproduce food and they don't eat enough of it within their own boundary. So, in the FEWSION data set metropolitan Phoenix is embedded with the large agricultural county of Maricopa, hence we show it with a high percentage of locally supplied food. A lot of producers and a lot of consumers within the same boundary.

For a method to be 'fairer' or more favourable to megacities like New York or Los Angeles it would require perhaps a larger boundary. New York might need a boundary that was much of the northeast because it's such a big city. So, some of this is an artifact of the county level boundary that we use in our method. Rural areas produce a lot of food, but even though they're big food exporters, farmers typically specialize in only one or two foodstuffs and so the county in a rural area has to still import all its other food from far away.

If we called the sources within your own State "local", then California would be a leader in local food because California is the largest year-round food producing region in the world - but Arizona and Florida are also high on that list.

If we defined "local" meaning your own neighbourhood or your backyard, then only community gardeners would qualify as local food producers. Farmers even at the edge of the city or nearby - wouldn't count. Also, cities at the center of diverse production States like Washington, Oregon, Wisconsin, or Vermont - they might be the most "local" in terms of their food supply - but only during the harvest season. During the winter and spring - and even for much of the summer, those northern States don't produce much and they rely on food imports from distant sources like California, Arizona, and Florida. So, they're local at one time of the year, but not at another.

Narrator: A SECOND key insight on how the FEWSION project measures food supply is that its data includes ALL KINDS of food...

Ben Ruddell: Most food comes to us from factories - not farms. So, distribution warehouses, food processing, meat packing, and dairy facilities count as sources in our data sets. This choice favors locations with a lot of food warehouses, groceries, restaurants, and food processing facilities - places like Phoenix or Fresno or Las Vegas. It also includes rural locations with lots of farms. It's important to remember that the food supply chain is complicated and has a lot of steps. Farms are only one small part of that system.

Also modern farms are NOT usually the first step in the supply chain. They use a lot of fertilizer, fuel, seed, equipment and animal feed and that's all sourced from other farms ... and other industries. If you're running a dairy, you probably buy hay and feed from another farmer. If the dairy is in your town, but the cows' feed comes from the other side of the world, would you say that cow's milk is "local"? In the FEWSION data set we would call this milk local - even though the feed comes from the other side of the world.

In Flagstaff, most of our food comes from Phoenix... is Phoenix "local"? Yes and no. Yes - because Phoenix is a lot closer than California or Illinois for instance, and because that food can be easily trucked from Phoenix to Flagstaff in a single morning, and also those tax dollars and jobs benefit the State of Arizona which we're a part of. No, it's not local because that food doesn't come from our city or its hinterlands, because the seasons don't match between northern and southern Arizona, and because those farmers in Phoenix aren't your neighbors in Flagstaff.

Narrator: The **THIRD** vital element is how you **MEASURE** food *amounts* – the units you use can make a difference to which city comes out top of the local food ‘league-table’.

Ben Ruddell: For instance - you might use sheer weight and measure it in "tons", or you could use "calories" which are a unit of energy ... or think of the costs and count "dollars". You might even want to factor in the so-called ‘footprint’ of the food ... and calculate how much ... land area ... or water ... or greenhouse gas emissions that it took to produce that food.

That surprising 85% figure of locally produced food for Phoenix which we mentioned before ... that’s actually made by measuring the food according to how much water was used to produce it – that’s often termed its ‘water footprint’. Right. So how much water did it consume to produce the food. Producing food takes different amounts of water in different places. So, producing food in Phoenix takes more water than producing food in Wisconsin, that’s because Phoenix is drier and sunnier, and it’s hotter – but you can also grow a lot more lettuce in Phoenix than you can somewhere cooler – and you can grow it in the winter. Yeah.

We were concerned about the environmental sustainability of the food – and because water is one of the main scarce and limiting resources in Arizona.

This choice pushes US Western cities up in that local food league ranking chart because their "local" foods take a lot more water to produce than food they import from wetter regions back east. In Flagstaff buying food from far away reduces the local water footprint – BUT it also increases the carbon footprint of that food because of all the trucking involved – so there’s a trade-off.

If we used units of dollars, instead of water, rich coastal cities and their high-quality expensive locally organic produce would come out higher on the local food rankings. But that measure minimizes homegrown and more "middle class" food sources that comprise the diet of more people. And, you might be surprised using this dollar measure, because the most expensive foods are also the most likely to be sourced from overseas.

[NSF/FEWSION musical logo]

Rushforth: Numbers ... numbers... yeah err big spreadsheets, big data sets, lots and lots of numbers. Sometimes the numbers mean stuff, sometimes the numbers don’t.

Narrator: FEWSION researchers have taken on the task of climbing a massive data mountain – with the goal of understanding food, energy and water supply at the national, regional and local levels – and presenting those numbers to other researchers and to the public in an accessible way.

Rushforth: My name is Richard Rushforth. I’m an assistant research professor at Northern Arizona University. My role in the FEWSION project as lead data scientist and my job is to identify what numbers mean something and what numbers don’t mean anything.

In the FEWSION project we're just finishing up the version one of our data set – the complete food, energy and water data layer for the United States at the county scale. And so, we have food layers that range from livestock to processed meat, agricultural products such as vegetables and fruits, and processed foods that you'd buy in the grocery store. Other layers that we have for the United States are an electricity flow layer, a natural gas flow layer, a crude petroleum flow layer and a coal flow layer. We have water flow layers – one is water production - where do natural water sources come from in the United States - and then when do they end up. And then the other layers that we've developed around water are related to the food and energy layers – so how much water is used for the food that is coming into your community and how much water is used to produce the energy that you consume every day. Those layers are called virtual water layers and not just the water coming out of our taps.

Once this information goes online at www.fewsiion.us anybody in the world really can look at any county in the United States and obtain data about where that county sources water from. Where does the food that people consume in that county originate from – whether it's from the Mid-West, the Central Valley of California or elsewhere in the world? Where does the energy that community consumes come from?

All this data will be available through a visualization portal. It will be a map similar to what you'd see on Google Maps and you'd click on a county or a state and then be able to pick what commodities that you wanna look for and then understand where those specific goods are coming from by visualizing 'heat' maps on the US and on the globe, to show hot spots for where food production occurs for that county, where energy production occurs for that county and where they're indirectly using water through their supply chain

Narrator: I was excited to get a sneak preview of some FEWSION data highlights, so Richard took me on a numbers tour of the mountain town of Flagstaff where the research team are based.

Located in the second largest county in the contiguous US, the small city of Flagstaff is where most of Coconino County's population live – making the county level data a reasonable approximation for the city. And looking at Flagstaff data demonstrates some of the principles that affect many US cities – large and small.

Rushforth: Flagstaff is an interesting city to look at within FEWSION data. For 2012 for the data year that we have we're looking at about 250,000 tonnes of food coming into Coconino County from around the United States, per year. And I'm talking about agricultural products, so that's farm-based products, cereal grains, bread, pasta, and meat and seafood – so the deli or the butcher section of the grocery store.

Flagstaff does produce food but it's not vegetables, it's not bread, it's not meat, its pet food - there's a large Purina manufacturing facility on the east side of town. And ice cream cones. Basically the western half of the United States gets their ice cream cones from a facility near the airport in Flagstaff.

Food that is coming into Flagstaff could be re-exported to other areas of the United States. Flagstaff is both a consumer and a producer of food – and I think that’s an important take away. If you’re looking at a city in the United States - it’s not just a consumer – its largely a consumer – but its also a producer of many goods. And cities have this wonderful role within the economy of being able to take in raw materials and reassemble them and make them into different products – very highly dependent on rural areas for those inputs.

Narrator: Situated on a high plateau 7000 feet above sea level, there’s only a very short growing season here - unlike other parts of Arizona with almost year-round warm produce-growing weather. And Flagstaff’s in a ponderosa pine forest so mostly the soils aren’t that great for growing crops. Meaning that the city is dependent on somebody else growing a lot of its food.

RUSHFDT03: Where we see that for Flagstaff is the usual suspects for food production in the United States. There’s a strong linkage to the upper Midwest – Nebraska, Iowa, but also the Central Valley of California, and a very strong connection to southern Arizona – so Maricopa County, Pinal County which would be the Phoenix metropolitan area, but also Yuma and LaPaz County – so farming along the main stem of the Colorado River.

In Flagstaff we like to think of ourselves as being separate from the water problems in Phoenix and Tucson – but we’re very much connected to those water issues that occur in the desert – because that’s where our food comes from.

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Narrator: And that begs the question – what IS ‘local’ in today’s interconnected economy? What does local mean to you? What *should* it mean? Is local really good? Or – in the concept of local ... are we really looking for something else - like resilience, security, profitability, quality, or sustainability? Or maybe ... all those things?

Narrator: In our next episode we’ll be investigating some of those factors at the local, big city and national levels using FEWSION data.

AND we’ll be finding out how much water each person uses every day in the city of Flagstaff –compared to its much bigger desert city cousin of Phoenix. Who do you think uses the most water?

To find out, join us for the next episode of Crucial FEWSION.

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