

## Workshop Report - Discovering if our food systems could operate at local level

Monday 23<sup>rd</sup> November 2015 at the Wellcome Collection, London

### Welcome and Introduction to the Local Nexus Network project

The workshop opened with a welcome and presentation about the Local Nexus Network from Aidong Yang, the Principal Investigator for the project. The presentation covered the network theme 'From smart engineering to shared prosperity', defined 'redistributed manufacturing', and described the three objectives of i. assessing the knowledge base, ii. creating a community interested in this field and iii. defining the research agenda. The presentation then described the approach, time scales (February 2015-January 2017), the framing for the research: layered representation of nexus systems (policy and regulatory layer, socio-economic layer and physical layer) and finally explained the exemplar food types of bread and tomato paste.

There were 25 participants at the event (13 stakeholders and 12 members of the project team).

### Session 1: What are the challenges and opportunities of localised food manufacturing?

The first session was an interactive session based on facilitated groups around tables and was introduced by Julian Cottee a researcher (food) for the project. The presentation described how we define 'localised food manufacturing', what we mean by 'manufacturing' or 'processing' and what we mean by 'redistribution' (typically from fewer, larger units to more, smaller units) . The presentation moved on to explore some of the concepts and options for the future using 2 example products of bread and tomato paste and considering the viability of different products in terms of scale, geography, economics, sustainability, employment and efficiency especially for water and energy.

#### GENERAL COMMENTS

Reflecting on the notes from this session it is apparent that the question was ambiguous, with responses indicating that it was interpreted in at least four different ways by participants, the first 2 from a societal viewpoint and the second 2 from a business perspective:

- What are the **negative outcomes** of localised as opposed to centralised manufacturing?

- What are the **positive outcomes** of localised as opposed to centralised manufacturing?
- What are the **challenges for businesses** operating or intending to operate in the localised manufacturing space?
- What are the means by which these **challenges might be overcome** in order for the sector to grow?

In order to produce useful outputs, this summary attempts to disaggregate the comments noted by separating them into these four questions. Below this is represented as a section on COSTS and BENEFITS of localised food manufacturing from a societal point of view, followed by a section on the key challenges for the localised manufacturing sector to grow in size. The means by which these challenges might be overcome are dealt with in the write-up for Session 2.

### COSTS AND BENEFITS OF LOCALISED FOOD MANUFACTURING

Both costs and benefits were noted. Since costs and benefits were often very different in type (e.g. global equity vs. social capital) it is not immediately obvious how or if an overall calculus of cost:benefit could be arrived at. However, it does seem that further work in this area is required.

| COSTS  | BENEFITS  |
|--|---|
| <p><b>Global equity:</b> By bringing manufacturing back to the UK we weaken a powerful mechanism for development in less well-off countries. What impact on SDGs?</p> <p><b>Social inclusion:</b> If smaller manufacturing facilities implies higher costs, then poorer consumers will be excluded from accessing products. If the local sector grew considerably, then food security could be affected. Potential health implications.</p> <p><b>Additional local transportation:</b> more smaller transportation units (e.g. small trucks) needed – potential impact on traffic and local air pollution.</p> <p><b>Lower efficiency:</b> Small-scale equipment can be lower efficiency in resource use and more polluting per unit of production. Higher environmental impacts per unit?</p> | <p><b>Increased food security:</b> onshoring more manufacturing could mean UK is insulated against global food price shocks, climate change disruption to supply, and increasing competition for products from industrialising countries. Reduced risk – centralised system vulnerable.</p> <p><b>Employment and economy:</b> More jobs generated. Local multiplier effect feeding back into local economy. Fostering a more entrepreneurial culture.</p> <p><b>Symbiotic co-location:</b> Siting manufacturing together with other complementary activities increases potential for beneficial resource cycling.</p> <p><b>Social economy:</b> A greater number of smaller economic units generates higher levels of social capital, more trust and connection between different groups in society.</p> <p><b>Seasonal sourcing:</b> local manufacturing units can source from nearby primary production, whatever is in season.</p> |

## BARRIERS TO THE GROWTH OF LOCALISED FOOD MANUFACTURING

The barriers to the growth of localised food manufacturing that were identified can be split into three categories. Barriers on the production side deal mostly with the viability of smaller-scale manufacturing in the current business environment, and whether issues such as compliance and high labour costs place an unreachably high burden on many potential local manufacturers. Barriers on the consumption side include whether the logistics and marketing infrastructure is in place for local manufacturers to be able to sell their goods, as well as whether consumers would tolerate higher prices. Barriers relating to the overall environment include considerations relating to the economic system and lack of regulatory will to overcome challenges posed by the market.

| PRODUCTION SIDE   |
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| <b>Compliance:</b> Can smaller manufacturers afford the costs of compliance with public and private standards e.g. environmental regulations, food safety regulations etc.  |
| <b>The growth paradox:</b> Will a small-scale local food manufacturer who becomes successful tend to want to grow their business to serve a national or global market?  |
| <b>Infrastructure and technology:</b> Does the infrastructure and technology for redistributed manufacturing exist, e.g. small industrial units, smaller-scale technology   |
| <b>Labour cost:</b> Where localised manufacturing is more labour-intensive than centralised alternatives, the higher costs incurred due to extra labour will increase prices of final product.                                      |
| <b>Labour availability:</b> Lack of skilled labour and low desirability of food industry jobs, which tend to be relatively poorly paid.   |
| CONSUMPTION SIDE  |
| <b>Price:</b> People will not be willing to pay the increased price necessary to manufacture food products on a smaller scale. We do not value 'good food' in this country.   |
| <b>Access to markets:</b> Supermarket retailers hold the vast majority of the market and may be structurally unable to deal with the logistics of local food provision (i.e. their supply chains are inherently centralised)        |
| <b>Quality and consistency:</b> How will UK consumers react to less consistent products and more variable quality?  |
| OVERALL ENVIRONMENT   |
| <b>Lack of regulatory will:</b> Policymakers in UK are less interventionist than other countries and may not be included to introduce policies that would favour local manufacturing, even if clear benefits could be demonstrated. |
| <b>Incentive structures:</b> No accounting and incentive mechanism by which perceived benefits of local manufacturing can be valued if they are not directly valued by individual consumers – e.g. lack of true cost accounting     |

## Session 2: What CHANGES and CONDITIONS would need to be in place by 2040 for there to be a significant increase in localised food manufacturing?

The second session was an interactive session based on facilitated groups around tables and was introduced by Alma López-Avilés a researcher (energy) for the project. The presentation set the scene stating that currently in the UK approximately 1-2% of all food is locally grown/processed and asking the participants to consider What would it take to have approximately 30% locally grown/processed food in 25 years time?

### GENERAL COMMENTS

There was discussion at the tables on whether real situations –e.g. climate shocks, war, population growth, security of supplies etc. will naturally lead to an increase in localised food manufacturing. For example climate change is affecting food production, so it was said that there may be a potential drive to improve food security via local food production.

Also discussed in relation to the above was whether incremental and/or step-changes should/will take place to promote localised food manufacturing, e.g. incremental changes in society and government, policy and market; or if on the other hand, step changes (e.g. more local bakeries built) or a sudden shock or shocks (e.g. embargo in Cuba, poor harvests, drought, pollution, flooding, war) will induce change. In order to produce useful outputs, a summary is provided here that disaggregates all comments noted around the ways to overcome challenges by separating them into CHANGES and CONDITIONS for localised food manufacturing grouped by THEME (see table below). ‘Conditions’ were understood to be the factors, circumstances, the landscape (e.g. policies, regulation, market conditions, trade, business models, funding etc.) that would enable the proposed ‘Change’. Some Conditions are ‘paired’ with the corresponding Change, but some Changes were proposed with little corresponding discussion among participants about the Conditions necessary to enable the Change (thus the blank lines).

### CHANGES AND CONDITIONS

| Changes   | Conditions  |
|---|---|
| <b>Technology</b>   |   |
| Technologies that enable traceability and consistent quality at a small scale (RDM, open-source, replication, down-scaled, shared technology to reduce costs) | Clarity in policy regarding food security Join up together small companies to make enough scale |
| Cheap and efficient food technologies (downscaling, downsized machinery etc)  | Positively discriminatory to encourage public procurement                                       |
| Make use of mobile/internet technologies for quick ‘on-demand delivery’ (e.g. robotics, drone /driverless deliveries)   | Top down benefits to drive market and public perception   |
| Innovation in technology and processes for full systems/ whole supply-chain   | Rethink legislative/regulatory framework for full systems                                       |
| Specific models for different scales/climate change to enable downscaling big systems to small-scale  |   |

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| Integrated and automated technology (e.g. waste by-products, energy, water)  | Industrial symbiosis: manufacturing, energy, heat, water   |
| Heat waste recovery technology and energy efficiencies)  |  |
| <b>Infrastructure (mainly energy and water)</b>  |  |
| Localised energy infrastructure  | Carbon/climate change levy etc.  |
| Improve energy transmission losses (electricity losses up to 30%)  |  |
| Renewable and/or localised energy for greenhouses  |  |
| Integrate systems to manage heat/cold energy networks, water connection, CHPs  | Regional economic development through industrial supply chains   |
| Industrial symbioses to help improve energy and water efficiency   | Regional economic development through industrial supply chains   |
| Water treatment plants (more research and development of decentralised plants)   | Regulation to recover methane for energy, fertilizers and heavy metals   |
| Energy decentralisation  | Pay more for your energy possible  |
| More wind generation for villages as exchange for free/cheap electricity   | Tax incentives, subsidies  |
| Reconfiguration of transport infrastructure for access to markets  |  |
| <b>Businesses and business models</b>  |  |
| Agro entrepreneurs   | Ability to scale / replicate business models   |
| Change to a 'service-led' local food production via servicizing business model and shared technology/ machinery  |  |
| Training to build local skills in RDM and in different business model  |  |
| Financing available for growers and manufacturers of local food  |  |
| Less waste in retail (e.g. smaller portions)   |  |
| Create thresholds to ease choice of food production and manufacturing systems and business models for specific scenarios                                     | Triple accounting for real cost of food, and environmental & socially detriments   |
| <b>Consumer behaviour</b>  |  |
| Education on food production, preparation, nutrition, value of food and health / diet  | These may happen through education (Government funds, but also related to higher food, water and energy prices, tax imports, and/or shortages) |
| Education/behavioural change in consumer attitudes & expectations (e.g. seasonality, fair prices, avoiding waste, benefits of localisation)                  |  |
| More time to grow, access local goods, shop and cook fresh food  | Institutional/policy changes about 'working-patterns/hours'  |
| Give people access to nut and fruit orchards and equipment to process fruit. Access to more allotments (currently up to 5 year wait). Access to bread-makers | Farming to cooperatives (enlarge coops similar to French - different land tenure system, ownership of land, management and products)           |
| Education about 'local'/city level awareness and food culture: change to 'local is best'   | Regional 'brand' or specific product   |
| Social change and retail infrastructure  | Regional 'brand' or specific product   |
| Empower local communities to control supply-demand and regional procurement  | New supply chains and regional brands/products   |
| People to spend more of income on food   |  |
| <b>Food production and supply-chains</b>   |  |
| More variety and optimisation of locally produced  | Broader indicators for measuring benefits (social &  |

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| crops (e.g. agro-ecology, biodiversity)   | environmental, not only financial)   |
| Optimise farm outputs (waste, heat, water)  | Change policy to encourage farming cooperatives and control product cost   |
| Being close to production of raw material (traceability and trust)  | Price of food more expensive.<br>National policy to minimise imports and maximise locally produced food                            |
| Enhance productivity of UK food (food security and UK economy), and planning / transparency of long-term food security  |  |
| <b>Market/procurement</b>   |  |
| Increase knowledge of local producers to renegotiate with suppliers (small buying power) and to sell to large businesses  |  |
| Mechanisms for better trading /barter (e.g. nuts vs fruits)   |  |
| Market has to be driven for RDM/local manufacturing to meet retailers' attitudes  |  |
| Access to viable market especially retail structure for locally produced food /producers (customers' access to local food)  |  |
| Move to procurement (e.g. public procurement) of locally produced products  | New supply chains from respective regions (poss. moving from incumbent free market)  |
| <b>Prices</b>   |  |
| Lower cost of retrofitting technologies such as water recirculation   |  |
| Managing/pricing externalities (include externalities in price)   | Collective buying in respect of externalities<br><i>Problem- supermarkets/ big businesses perceived to have drive prices down.</i> |
| Products prices to reflect the real cost of food, and environmental and social burdens  | Policies for triple accounting real costs: food, environmental & social burdens  |
| Local food to reflect the cost of labour  |  |
| <b>Policy, planning and regulation</b>  |  |
| Regulation to be more pro-active to minimise energy & water use, and food waste while increasing local jobs.  |  |
| Need to regulate the front-end (e.g. no overproduction to avoid food waste)   |  |
| Stronger legislation and regulation e.g. market and innovation (e.g. infrastructure)  | Legislative/regulatory framework for full systems needed   |
| Procurement regulations (especially public sector) to buy locally grown/ produced food  |  |
| Re-organisation of land-use and spatial planning system for local food production (where we grow, build, have green spaces, build localised heating, water recycling drainage etc.)   | Legislative framework for local Authorities to drive change, e.g. community heating from heat recovered in manufacturing etc.      |
| New developments such as Northstowe to include energy and water efficient measures  | Right planning, regulation and investment  |
| Flexibility of working-patterns to encourage growing, shopping, cooking local fresh food  | Institutional policy changes   |
| Policies to reflect real costs of food, social & environmental burdens (e.g. sugar tax)   |  |
| <b>Vision</b>   |  |
| Have a vision of co-benefits of localised food manufacturing e.g. training, jobs, housing, urban development, experimental food production (e.g. off-grid as well as on-grid systems) |  |
| Vision of society: are we aiming for a healthier society? What sort of food people want?  |  |
| Visionary change: challenge existing systems and allow new thinking and innovation, e.g. what type of   |  |

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| food production people want |
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| Vision in relation to ensuring food security in relation to possible stresses and shocks that will trigger change (e.g. population growth, conflict, climate / environmental refugees, climate impacts: drought, flooding etc.) |
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## GENERAL REFLECTIONS

A number of related issues were discussed in session 2 in relation to possible future changes which were less specific and thus difficult to fit in the table above. This section summarises some of the valuable points made by participants even when not strictly responding to the questions asked.

- Not all discussion was focused purely on the manufacturing stages of the food supply chain - there was also considerable discussion around agriculture.
- Different participants brought different views as to the appropriate meaning of 'local': the operations of a large multinational food manufacturer for example were described as local as they tend to have separate factories in many countries, rather than one or two factories at continental scale. Participants also discussed localisation in the sense of the 'on-shoring' of manufacturing which previously took place overseas, with the implication that there may be food security benefits where companies are exposed to supply chain risk.
- As stated above, participants also discussed the issue of food security and the need to have vision that may include localised food manufacturing to deal with existing challenges and future stresses and how to deal with these, i.e. via incremental or step changes such as for example via interventions to dictate food, energy and water market prices, food imports taxation etc. It was acknowledged that this may happen naturally if there are shortages. Participants also reflected that the Food-Water-Energy Nexus may take care of itself as a result of SHOCKS linked to shortages and higher food prices. Shocks may include: World / regional crisis - war / migration / population growth; World trade curtailed; retail prices increasing, and via climate extremes – drought, flooding, pests, increased temperatures etc.
- Participants said it might be easier to create the sense of community and culture around food at the city level, and so local government in places like Denmark / Sweden that promote a kind of city-state model can make it easier to reduce food waste, to use heat from industry for heating including in agriculture etc. Participants mentioned that the UK's Devolution agenda may benefit in this regard.
- On social aspects, participants discussed that social policy needs to include aspects related to jobs and work (including localised manufacturing) which help with promoting worthwhile lives. It was also mentioned that localising food production may offer opportunities for training, employment, rural and urban development etc.
- Also discussed was the need to avoid polarisation of society and instead aim for equity. Guard against disruptive forces and aim for an equitable society. Avoid magnifying vulnerabilities. Keep fair society in mind to be preserved so that RDM in the food sector does not push richer people to be richer and healthier communities (e.g. by buying land and foods from cooperatives, or forming cooperatives themselves), and poorer communities to become worse off and dependent on centralised, cheap, less quality food which is less healthy.

- A point was raised that consumers are used to a product's flavour (e.g. Californian tomato flavour in tomato paste) and whether localising food production and manufacturing in the UK/other places may be a problem in relation to maintaining flavour.
- On quality and flavour, the consensus was that there are significant cultural differences among consumers, for example when talking about bread in Italy or France compared to the UK. Local artisanal breads and industrially made mass-produced cheap long lasting sliced bread loafs were considered as different products involving different markets and business models.

### Session 3: Synthesis of the day and reflections from the stakeholder community

The final session brought together the main points of the day and opened the floor for any final comments from stakeholders.

Several challenges but also opportunities for RDM were noted:

|                      | Technological  | Socio-economic   | Political   |
|----------------------|--|--|---|
| <b>Challenges</b>    | <ul style="list-style-type: none"> <li>• Downscaling machinery to small-scale</li> <li>• Traceability and food safety</li> </ul>       | <ul style="list-style-type: none"> <li>• Acceptance/desire for more variable food</li> <li>• Greater polarisation of society given possible price implications</li> <li>• Inertia and drive from corporates for maintaining the status-quo – power arrangements</li> </ul> | <ul style="list-style-type: none"> <li>• Political will to take on the status-quo</li> <li>• New legislation and intervention needed</li> </ul> |
| <b>Opportunities</b> | <ul style="list-style-type: none"> <li>• Better and more efficient water and energy use</li> <li>• Synergies for waste heat</li> </ul> | <ul style="list-style-type: none"> <li>• Implications for local businesses, entrepreneurs, health</li> <li>• Potential to reduce risk associated with long supply chains</li> </ul>  | <ul style="list-style-type: none"> <li>• Political capital and local development zones (LEP)</li> </ul>   |

There was also considerable discussion on the 'conditions' needed for RDM: First, RDM needs to be 'market driven', with a clear market 'pull'; enterprises need reassurance. Second, RDM will not happen overnight, and may be of a 'generational' (25+ years) nature. This is due to general inertia in the system due to current investment and concern about new markets. Third, there needs to be a significant 'ease of entry' for new businesses, which may require new grants and social changes. Fourth, technological innovation and especially increased automation could both help and hinder RDM. At what point, for what operations, does automation prove better than people? Finally, there would need to be a change in food culture towards local = better, which could well be on a generational timescale.

## CLOSING COMMENTS

RDM presents many opportunities but there are also significant challenges to be overcome. While there are good examples of RDM, they tend to be for more ‘niche’ products, but lessons can be learnt about societal uptake. There are also examples of failed case studies which similarly can be analysed for learning.

RDM would not be appropriate for all foods, so it is important to identify for which, and where, this approach makes sense. Clearly not all ‘centralised’ food manufacture is bad, so how do we decide when RDM would be a viable alternative? Fundamentally, we need a method to establish what constitutes ‘sensible’ local products, i.e. appropriate for RDM consideration. This is complicated by the fact that many foods are multi-composites, with very complex chains/configurations (e.g. a ready-to-eat pie). This is why we have used ‘simple’ examples of bread and tomato paste, but we could use engineering techniques to help analyse how food systems for more complex foods operate.

Finally, using food security as an overarching framing will help consider the wide range of outcomes we need from food systems, and hence help identify how RDM could improve/decrease our overall food security. The associated food systems framing also helps with risk management by identifying sensitivity/vulnerability points in the system; and analysing the feedbacks from interventions to mitigate risk.

## NEXT STEPS

1. A summary report will be written about the workshop and made available.
2. A Blog will be written about the outcomes of the workshop by the LNN team
3. The results of workshop will be considered as the research study progresses including the ‘Future research needs’ section below.
4. There is the option to hold a second workshop in 2016.

## Future research needs

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| <p><b>Cost-benefit analysis:</b> Do we actually know what the full costs and benefits of localised vs centralised manufacturing would be? Need for a detailed mapping of the implications of these systems for resource efficiency and other indicators.</p>  |
| <p><b>What does redistributed mean?</b> The term can be used to refer to the on-shoring of manufacturing (bringing manufacturing back to UK from abroad) as well as sub-national scales. Which of these is focused upon raises different sets of questions.</p>   |
| <p><b>Is RDM in food actually happening?</b> There is a need to know if there is a current trend towards localisation of manufacturing in any sectors of food, or whether it is a purely hypothetical trend.</p>  |
| <p><b>Implications for food security:</b> what does more localised food manufacturing mean for food security in the context of the global food security picture? What mix of local and global is optimal?</p>   |
| <p><b>Potential for servicing in localised food manufacturing:</b> What would a change to a ‘service-led’ local food production/industry and servicing business model (e.g. shared or hired technology/machinery) mean? Are there any pre-conditions? Would it help prevent waste? Would it change the current situation/landscape?</p> |

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| <p><b>Potential for synergistic collaborations:</b> does small-scale manufacturing make circular economy collaborations more likely or is scale not a key factor?</p>   |
| <p><b>Online economy:</b> what will be the impact of ever-improving online technology in retail and logistics on the potential for localised food manufacturing?</p>  |
| <p><b>What role does ownership play?</b> Do the same outcomes occur from RDM where ownership of localised manufacturing facilities is still centralised, as opposed to where ownership is also more widely distributed?</p> |

## Agenda: Discovering if our food systems could operate at a local level

### Monday 23<sup>rd</sup> November at the Wellcome Collection

|              |   |                   |
|--------------|---|-------------------|
| <b>10:00</b> | <b>Registration and networking</b>  |                   |
| <b>10:30</b> | Welcome and Introduction to the Local Nexus Network   | Aidong Yang       |
| <b>10:40</b> | Presentation - What do we mean by localised food manufacturing? And What have we learned so far?  | Julian Cottee     |
| <b>10:55</b> | Q&A   | Aidong Yang       |
| <b>11.15</b> | <b>Session 1:</b><br><b>What are the challenges and opportunities of decentralised food manufacturing? [Breakout Groups]</b>  | Julian Cottee     |
| <b>12:15</b> | Session 1 Feedback and Discussion   | Julian Cottee     |
| <b>12:45</b> | <i>Lunch (A two-course vegetarian lunch will be provided)</i>   |                   |
| <b>13:45</b> | <b>Session 2:</b><br><b>What changes and conditions would need to be in place by 2040 for there to be a significant increase in localised food manufacturing? [Breakout Groups]</b> | Alma Lopez-Aviles |
| <b>14:45</b> | Session 2 Feedback and discussion   | Alma Lopez-Aviles |
| <b>15:15</b> | <i>Afternoon tea and coffee</i>   |                   |
| <b>15:30</b> | <b>Session 3:</b><br><b>Synthesis of the day and reflections from the stakeholder community</b>   | John Ingram       |
| <b>15:50</b> | Wrap-up and Next Steps  | John Ingram       |
| <b>16:00</b> | <b>Close</b>  |                   |

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