

## Guidance for Data Extraction Spreadsheet

### Section 1: Study Information

Column	Input	Guidance	Example Data Synthesis (how the data will be presented)
A: No.	Pre-populated	this number correlates to the full-text file for the study	NA
B: Title	Pre-populated	title of the study	NA
C: Authors	Pre-populated	authors of the study	NA
D: Publication	Free-text	the journal name	NA
E: Publication Year	Drop-down menu	5-year intervals for publication date	Trend of research interest in the topic. Bar chart.
F: Funding	Free-text	The main funding body/bodies	Who funds this type of research: government, international organizations, environmental donors, agri-food groups etc. Bar chart
G: Study Design	Drop-down menu	<p><b>Prevalence/Cross-sectional:</b> a study where both the exposure and outcome are known with the aim being to calculate prevalence in a group</p> <p><b>Experimental Trial:</b> a controlled trial where exposures are assigned by the investigator; can be random or not</p> <p><b>Cohort:</b> a study that follows a group of participants with a known exposure to determine their outcome; can be prospective or retrospective</p> <p><b>Case Control:</b> a study that investigates a group of participants with a known outcome to determine common exposures; prospective or retrospective, usually determines odds ratios</p> <p><b>SR &amp; MA:</b> systematic review &amp; meta-analysis</p> <p><b>Descriptive:</b> case studies or case series</p> <p><b>Qualitative:</b> studies where data is collected through interviews and questionnaires of participants, also includes mixed-methods studies</p> <p><b>Longitudinal/Time Series:</b> observational studies conducted over long periods of time (10-20 years)</p> <p><b>Quantitative Assessment:</b> risk analyses, economic studies</p>	What types of studies are being conducted on this topic; also quality of evidence (randomized controlled trials provide best quality, descriptive studies are poor). Bar chart.

		<b>Grey:</b> Conference proceedings, workshops etc	
H: Country	Free-text	Name of the country	Where is research on AMR in crops taking place? Are some regions prioritizing this topic (and others not)? Is research output by development status variable? Map.
I: City/Area	Free-text	Write the city or region if reported (less important than country)	NA
J: Study Objective	Free-text	The goals of the authors – what did they want to find out	NA


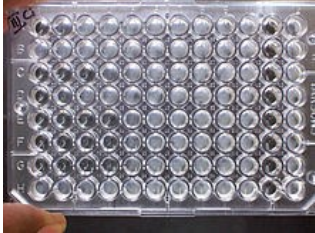
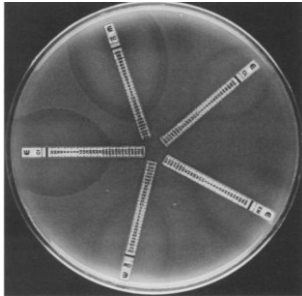
## Section 2: Sample Information

Column	Input	Guidance	Example Data Synthesis
K: Sampling Method Used	Drop down menu	<p><b>Non-probability:</b> includes <i>convenience</i> (e.g. selected fruit samples sold near the lab or collected fruit samples until a contaminated sample was found), <i>judgement</i> (selected samples of the fruit most likely to be contaminated with AMR), <i>purposive</i> sampling (selected samples of the most popular fruit type)</p> <p><b>Probability:</b> any random selection of samples, should be stated explicitly; also includes cluster sampling</p> <p><b>Not reported:</b> if the type of sampling isn't described, choose 'not reported'</p> <p>NA: for grey literature, SR&amp; MAs, Descriptive and Quantitative analyses</p>	What proportion of studies on AMR in crops use probability sampling versus non-probability sampling? This can give us an indication of how well we can extrapolate findings beyond the sample population. Bar chart.
L: Sample Source	Drop-down menu	<p>Sample source category:</p> <ul style="list-style-type: none"> <li>• Farm Crop – Vegetable</li> <li>• Farm Crop – Fruit</li> <li>• Soil</li> <li>• Manure</li> <li>• Other Fertilizer (e.g. chemical, compost, biochar)</li> <li>• Human Feces</li> <li>• Irrigation Water</li> <li>• Harvest/Processing (e.g. picking, washing, packaging)</li> <li>• Retail – Vegetable</li> <li>• Retail – Fruit</li> <li>• RTE (ready-to-eat: foods eaten without further cooking or</li> </ul>	Which parts of the food value chain from plant seed to retail food are finding AMR contaminated samples? Are there research gaps in some parts of the food chain? Heat map.

		preparation required: e.g. bagged spinach or juice <ul style="list-style-type: none"> <li>• Other (can use for genomic studies if it's unclear where the DNA came from)</li> </ul>	
M: Specific Sample Type	Free-text	Write down the specific sample name (banana; poultry litter; compost etc). I think we will include RTE foods that do not contain non-food crop samples (e.g. fruit juice, salad can be included but not chicken salad etc).	Which crops are being tested most frequently for AMR? Which crops have been found to have resistant bacteria on them? Infographic.
N: Number of Samples	Free-text	List out the number of samples taken of each sample type, if reported	NA, might give some evidence of quality of studies (e.g. 3 grapes sampled is not a very representative sample)

### Section 3: Methods

Column	Input	Guidance	Example Data Synthesis
O: Microbes Isolated	Drop-down menu	<ul style="list-style-type: none"> <li>• Escherichia coli: all serotypes</li> <li>• Salmonella enterica: all serotypes</li> <li>• Klebsiella pneumoniae</li> <li>• Enterococcus faecium/ E. faecalis</li> <li>• Listeria monocytogenes</li> <li>• Staphylococcus aureus</li> <li>• Acinetobacter baumannii</li> <li>• Bacillus spp (any species but especially B. cereus)</li> <li>• Shigella spp</li> <li>• Erwinia amylovora (bacterial cause of fire blight in apple and pear crops. Not a human pathogen but horizontal gene transfer to human pathogens of resistant genes reported)</li> <li>• Aspergillus fumigatus (fungi)</li> <li>• Xanthomonas spp (especially X. oryzae, which causes bacterial blight in rice)</li> </ul>	<p>Which microbes are most studied for AMR in crops?</p> <p>Bar chart.</p>
P: Serovars/Serotypes Reported	Free-text	Mainly for E. coli and Salmonella: if serotypes are reported, list these	NA but serotypes are associated with pathogenicity and virulence for human illness.

Q: Number of Isolates	Free-text	Number of microbial isolates detected on samples	NA
R: AMR Detection Method	Drop-down menu	<p><b>Disk diffusion:</b> antibiotic discs are placed on agar where bacteria have grown. The zone of inhibition is the area where the antibiotic stopped bacterial growth (also called Kirby-Bauer or agar-diffusion test).</p>  <p><b>Broth Microdilution:</b> microtiter plates are filled with broth and the bacteria as well as varying concentrations of the antimicrobial and then incubated. MIC is determined by the concentration that inhibited growth.</p>  <p><b>E-test:</b> a strip with a continuous gradient of antimicrobial on one side</p>  <p><b>PCR:</b> polymerase chain reaction – a method to amplify DNA through thermal cycling</p> <p><b>qPCR:</b> quantitative PCR, also called real-time or RTPCR.</p> <p><b>Sequencing:</b> the process of determining the nucleotide order of a DNA fragment; whole genome sequencing determines the complete structure of a genome. Also called third-generation sequencing, WGS, Next-generation or high-throughput sequencing.</p> <p><b>Metagenomics:</b> study of genetic material derived from the environment. Also called community genomics or environmental genomics.</p>	

S: Interpretive Criteria	Drop-down menu	CLSI: Clinical and Laboratory Standards Institute EUCAST: European Committee on Antimicrobial Susceptibility Testing CLSI & EUCAST NA	What are the most common tests used? Bar chart.
T: Breakpoint Criteria	Drop-down menu	<b>Clinical breakpoint values:</b> the highest plasma drug concentration that can safely be achieved in the patient. Determined using several clinical criteria and updated annually. <b>Epidemiological Cutoff Values:</b> measures of a drug MIC distribution that separate bacterial populations into those representative of a wild-type population and those with acquired or mutational resistance to the drug. <b>Usually abbreviated ECV (CLSI) or ECOFF (EUCAST).</b> <b>Not specified</b> NA	Clinical breakpoints are determined from clinical criteria so are less accurate for environmental microbes than epidemiologic values, however clinical breakpoints are far more commonly used.
U: Statistical Methods	Free-text	List any statistical methods/tests used	Types of statistical analysis being used

#### Section 4: Antimicrobial Susceptibility

Column	Input	Guidance	Example Data Synthesis
V - AK	r: resistant s: susceptible	AMP: ampicillin AMX: amoxicillin IPM: imipenem STR: streptomycin GEN: gentamycin TET: tetracyclines (any) CAZ: ceftazidime CTX: cefotaxime CST: colistin CIP: ciprofloxacin KAS: kasugomycin (only used on crops) VAN: vancomycin CHL: chloramphenicol ZSM: zhongshenmycin (only used in China on crops) MDR: multidrug resistance (resistance to more than 3 antibiotics) DMI: demethylation inhibitor (fungicides, e.g. imidazole class)	What types of resistant microbes are being detected on food crops? What is the most common resistance reported in the published literature? Heat map.

## Section 5: ARG

Column	Input	Guidance	Example Data Synthesis
AL: Reported Resistance Genes	Free-text	List the reported resistance genes per sample (e.g. crop type) if possible. Ensure samples were not pooled together before testing for ARG, as otherwise may not be able to distinguish what origin was. If too many genes to write out (>100) you can include a reference to the table they are listed instead of typing them out.	Most commonly detected resistance genes reported in the literature – table.

## Section 6: Transmission Information

Column	Input	Guidance	Example Data Synthesis
AM: Proportion of AMR contaminated sample	Free-text	If the proportion of samples that are contaminated with resistant microbes has been calculated, list the absolute numbers and percentage here. If the proportion has not been calculated but the absolute values are listed somewhere, please still report them.	What proportion of sampled crops contain resistant microbes of human pathogenic importance? Bar chart
AN: Risk Factors for Transmission	Free-text	List any odds ratios, risk ratios etc reported for risk factors. If risk factors have been suggested but not statistically evaluated, make sure this is clear in your entry: e.g. “the authors <i>suggest</i> [x] might be a risk factor for AMR persistence on...”	What type of risk factors have been determined for resistant microbes contaminating food crops? Table
AO: Evidence for Transmission Route	Free-text	Extract any hypotheses or results that specifically describe or indicate evidence of transmission of AMR from a source in the food value chain (soil, fertilizer, water, manure, processors, retailers) to food crops. Include any statistical evidence if given (significant findings and CIs).	What is the evidence for transmission of AMR through food crops? Possibly an infographic or table.