Establishing the 'Food-Smart City' Concept Project

Universities West Midlands Collaboration: End of Funding Report

Dr Adrian Morley, Food-Smart City Project Manager, 2014

Executive Summary

1.1 The 12-month project *Universities West Midlands (UWM) collaboration establishing the 'Food-Smart City' concept* commenced in July 2013, jointly funded by the Higher Education Funding Council for England and Universities West Midlands member institutions.

1.2 The aim of the project was to establish a collaboration between the universities in the West Midlands that would lead to the creation of a long-term partnership that will provide, through education, research and knowledge transfer, the expertise to establish the Food-Smart City concept as an achievable proposition.

1.3 Though restricted by the short timescales, the project delivered a number of valuable substantive outputs that have laid the foundation for future education, research and knowledge exchange in this area:

- Establishment of a collaborative relationship between nine West Midlands universities through the Project Advisory Group and Project Steering Groups, both of whom met three times over the project period.
- A mapping of relevant expertise, research and course provision among the UWM institutions for signposting services.
- Production of a report on mapping the food system in the West Midlands.
- Organisation of public and business seminars on the subject of Food Smart Cities (FSC) focused on the West Midlands.
- Development of a collaborative research proposal (value: £440,000).
- Presentation of the project at regional, national and international events and liaison with organisations in the West Midlands to signpost expertise and opportunities.
- Development and piloting of the cross-University online short course 'Food and the City' as a precursor to a potential shared module, attracting 350 registrations, 60 of which fully completed the course.

1. Introduction

1.1 Universities West Midlands (UWM) is the regional membership association of 12 member institutions in the West Midlands region. Its diverse membership incorporates a range of higher education institutions, both small and large, specialist and broad-based. The association fosters collaborative solutions and strong partnerships among its members in support of economic, social and cultural well-being.

1.2 In 2013, UWM members came together, with support from the Higher Education Funding Council for England (HEFCE) to develop a project which would establish the concept of a 'Food-Smart City'.[1] The project aimed to establish a collaboration between the universities in the West Midlands, leading to the creation of a long-term partnership and provide, through education, research and knowledge transfer, the expertise to establish the Food-Smart City concept as an achievable proposition within the West Midlands region.

1.3 In order to provide a clear focus, the project began by identifying a working definition of a 'food-smart city' as:

"A city or metropolitan area that harnesses its potential to maximise the social, economic and environmental benefits of its food system whilst also supporting its rural hinterland and contributing towards global food security and sustainability."

1.4 The project was designed to encourage participation by UWM member universities operating in partnership, with each contributing according to their expertise and available resources. The scope of the project was intentionally broad in order to encompass the range of sciences and technologies across the UWM membership with relevance to the topics of food security and sustainability, as well as the range of specialisms in the humanities that relate to food security and sustainability issues and their resolution from human and environmental perspectives.[2]

1.5 The 12 month project proposed to deliver five Key Outputs :

(a) Collaboration for the benefit of contributing significantly to the **food security and sustainability strategy of cities in the West Midlands and catalysing the practical development of solutions** to food security and sustainability issues and problems faced by cities and smaller urban developments.

(b) Collaboration for the benefit of **encouraging and supporting economic development and growth in the West Midlands**, particularly by engaging with Local Enterprise Partnerships and other appropriate stakeholders in the development of the Food-Smart City concept and by **energising and supporting responses to food security and sustainability agendas** reflecting national strategic needs and goals.

(c) Collaboration in order to **investigate the potential development of shared HE courses and, where appropriate, joint awards at undergraduate and postgraduate levels** in subject areas related to food security, sustainable

[1] *Universities West Midlands Collaboration: Establishing the 'Food-Smart City' Concept* was supported through funding from HEFCE (£25,000) and Universities West Midlands (£42,000) along with in-kind support from Harper Adams University, which hosted the project.
[2] Project management and governance details are presented in Appendix I.

food production, human nutrition, community mobilisation and participation, sustainable energy, green waste management, human waste management, short food supply chains, nutrient cycling, and green technologies, etc.

(d) Collaboration in the development of **linkage with regional industry and commerce**, to encourage an entrepreneurial response to the Food-Smart City concept and the business opportunities to be found in associated green technologies and services.

(e) Collaboration for the benefit of **attracting EU funding** to the further development of the project and the region.

1.6 In practice, many project activities covered more than one key output and these are covered in the following sections under the headings: Research Funding, Knowledge Transfer / Engagement & Educational Provision

2. Educational provision

Mapping Course Provision and Expertise

2.1 One of the initial tasks of the project was to map and understand existing educational provision related to the Food-Smart City concept among UWM institutions. This was done alongside the mapping of research expertise and current projects. A desk-based review of online information about existing courses, projects and individuals was conducted and distilled into a database which was then reviewed by Project Advisory Group members to certify accuracy.

2.2 The database of educational provision identified 70 courses across the 12 UWM Universities with either an explicit 'food' theme or one closely related to the Food-Smart City concept. The subject areas included health (e.g. Public Health & Nutrition) and the environment (e.g. Environmental Management / Technology / Sustainability) in addition to courses with food related modules such as Geography, Business Management and Entrepreneurship. Analysis of this data found that between them the universities cover the main areas connected to the Food-Smart City concept, however there was a lack of courses or models specifically focused on urban food or food sustainability. Teaching expertise in this area is therefore disparate.

2.3 The exercise generated a database that, along with the review of projects and expertise, was published as an online wiki document available to members of the project and member institutions. The wiki nature of the document allowed the data to be easily updated and shared between the different universities. Categories were developed in order to facilitate potential collaboration, the database included the following sections: Courses, Research, Expertise, External Expertise / Organisations, Funding Opportunities, Potential Businesses Contacts. The database proved useful for further activities in all areas, in particular signposting and identifying expertise for activities such as engagement events.

Collaborative Education Provision: The Food and the City Course

2.4 A number of possible collaborative outputs were considered including coordinating postgraduate dissertations in the area and introducing a lecturing exchange programme. Given the short timeframe of the project and existing educational policy interest in online education, it was decided that the collaborative development of an online short course would be an effective focus for educational activities.

2.5 The development of the course was led by Dr Adrian Morley, Project Manager for the Food-Smart City project, and Dr Michael Heasman, Senior Lecturer in Food Policy and Management at Harper Adams University, acting as co-facilitators for the duration of the pilot. With a financial contribution from the Harper Adams University Aspire Fund, the project was able to recruit the Website development company, Ethical Internet Ltd, to assist with website design and construction.[3] Both the Project Advisory Group and Project Steering Group inputted into the design and development of the course, as part of the regular project meetings and through one to one meetings and email exchange. The co-facilitators also benefited from the advice of Educational and E-Learning support professionals based at Harper Adams University.

2.6 The resulting Food and the City Course ran over 6 weeks, from June 2014. A total of 345 individuals signed up, with 250 starting the course and 59 people completing all the lessons. The course was divided into 12 lessons across six themed weeks. Each lesson had between 60 & 90 minutes of content plus links to further reading. Participants were invited to comment throughout and consider a series of reflective questions. The course curriculum is included as Appendix III in this report.

Course Design & Delivery

2.7 An external website – www.foodcitycourse.com – was designed using a Wordpress platform incorporating the Learning Management System 'LearnDash'. It was decided that this option provided greater freedom and flexibility compared to existing in-house university learning management systems such as Moodle or Blackboard. In particular it avoided ownership problems among the various partner organisations by providing a neutral 'third party' platform.

2.8 Three partner universities provided complete lessons for the course: Warwick University, University College Birmingham and Coventry University. In addition, academics at Aston, Birmingham City and Wolverhampton universities provided material as part of other lessons. External collaborators included University of Salford, Ryerson University (Canada), the Sustainable Food Cities Network and Trendwatching.com. In addition, the co-facilitators recorded interviews with regional and national experts as well as providing the rest of the content.

2.9 Each lesson contained a mixture of learning media, focusing on written text and graphics, video presentations and slides with audio commentary. The lessons were broken down into between 5 and 10 topics, which allowed participants to progress through the course in short sessions and fit it around other commitments. Participants self-declared completion of each topic before before they could progress to the next stage.

2.10 Three 'reflective questions' were posed per lesson to stimulate critical thinking and debate among the group and users were given the facility to leave comments under each of the topic pages. This approach was extremely effective, leading to some interesting and in depth debates among participants. Over the duration of the course, more than 1,250 comments were left by participants.

2.11 Three sets of formal assessment questions were set during the course. They took the form of a quiz with closed questions allowing automatically marking. At the end of the course an optional assignment was set which involved a 500-word written submission

[3] Advancing Skills for Professionals in the Rural Economy (Aspire) **http://www.harper-adams.ac.uk/aspire/**

outlining what participants would set out to do if given the position of Food Director in their given city or locality. Participants were allowed four weeks after the final lesson was posted to complete the course and assignment.

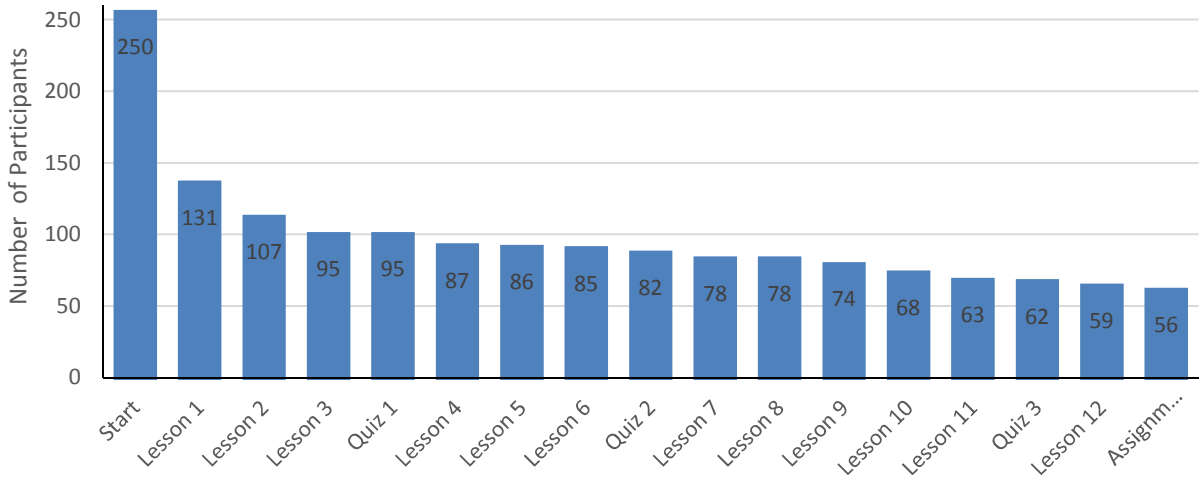
Participation Analysis

2.12 Interest in the course far exceeded expectations, and registrations had to be closed at 345 participants to minimise any risk to the ability of the website to handle simultaneous traffic during the course and human resource issues around course facilitation. At the time of close, registrations were still growing strongly, suggesting a potential large audience which could be tapped into in the future.

2.13 There was a higher than anticipated level of people with existing professional expertise related to food, with 118 of the 250 who provided the relevant information stating that their jobs or courses related directly to food; among this group there were 39 food business employees or owners, 31 people who work in food related public sector positions and 48 full time students on food related courses. There was also a high number of individuals who were active in supporting food initiatives at the grassroots level.

2.14 A total of 51 participants signed up from the West Midlands region, along with 176 from other parts of the UK and 101 international participants, from a wide range of overseas countries andnotable concentrations in North America and Australia.

2.15 Of the 345 participants, 250 started the course. A total of 59 people completed all the lessons within the official course period, with 56 of these submitting the end of course. The figure below illustrates the numbers of people who completed each stage.



2.16 The most significant falls in participation were between registration and start (95 people) and starting the course and completing the first lesson (119 people). Nonetheless, these rates compare favourably with statistics for conventional MOOCs, as can be seen in comparing completion statistics from the Food and the City Course with published averages from 17 Harvard / MIT MOOCs run on the Edx platform over 2013/14.[4]

[4] External data sourced from http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2381263

	Number of Registrations	Percentage Started	Percentage Over half	Percentage Complete
Harvard / MIT	842,000	65.2	9.4	5.1
Food and the City	345	72.5	24.6	17.4 (lessons) 9.9 (assignment)

Course Conclusions

2.17 The success of the course suggests a considerable knowledge gap for stakeholders interesting in food-smart cities. The course attempted to contribute to the education provision needed to underpin the development of more sustainable cities. It has proven to be a facilitative and cost effective way for universities to collaborate together on educational issues. The collaboration was notably broad-based, with seven institutions contributing content, and is a useful model for other emerging academic areas with relatively high degrees of multi-stakeholder interest.

2.18 The pilot course has potential to be developed and modified to meet the needs of specific audiences, for example key groups such as businesses and regional stakeholders. The materials generated for the course can be used in other university teaching, for example, as a basis of an elective module which could be made available to UWM member institutions and administered separately, with flexibility to be delivered as a whole or broken up for use in existing modules. The two-way knowledge exchange process built into the course design, along with the evaluative framework set as part of the course assessment also provides a source of data on stakeholder views related to Food-Smart Cities.

3. Knowledge Transfer and Engagement

Food System Mapping

3.1 The second mapping exercise set out to understand the nature of the food system in the West Midlands. Using existing secondary data, the exercise analysed data sources along the food supply chain, from farm to fork. This exercise allowed the project to define its principal empirical research area, identify opportunities for collaboration and provide a resource for regional stakeholders. A short report outlining what we know about the food system in the region, where the gaps are and some of the implications of these gaps was produced for project partners and regional stakeholders and is included in Appendix II.

3.2 One conclusion of the mapping exercise was that data sources about the region are partial and fragmented; comprehensive statistics at a regional level tend to be confined to the primary production sector. This fact combined with the inherent complexity of modern food supply chains, which are inherently complex and do not sit within geographical boundaries, means that a detailed understanding of the system at a regional level can be challenging.

3.3 The mapping exercise recorded that the West Midlands region contains 10.3% of English agricultural land, 10.6% of the total population and contributes to 11.8% of the total Gross Value Added of English agriculture. This suggests its current production is proportional to the region's size, which could be considered consistent given its mixed urban and rural nature. Analysis of the UK Government's Inter-departmental Business Register identified over 26,000 food businesses in the region, including farmers, employing around 342,000 people with an annual turnover of £31.5bn. The diffuse nature of both ends of the supply chain is highlighted by the fact that 40% of food businesses are farmers and 35% are food service outlets (restaurants, fast food, etc).

The sheer number of businesses suggests that the West Midlands has capacity to develop both vertical and horizontal supply relationships to promote more sustainable food production and consumption practices in the region.

Engagement Events

3.4 The project ran a series of events through the year to aid networking, promote the concept of a food-smart city to the region and help steer the project. Working with a limited marketing budget, these events also proved to be invaluable in generating interest in the online course described above.

Stakeholder Event: Establishing the Food-Smart City Concept

3.5 The project commenced in July 2013 with an invaluable half day workshop with academics and regional policy and practitioner representatives, which not only set the tone of the project but also provided a useful stakeholder group to work with throughout. The aim of the workshop was to introduce the project and to identify and discuss barriers and opportunities related to the success of the project. There were 20 attendees from the West Midlands region present on the day and the discussions were written up and used to inform the immediate development of the project. The event also enabled the collection of contact details for regional stakeholders, both those present and leads given by attendees.

Public Event: 'Becoming a Food-Smart City: how can we feed ourselves better?'

3.6 In March, the project organised a 2-hour evening seminar at Birmingham City University as part of Climate Week 2014. As well as outlining the Food-Smart City project, four invited speakers gave presentations on different aspects of the Food-Smart City concept within a framework contrasting technological versus social developments as solutions to urban food sustainability issues. Audience members were able to vote on a series of questions using handheld consoles during the event, which concluded with a Question Time style debate moderated by a professional facilitator. Approximately 30 people attended.

Business Seminar: 'Food and the rise of Sustainability: Opportunities for Business'

3.7 An early morning business seminar was led on May 14th 2014 in conjunction with Birmingham Chambers of Commerce, who provided the venue and marketed the event among their business networks. The aim of the seminar was to introduce the concept of a Food-Smart City and discuss the business opportunities associated with sustainable food. Colleagues from Harper Adams and Coventry universities made presentations along with a representative from the Birmingham Council Business Support Team and the Chairman of East End Foods Ltd. Approximately 30 people attended the event, the majority of whom were from the business community. Delegates were able to network both before and after the event.

Other Organisational Engagement

3.8 In addition to the above events, the project regularly interacted with stakeholders from within the West Midlands and nationally. The box below lists some of these organisations.

In region	**Outside of region**
• Birmingham Smarter Food	• Sustainable Cities Network

• West Midlands Strategic Food Board • Birmingham Food Council • Birmingham Sustainability Forum • West Midlands Food Links • New Optimists • Telford and Wrekin Borough Council • Birmingham NHS Trust • Sandwell Metropolitan Borough Council • East End Foods Ltd • Organic Farmers and Growers Ltd • Staffordshire County Council	• Brighton and Hove Food Partnership • Soil Association • Sustainable Society Network • Carrot City • Sustain

3.9 The project engaged with stakeholders using social media (https://twitter.com/FoodSmartCity) as well as more mainstream avenues, such as liaisingwith the UK wide Sustainable Cities Network and presenting at events such as the Digital Technologies for Sustainable Local Agri-food Systems conference held in July at Imperial College, London.[5] Through these activities, the Food-Smart City project is promoting both the reputation of Universities West Midlands as an organisation and the relevant expertise of its member universities.

3.10 One particularly successful relationship emerged from the project with East End Foods Ltd. The Food-Smart City project provided assistance with educational materials for an urban farming initiative at their site in Aston, Birmingham, launched in November 2014. The centrepiece of the attraction is a vertical farm demonstrator project, which is enhanced throughposters and information panels based on material created for the Food and the City course.

3.11 An academic presentation to the Association of European Schools of Planning Sustainable Food Planning Conference 'Innovations in Urban Food Systems' in Montpellier in October laid the foundation for potential future international collaboration. The feedback from this presentation was positive with a lot of interest in the project itself and the ambition of such a multi-institutional arrangement.

4. Research Funding

Data in the Food System Collaboration

4.1 An ESRC / Food Standards Agency call on the subject of 'Understanding the Challenges of the Food System' acted as a catalyst for a joint research proposal between members of the Project Advisory Group. The resultant submission was titled 'Data and Information in the Food System: Addressing the Challenges via Information, Integration, Standards and Regulation'. Led by Aston University (with Dr Christopher Brewster as Principal Investigator) and including Wolverhampton and Harper Adams, the proposal was for around £440,000 over 2 years and included support from regional and national food industry organisations. Although the bid was unsuccessful, the collaborators are pursuing other funding sources and are currently preparing a related proposal for submission to the EPSRC Standard Research competition (due to be completed in October 2014).

[5] http://sustainablesocietynetwork.net/digital-technologies-for-sustainable-local-agri-food-systems/

4.2 The original bid process was a positive example of how a region-wide project such as this can facilitate collaborative opportunities by bringing together broader groups of researchers than is the norm. Using the Project Advisory Group to generate expressions of interest allowed areas for development in to fully-fledged proposals to be identified, those a with expertise relevant to the chosen theme evolved organically into a core group to develop a project bid. The proposal which emerged was multidisciplinary in that it combined information technology, supply chain management and food policy and was a novel approach to an important research problem.

Engagement with EU Funding sources.

4.3 Structural problems were identified with regard to the regional multi-institutional nature of the Food-Smart City project and the pan member state multi-institutional nature of much EU funding. Although the project signposted opportunities for EU funding to individual researchers and institutions, the scope for a group bid was limited. These difficulties were further compounded by a dip in overall opportunities as the Commission transitioned to Horizon 20:20 and the lack of relevance of the calls that were released during the 12 month project period.

4.4 A potentially feasible EU funding opportunity which arose near the end of the 12 month period was the Marie Skłodowska-Curie COFUND programme (H2020-MSCA-COFUND-2014). The programme funds regional initiatives (along with those at national and international levels) that 'foster excellence in researchers' training, mobility and career development, spreading the best practices of Marie Skłodowska-Curie actions'. A call for Innovative Doctoral Training Programmes and Fellowship Programmes was announced with a deadline of 2nd October 2014. The limited capacity of the project in light of undertaking the Food and the City course and exploring a resubmitting the ESRC / FSA bid led to this opportunity being postponed. Nonetheless, the interdisciplinary and applied nature of the COFUND scheme would appear to make it ideal for a 'Food-Smart City' bid in the future.

5. Summary of activities

5.1 The figure below plots the activities described in the previous section against the five key outputs that were outlined in the original proposal. As the table illustrates, delivery of all five key output areas required a multi-activity approach, and each has been pursued through multiple activities.

Key Output	Activity							
	Data funding bid	Food system mapping	Stakeholder Workshop	Public Seminar	Business Event	One on One Engagement	Course Provision Mapping	Online Short Course
1: City strategies & practical solutions		X	X	X		X		X
2: Supporting economic development	X	X			X	X		
3: Investigate shared courses						X	X	X
4: Industry linkages	X		X			X		
5: Attract funding	X							X

6. Conclusions

6.1 Given its nature, the Food-Smart City project as a whole was as much an experiment in inter-institutional collaboration as it was an ambitious attempt to forge an emergent research and teaching area over a short time period. The project provided a number of lessons in how to make projects of this type effective and these are explored below.

6.2 Firstly, it demonstrated that some types of collaboration are more attainable within shorter timeframes than others; obviously some institutions will be more interested in a particular subject area than others and the resources and timeframe available largely dictates the achievements that are possible.

6.3 A tightly defined topic area, such as food-smart cities, will always be more attractive to some institutions than others and to be successful, such projects must be pragmatic about how many institutions will be actively engaged without diluting the topic too far.

6.4 The project required an initial period of networking and working through potential collaborative options in order to establish momentum. 12 months is a short period to develop collaboration and embed working networked relationships in an emerging area. Working with tight timescales requires a pragmatic approach to governance and objective settings to maximise effectiveness.

6.5 Nevertheless, Food-Smart Cities was able to build a strong profile in the West Midlands region and its national profile has started to emerge. The online short course, in particular, has been successful in reaching a wide-ranging audience and has strong potential to be developed further in order to engage with key groups such as businesses, potential students and regional stakeholders.

6.6 The project experienced some of the familiar difficulties in accessing research funding for multidisciplinary and multi-institutional approaches. Regional clusters of academics have challenges accessing EU funds that are generally set up to promote pan-European clusters. A further challenge is found in accessing research funding where such a novel multidisciplinary mix of falls across the gaps between funders' priorities.

6.7 Going forward, the project has laid foundations for future opportunities and potential to develop a more focused collaboration arrangement, particularly between the UWM institutions with concentrated food expertise. Although external funding mechanisms to support multi-disciplinary and multi-institutional collaborations of this nature are limited, significant opportunities exist to attract funding for projects in core areas and topics under the Food-Smart City remit which could merit institutional resource.

6.8 The area of urban agriculture technology, for example, is an area of interest for the Agri-Tech Catalyst programme. Data systems in the food sector is a research agenda already being pursued by the project through the submission to the EPSRC (led by Aston University) and could be developed further, for example by focusing on urban specificities in the context of smart cities.

6.9 A further area of development is the use of digital technologies to support knowledge transfer. A funding proposal has been submitted to the Sustainable Societies Network to develop the online course, and the opportunity exists to broaden and deepen this collaboration area further, for example, through a bid to Esmee Fairbairn Foundation's food strand.

6.10 The Food-Smart City project has also developed the relationships between member institutions and important networks such as the Sustainable Food Cities Network (who

are partners for the Sustainable Societies Network bid) and AESOP Sustainable Food Planning Group (who are the principal academic network for research into urban food systems in Europe). Towards the end of the funding period, the Food-Smart City project was invited to form an official collaborative partnering agreement with the UN FAO 'Meeting Urban Food Needs' project.

6.11 Such examples demonstrate that there is certainly potential to continue to develop a number and variety of activities based on a regional collaboration between universities, agencies and business around the food smart city theme. The project has shown that to develop such opportunities, relatively small levels of funding can be extremely effective in delivering the focused coordination which is necessary when working across multiple institutions.

Appendix I: Project Management and Governance

The project was managed on a day-to-day basis by a Food-Smart City Project Manager based at Harper Adams University (Adrian Morley). Overall governance was undertaken by a Project Steering Group comprised of representatives of the collaborating universities reporting to the Board of Vice-Chancellors of Universities West Midlands. A Project Advisory Group consisting of university representatives with appropriate expertise routinely oversaw the project in conjunction with the Executive Officer of Universities West Midlands and Professor Ralph Early, Head of the Food Science and Supply Chain Management Department at Harper Adams University. The *modus operandi* from a project management perspective was to map, signpost and facilitate collaboration between UWM members and between them and regional stakeholders. Project Steering Group and Project Advisory Group membership is listed below.

Project Steering Group

- David Llewellyn (Chair), Vice Chancellor, Harper Adams University.
- Phil Extance, Pro-Vice Chancellor (Business Partnerships and Knowledge Transfer), Aston University.
- Mel Lees, Executive Dean, Faculty of Technology, Engineering and Environment, Birmingham City University.
- Gary Wood, Deputy Vice-Chancellor (Academic Affairs), University College Birmingham.
- Michel Pimbert, Director - Centre for Agroecology & Food Security, Coventry University.
- John Adlen, Director - Office of Sustainability, Staffordshire University.
- Rosemary Collier, Director of Warwick Crop Centre, University of Warwick.
- Ann Holmes, Deputy Vice Chancellor (Academic), University of Wolverhampton.

Project Advisory Group

- Chris Brewster, Lecturer in Information Technology, Aston Business School, Aston University.
- Ian Stanford, Associate Dean, Research & Enterprise Life & Health Sciences, Aston University.
- Aristides Matopoulos, Lecturer in Engineering Systems and Management, Aston University.
- Peter Larkham, Head of School for Property, Construction and Planning, Faculty of Technology, Engineering and the Environment, Birmingham City University.
- Angus Dawson, Professor of Public Health Ethics, Birmingham University.
- Paul Russell, Dean of the School of Hospitality and Events Management, University College Birmingham.
- Moya Kneafsey, Reader in Human Geography, Co-Director ARG Sustainable Agriculture, Coventry University.
- Julia Wright, Deputy Director, Centre for Agroecology and Food Security, Coventry University.
- Michael Heasman, Senior Lecturer in Food Policy and Management, Dept. of Food Science and Agri-Food Supply Chain Management, Harper Adams University.
- Chris Gidlow, Senior Researcher, Centre for Sport, Health and Exercise Research, Faculty of Health Sciences, Staffordshire University.
- Brian Thomas, Deputy Head, School of Life Sciences, University of Warwick.

- Bob Newman, Professor of Computer Science, Pervasive Computing Research Group, School of Technology, University of Wolverhampton.
- Hazel Gibson, Senior Lecturer in Microbiology, School of Applied Sciences, University of Wolverhampton.
- Dave Hill, Principal Lecturer Applied Biology, School of Applied Sciences, University of Wolverhampton.
- Brian Shiplee, Senior Lecturer, Department of Architecture & Built Environment, University of Wolverhampton.

Over the 12 month period, the project held six formal meetings between representatives of universities through the Project Advisory Group and Project Steering Group. In addition, one to one meetings were held between the Project Manager and group representatives as well as regular communication through other means. The project also engaged with other experts within the collaborating institutions as well as regional stakeholders.

Appendix II: Understanding the Food 'DNA' of the West Midlands

Adrian Morley – Food-Smart City Project Manager

1 Introduction

The objective of this short report is to contribute towards one of the principle aims of the 'Universities West Midlands Collaboration Establishing the Food-Smart City Concept' project, namely to:

- Map and understand the West Midlands' "food DNA"; e.g. the number and nature of food businesses – agricultural production and processors – and estimate the amount of food produced, imported, exported, consumed and the waste produced, as well as define the principal food supply chains in the region.

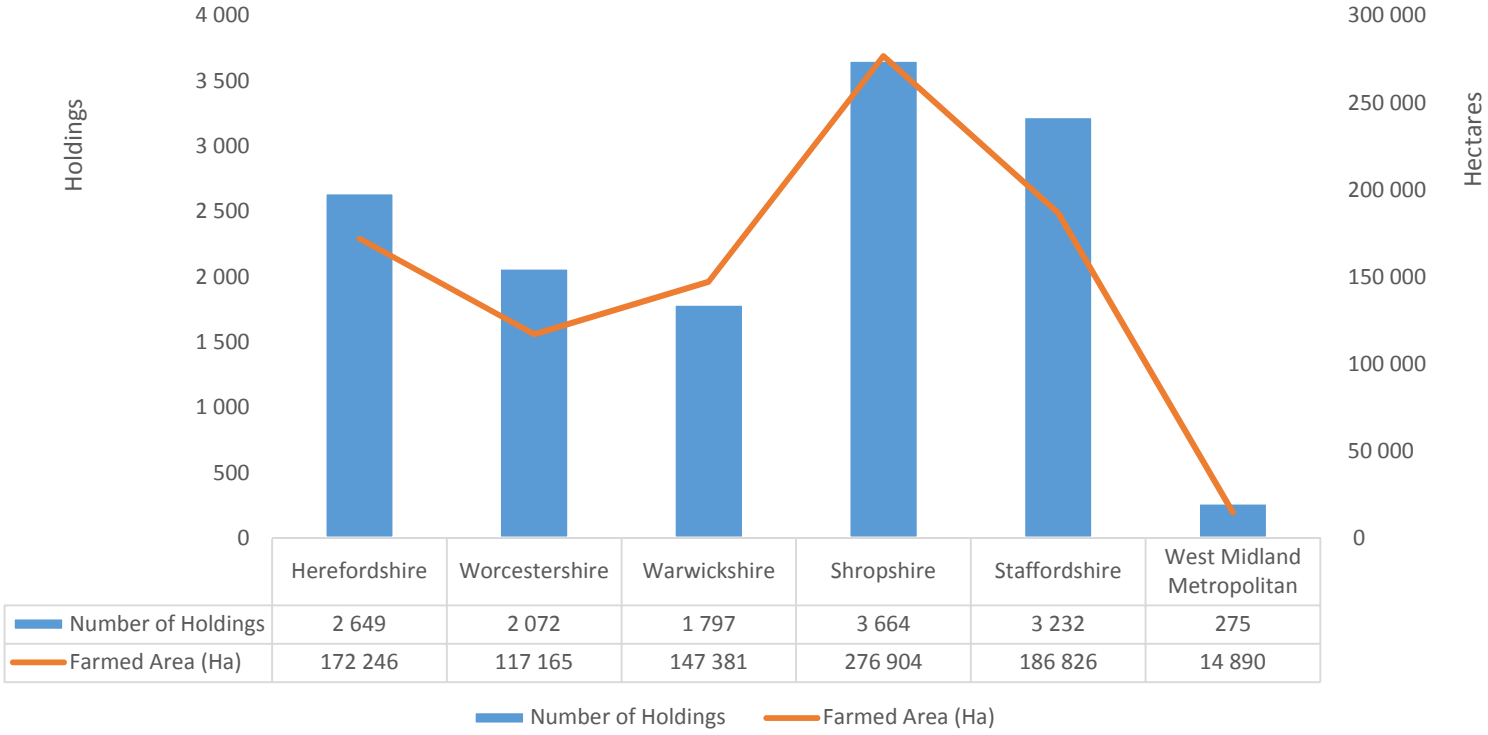
In doing so, the document attempts to provide a background understanding of the impact of food in the region, in terms of both production and consumption as well as intermediary and associated stages. In addition to providing a picture of our existing understanding of food in the region, it also identifies gaps in data provision and the implications of this for the development of the Food-Smart City concept, for meeting food security and sustainability goals and for harnessing the transformative potential of food more generally.
For the purpose of this document and the Food-Smart City project as a whole, the geographical definition of the West Midlands mirrors the NUTS regional designation, covering the ceremonial counties of Herefordshire, Shropshire, Staffordshire, Warwickshire and Worcestershire as well as the metropolitan county of the West Midlands.
The following sections present existing data for the food system in the West Midlands, from agricultural production through to consumption and waste.

2 Agricultural Production

Outside of urban areas, agricultural production has a strong tradition in the West Midlands region and remains a significant part of the economic and social fabric of large parts of the region. About 80% of the West Midlands is classed as rural and 70% of land is used for agricultural or horticultural production. Within the agricultural sector, data from the annual June Agriculture and Horticulture Survey and the annual Farm Business Survey form the core of what is known quantitatively about food production in the region. Figures from 2010 Agriculture and Horticulture Survey[6] indicate that there were 13,689 farm holdings in the West Midlands region. This represents around 13% of all agricultural and horticultural holdings in England. The total area in production is estimated at 915,412ha which represents around 10.3% of the total UK area. Figure 1 provides a breakdown of holdings number and production area by county.

[6] Defra Regional Food, Farm, Land use & Livestock dataset for June 2010, available from https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/183110/defra-stats-foodfarm-landuselivestock-june-results-countydataset19052010.xls

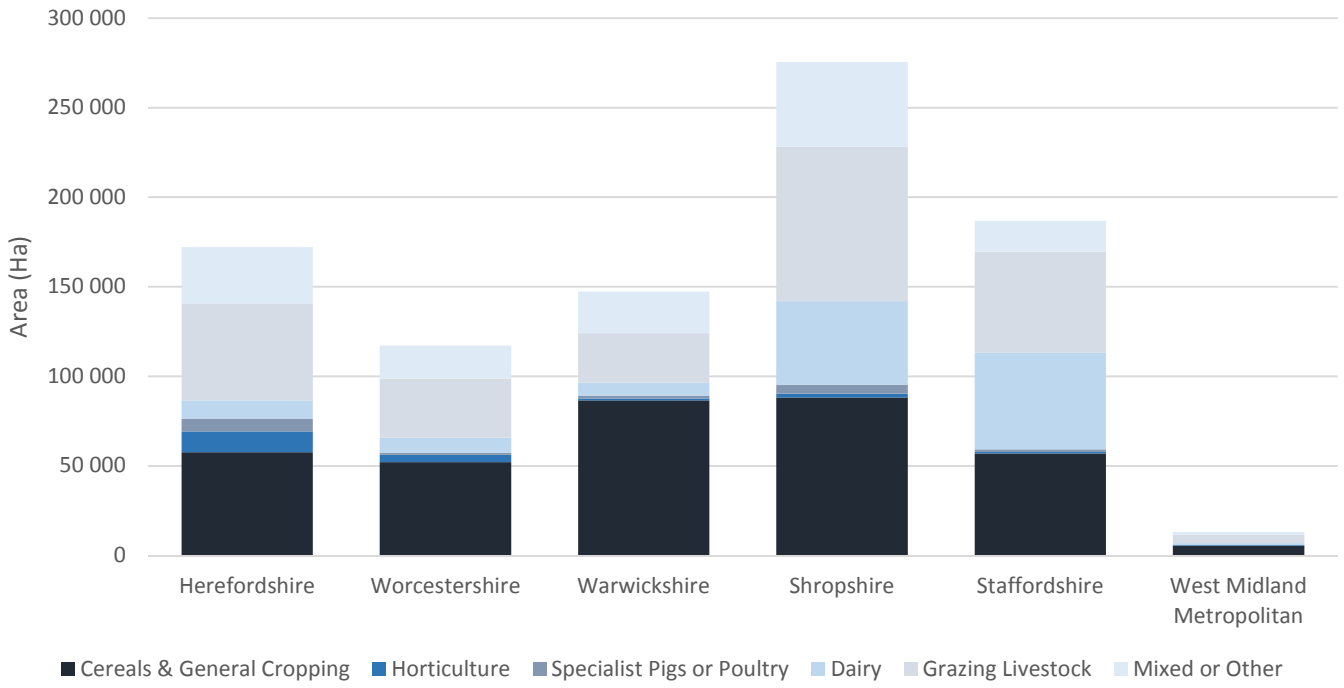
Figure 1 Agricultural & Horticultural Holdings and Area by County



	Herefordshire	Worcestershire	Warwickshire	Shropshire	Staffordshire	West Midland Metropolitan
Number of Holdings	2 649	2 072	1 797	3 664	3 232	275
Farmed Area (Ha)	172 246	117 165	147 381	276 904	186 826	14 890

The average holding size for the region is 66.9 hectares (ha), compared to an England average of 84.3ha. The county with the largest holding size is Warwickshire (82ha), the smallest is the West Midlands metropolitan country (54.2ha). Among other factors, holding size is linked to farm production type with arable farms typically requiring larger areas in order to remain economically viable. Figure 2 outlines farm output type broken down into counties. In terms of hectares, arable production is most significant as a proportion in Warwickshire and Worcestershire, whilst total output is largest in Shropshire. Dairy and grazing livestock are most significant in Herefordshire and Staffordshire.

Figure 2 Agricultural & Horticultural Production Type by County



It is estimated that 36,118 people were directly employed in agricultural production in the West Midlands in 2012, as a proportion this is broadly in line with the UK average. The 2011 Farm Business Survey estimated 764,000 head of cattle and calves, 2,090,000 sheep and lambs, 189,000 pigs and 17,499,000 head of fowl in the region. In total, Agriculture was been estimated to account for 0.87% of the region's Gross Value Added (2009 figures)[7].

Figure 3 West Midland Contribution to Farm Production in England[8]

- 10.3% of Total Agricultural Area
- 14.4% of UK Cattle and Sheep Production
- 15.9% of Potato Production
- 12% of Horticulture Production
- 11.80% of Gross Value Added for Agriculture

3 Food Businesses

According to a snapshot of the UK Government's Inter-Departmental Business Register taken in March 2012 and detailed in Figure 4, there are 26,635 food businesses in the West Midlands Region (using UK SIC 2007 classification codes covering food production, manufacturing and retailing and including local units of multi-sited businesses, e.g. retail chains). Of this figure, just over 40% are farmers and only 2.4% manufacture foods, according to the SIC code classification. Together, the food sector in the region generates nearly £31.5bn in annual turnover and employs approximately 342,000 people. Restaurants and food service account for significant proportions of this sector, representing 35% of total food businesses, 58% of employment and 30% of turnover. It should be noted that a discrepancy of nearly 3000 food producers exist between the agricultural survey data and the Inter-Departmental Business Register. This can be attributed to definitional differences.

Figure 4 Registered Food Businesses in the West Midlands

	Number of Businesses	Employment	Annual Turnover (Billions)
Agricultural Production	10,775	36,118	2.74
Food Manufacture	630	17,176	2.71
Wholesalers and agents	1,140	10,398	4.38
Retail	4,875	64,961	7.17
Restaurants & Food Service	9,215	198,593	9.42
Food Industry Total	26,635	341,975	31.49

Source: Inter Departmental Business Register, March 2012.

It can be assumed that SMEs dominate the sector, despite the business register including local units of non-local companies. The average employment levels for each sector (people/unit) are as follows: Agricultural Production (3.35); Food Manufacture (27.26); Wholesalers and agents (9.12); Retail (13.3) and Restaurants & Food Service (21.55). The size and diversity of the region mean that characterising dominant food supply chains is difficult. There are, however, a small number of very large employers. Cadbury's (Mondelēz International), Müller, Coors, Unilever, Dairy Crest, Walkers (Pepsico) and Nestlé are among the multinational food businesses with factories in the West Midlands. There are numerous

[7] Defra (2012) West Midlands Region Farm Business Survey Commentary 2011/12 available from http://www.farmbusinesssurvey.co.uk/regional/commentary/2011/westmidlands.pdf
[8] Ibid.

regional producers and speciality products with an international reputation. Marmite and Worcestershire sauce both come from the region, for example. The West Midlands also has six products with EU protected origin status and a further two in application (see below).

Existing	
Staffordshire Cheese	Protected Designation of Origin (PDO)
Herefordshire Cider	Protected Geographical Indication (PGI)
Herefordshire Perry	Protected Geographical Indication (PGI)
Worcestershire Cider	Protected Geographical Indication (PGI)
Worcestershire Perry	Protected Geographical Indication (PGI)
Under Application	
Evesham Asparagus	Protected Designation of Origin (PDO)
Birmingham Balti	Traditional Specialities Guaranteed (TSG)

A number of sub-regional databases exist for food businesses although they are not comprehensive enough to create a meaningful regional database or infer any reliable statistics.

4 Food Consumption

The Defra Family Food 2011 publication presents a regional breakdown of food consumption habits in the West Midlands as well as UK level analysis. Analysis of 3 year averages (2009-2011) indicates that food consumption in the West Midlands largely reflects UK levels as a whole. Comparing the English regions, West Midland residents are the highest consumers of potatoes and cereals and the lowest consumers of eggs, although it should be noted that regional differences are relatively small across food types. Regarding food expenditure however, the West Midlands region was the third lowest of nine with respect to household expenditure and the lowest spending region for eating out expenditure. West Midland consumers spent an average of £23.09 per person per week on all food & drink (excluding alcohol) compared with an English average of £24.28 and £25.89 in the South East of England.

	England	West Midlands
Household Expenditure		
Total all food & drink excluding alcohol	2428	2309 *(-5%)*
Total alcoholic drinks	299	267 *(-11%)*
Total all food & drink	2727	2576 *(-6%)*
Eating Out Expenditure		
Total all food & drink excluding alcohol	849	701 *(-7%)*
Total alcoholic drinks	309	300 *(-3%)*
Total all food & drink	1158	1001 *(-4%)*

Source: Defra (2012)[9]

On a national level, the report clearly shows a reduction in levels of food consumption and an increase in the proportion of household income spent on food since 2007 / 2008. This can be attributed to the combined effects of food price increases (including commodity price spikes in 2007/08 and 2011/12) and pressure on household incomes associated with the economic recession and reduction in public spending. The rise in foodbanks is a relatively high profile expression of these pressures. The Trussell Trust, the UK's leading foodbank

[9] Defra (2012) Family Food 2011 Report, p31.

provider, calculate that the number of people using their services has risen from around 61,000 in 2010/11 to 347,000 in 2012/13[10]. Whilst critics argue that there is a level of 'supply push' behind this phenomenon, there can be little doubt that food affordability and therefore access to healthy food are growing problems in the UK. The Trussell Trust operates around 33 foodbanks in the UK[11], with more in development. Numerous others are run by other organisations.

Regarding nutrition and dietary health trends, the NHS Health and Social Care Information Centre produce the annual report 'Statistics on Obesity, Physical Activity and Diet'. According to the 2013 edition, nationally, the proportion of overweight adults grew between 1993 and 2011 from 58% to 65% in men and from 49% to 58% in women. Only 24% of men and 29% of women daily consume the recommended five or more portions of fruit and vegetables. Average oily fish consumption for adults between 19 and 64 years old was 54g per week compared to the recommended amount of 140g. Other statistics have indicated that 70% of UK adults consume more than the recommended levels of salt[12]. The annual Health Survey for England provides a regional breakdown for some measures. The 2011 report[13] reports that the West Midlands is the English region with the highest proportion of overweight men (68%) and the third highest level for women (60%). The Marmot Social Determinants of Health Indicators 2012 report calculated Life Expectancy in the West Midlands at 77.9 years for men (compared with an English average of 78.6) and 82.2 years for women (compared with an English average of 82.6). The figure overleaf presents other public health related statistics for the West Midlands.

Proportion of Adults consuming alcohol on a weekly basis
- Male = 72%
- Female = 52%

Proportion of Children (2-15) overweight or obese
- Male = 32%
- Female = 30%

Heart Disease Incidence
- Male = 18%
- Female = 15%

5 Food Waste

Reliable food waste data is difficult to obtain for a number of reasons often but not exclusively connected with complexities associated with definitional issues and data collection. Moreover, regional data – beyond occasional ad-hoc studies – is virtually non-existent. At best, therefore, we can estimate the likely situation in the West Midlands by using national figures and assuming business and household demographics in the region reflect the UK as a whole.

According to the most recent study by WRAP (Household Food and Drink Waste in the UK 2012), the average household purchased about 27kg of food and drink per week in 2011 and failed to consume around 5.1kg (19%). Of this waste, approximately 3/5^{ths} may be

[10] Trussell Trust (2013) *The Trussell Trust's UK foodbank network*, p2.
[11] See http://www.trusselltrust.org/map
[12] Department of Health (2012) National Diet and Nutrition Survey -Assessment of dietary sodium levels in adults (aged 19 to 64 years) in England, 2011.
[13] Health Survey for England - 2011, Health, social care and lifestyles, NHS Health and Social Care Information Centre.

classed as ‘avoidable’ with around 1/5th considered ‘possibly avoidable’ and 1/5th ‘unavoidable’. Around 2/3rd of household food waste is collected by local authorities, roughly 1/5th is disposed via the sewerage system and the remainder either composted at home or fed to animals.

According to the last census (2011), there were 2.29 Million Households in the West Midlands region[14]. Combining this figure with the WRAP estimates above indicates that household food waste in the West Midlands region is around 3.2 Million tonnes a year, of which only 0.6 Million maybe considered as ‘unavoidable’.

Household food waste is of course only one element of total food waste. The 2013 WRAP report ‘Estimates of waste in the food and drink supply chain’ estimated that around 6.5 Million tonnes of supply chain waste occurs annually, with about 4.9 Million tonnes accruing in the manufacturing sector, the remaining losses taking place at the retail and wholesale stage. Although it is more problematic to assume the food supply sector in the West Midlands reflects the national sector profile, a simple calculation using business numbers from the Interdepartmental Business Register indicates that West Midlands is home to 7.83% of UK food businesses[15]. The total food waste accruing to food businesses in the region would therefore be around 509,000 tonnes per annum, of which that manufacturing sector produces approximately 384,000 tonnes. It is important to note, however, that these figures exclude agricultural waste and include packaging waste. Comparison with household data is therefore limited.

6 Conclusions

As this short report illustrates, published systematic data for food in the West Midlands is partial. Moreover, differences in data collection methodologies and units render comparison along supply chains, in particular, problematic. Even at its most basic level, the food sector can be measured in terms of business numbers, turnover, weight, employment and area (for production). In addition, the scale and scope of modern food systems means that ‘flows’ of food into, out of and within the region are extremely complex. Without conducting a comprehensive and resource intensive ad-hoc study, it is impossible to conduct both a meaningful and detailed analysis of West Midland’s ‘food DNA’.

Notwithstanding this, it is possible to present a picture of food in the West Midlands. It is clear that agricultural production in the region is strong and relatively diverse. The region contains approximately 10.3% of English agricultural land, 10.6% of the population and contributes to 11.8% of the total Gross Value Added of English agriculture. The similarly diverse and numerous food processing and retailing sectors would suggest that the region has significant capacity to develop and reconfigure both vertical supply chains and horizontal sectors in ways that support the development of food-smart cities to the benefit of the region. The development of the Universities West Midlands Food-Smart City project will contribute towards an understanding of whether a detailed ‘map’ of existing food activity is an effective building block towards developing food-smart cities.

[14] ONS (2013) 2011 Census: QS406UK Household size, local authorities in the United Kingdom.
[15] UK Total Food Businesses (SIC 2007 codes: 10,11,46.17,46.3 (excl. 46.35), 47.2 (excl 47.26), 47.81 & 56) = 204,885 units, according to the Inter Departmental Business Register snapshot taken on 12th March 2013.

Appendix III: Food and the City Course Curriculum Outline

Week One – theme: Drivers of Change

Lesson 1 Food in the city: the challenges facing urban food supply
This session introduces the course and outlines the fundamentals of why urban food systems are important and how they relate to growing global food security and sustainability challenges more generally. We communicate why this issue is important from a number of perspectives including businesses, policymakers, health professionals, educationalists, rural producers and urban consumers. We also outline the role of regions such as the West Midlands.

Lesson 2 Consumer Demands
This session attempts to understand existing and emergent consumption trends among urban consumers. This covers how interest in environmental sustainability, social equity, provenance and food as a social and sensory experience manifests itself in consumer trends such as local food, street food and pop-up restaurants. The scope and potential to 'harness' these developments in order to promote positive change is discussed, drawing upon case studies.

Week Two – theme: Production & Consumption Practices

Lesson 3 Growing in the City
The topic focuses on the renaissance of urban food production in cities around the world, ranging from conventional garden and allotment growing to modern movements such as community gardens and guerrilla gardening. We also consider the case for scalable initiatives which have the potential to compete with established supply channels.

Lesson 4 Consuming in the City: Culture and Gastronomy
This session focuses on how food is consumed in urban areas and related aspects such as the impact of multiculturalism and the rise of celebrity chefs and restaurateurs. We consider the opportunities associated with diverse communities such as those found in the West Midlands.

Week Three – theme: System Change

Lesson 5 Re-connecting the Food System
This topic looks at the relationship between urban consumers and other parts of the food system. In particular we consider the complex relationship between cities and their regional hinterlands and the potential for mutually beneficial production and consumption relationships.

Lesson 6 Planning for Food Smart Cities
This session outlines the scope cities hold to support more sustainable urban food systems and highlight the importance of effective and joined up planning systems. Planning for food smart cities ranges from the inclusion of procurement policies, planning guidance to zoning policies and purpose built eco-cities / garden cities.

Week Four – theme: Core challenges facing food and the city

Lesson 7 Environmental Concerns
This topic describes the impact the food system has on the environment, both in general terms and specifically within urban areas. As well as global environmental issues such as resource pressures (water, soil, energy) and climate change, this session covers micro-level concerns such as pollution, food waste and road transport.

Lesson 8 Food Poverty and Public Health

This session describes the complex relationships between food, poverty and health. Global health concerns around malnourishment and obesity will be outlined and related to the specificities of urban environments. Drawing on examples from the West Midlands and beyond, this topic provides an understanding how governments and third sector organisations can promote the skills and opportunities for individuals to avoid or escape hunger and food related ill health.

Week Five – theme: Organisational Change

Lesson 9 Communities Working Together
This session covers the ways communities and other grass root groups can come together to develop more sustainable food systems. It outlines both the main types of community initiatives and how they typically function, including with regard to organisational structure and finance.
Lesson 10 New Business Models
This topic concentrates on the business case for food smart cities and the potentially positive role of commercially focused organisations. A range of successful business models are outlined, drawing on appropriate case studies, along with the role of entrepreneurs. Consideration is given to both the empowering and destructive nature of commercial forces relevant to urban food systems.

Week Six – theme: Looking Forward

Lesson 11 Emerging Technologies
This topic looks at a series of emerging technologies that could play a vital role in urban areas becoming 'food smart'. As well as the technologies themselves, the importance of consumer / stakeholder acceptance of technology are discussed drawing on examples of technologies that have struggled to be accepted such as GM and irradiated food.
Lesson 12 The Future of Food in the City: what needs to be done?
The final topic reviews the learning gained from the course and discuss what steps can be put in place to manage a transition to a Food-Smart City. This is illustrated by examples of leading initiatives at the global level. Consideration is given to how individual cities and regions such as the West Midlands can mobilise themselves and the practical tasks for consumers, campaigners, entrepreneurs and public servants.