

CODEX ALIMENTARIUS COMMISSION



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Organization of
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World Health
Organization

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Agenda Item 9

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JOINT FAO/WHO FOOD STANDARDS PROGRAMME

CODEX COMMITTEE ON PESTICIDE RESIDUES

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DISCUSSION PAPER ON GUIDANCE TO FACILITATE THE ESTABLISHMENT OF MAXIMUM RESIDUE LIMITS FOR PESTICIDES FOR MINOR CROPS / SPECIALTY CROPS

(Prepared by the Electronic Working Group chaired by France
and Co-Chaired by Thailand, Kenya and India)

Background

Report of the 46th Session of CCPR

1. During the 46th Session of the Committee on Pesticide Residues (May 2014), the Delegation of France, as Chair of the Electronic Working Group on Minor Crops / Specialty Crops recalled that the key points of discussion in the Committee for the past four sessions referred to the definition and identification of minor crops and the minimum number of residue field trials necessary to support the establishment of maximum residue limits for pesticides for these commodities.

2. The Delegation also recalled that, in view of the difficulties in defining what minor crop is, the Committee had decided in 2012 that it would be more appropriate to focus its work on the development of criteria to determine the minimum number of field trials to support the establishment of MRLs for minor crops. Following this decision, the Committee had agreed on a set of criteria based on global consumption data (FAOSTAT Food Supply Quantity) and regional consumption data (GEMS/Foods cluster diets). The EWG Chair explained that selection of consumption data (rather than production area) was selected as the most reliable and complete source of information currently available to identify minor crops at international level and that the use of the regional consumption data adequately addressed those commodities, like yams or cassava, which could be a major crop in terms of consumption and/or production and/or cultivation area at a local level.

3. The Delegation explained that based on these consumption criteria the EWG had identified those crops where consumption was less than 0.5% globally and that these were listed in Table 2 of CRD 22¹. The EWG Chair informed the Committee that a minimum number of field trials had been proposed for each category and that these trial numbers related to the establishment of MRLs for single commodities and not Group MRLs.

4. The Delegation recalled the EWG refined a limited list of crops with national consumption data and other criteria (e.g. seasonal consumption) upon request from members.

5. The Committee noted concerns in relation to commodities currently considered as minor crops (e.g. lemon and kiwi) which became major crops following these additional recommendations and agreed that further work should be done in relation to this issue.

6. The Committee also noted that for spices, monitoring data could be provided as an alternative to submitting field residue trials. The EWG Chair explained that dealing with monitoring data was not in the scope of the EWG mandate.

Conclusions and recommendations

7. The Committee agreed that the issue of use of official letters, from regulatory agencies, containing information on authorised crops and GAP as an alternative to registered labels for MRL setting should be examined by the EWG when considering the guidance to facilitate the establishment of MRLs for pesticides for minor crops.

¹ CRD22 (Report of the in-session Working Group on Minor Crops held at the 46th Session of CCPR).

8. The Committee agreed to seek feedback from the 2014 JMPR on whether the proposed approach could be used as a starting point in determining the number of trials considered necessary in the setting of MRLs for minor crops.

9. The Committee agreed to establish an EWG, led by France and co-chaired by India, Kenya and Thailand, and working in English only, to refine the list of commodities in Tables 1 and 2 (CRD 22) for a limited set of borderline crops and to finalise the guidance document. The Committee noted that there was already ongoing work in the EWG on this issue, as shown in point 2 of CX/PR 14/46/12 (Rev) and in the last paragraph of CRD 22.

10. The Committee further agreed that the EWG would continue to identify issues and find solutions to facilitate the establishment of MRLs for minor crops based on establishment of Codex schedules and priority lists of pesticides.

11. With regard to the establishment of a "Minor Crops Interest Group", the Committee noted that in Codex there were no procedures for operation of such a group and that working groups should work within the mandate given by CCPR and, as such, only report back to Committee. However, the Committee noted that the task proposed for this group i.e. identification of issues and solutions to facilitate the establishment of MRLs for minor crops could be carried out by the CCPR EWG on minor crops.²

Establishment of the EWG on Minor Crops

12. Following the invitation sent to all member countries via the Codex Secretariat in August 2014, 48 participants joined the EWG representing 30 countries and international organizations (detailed list of participant available in Appendix I).

13. On December the 29th 2014, a first draft document was circulated for comments among members of the EWG. Comments were received from the delegations of Canada, Costa Rica, EU, Greece, The Netherlands, Thailand and USA. Comments were compiled in one table and are available upon request from the Codex Secretariat.

1: Feedback from the 2014 JMPR:

14. The EWG took note of the JMPR answer on the appropriateness of the approach taken for the identification of minor crops and the determination of minimum field trials necessary for the establishment of MRLs for pesticides for these commodities (See JMPR summary report, October 2014). JMPR reminds the Meeting uses expert judgment to assess whether there are sufficient data points support robust MRL. However the meeting also admitted the suggested minimum number of trials proposed for Categories 2 and 3 are not too dissimilar to current JMPR procedure.

15. Considering the absence of consumption data, both worldwide and national, for crops listed in category 1 and the fact that it unlikely that a specific MRL would be requested on those crops and only group MRL may apply, in order to consider the JMPR comments, the EWG recommends not to propose any number of trial for the crops listed in category 1.

2: Refine the list of commodities in Tables 1 and 2 (CRD 22) for a limited set of borderline crops.

16. During the 46th session of CCPR, some members and observers expressed their concerns about the classifications of lemons, kiwi fruits, pumpkins and yams in the group of crops for which worldwide consumption values are above the threshold of 0.5% of the total daily consumption/capita (listed in Table 1). The Meeting recommended the EWG to continue refining this limiting list of borderline crops.

– Lemons

17. Lemon consumption accounts for 0.3% of the total worldwide consumption (ie 4,153 g/capita/day), EU proposal to set MRL on lemons based on a minimum of 6 trials was not accepted by some members. National data show that in most of the countries, lemon consumption are low and only few country specific data are above the threshold and do not modify the worldwide lemon consumption.

18. It should be noted that very few CXL were set for Lemon only, among the 42 CXL that are currently valid for citrus fruits, only two are specific to lemon and correspond to old CXL. The common practice is therefore to apply for a group MRL on citrus.

² REP14/PR, paras 165-177, Appendix IV

19. In case a CXL specific to lemon is applied for, the EWG recommends a minimum of 5 trials to be required and lemon should be placed in category 3.

– Kiwi

20. Kiwi consumption accounts for 0.03% of the total worldwide consumption (ie 0,442 g/capita/day), which is below the threshold both worldwide and for individual clusters. Last year, EU asked for a minimum of 6 trials to set a CXL on kiwi based on high consumption level in some European countries. Several members and observers opposed the proposal to consider kiwi as a 'major' crop. The eWG admits the consumption level is quite important in few European countries, however these consumption levels are not likely to modify the established corresponding cluster consumptions. The EWG recommends that in order to consider the whole set of data available in an adequate way, kiwi fruits are set in category 3. It is also noted that recent CXL on kiwi fruits was set on the basis of 5 trials without any concern or comment by members and observers (Spirotetramate 2012)

– Pumpkins

21. Pumpkin consumption (including squash and gourds) accounts for 0.5% of the total worldwide consumption (ie 7,6 g/capita/day). During the 46th CCPR session, a member country asked for pumpkin to be included in category 3 because the group includes also squash and gourd and the total consumption was just below the threshold. The EWG noted that indeed pumpkins are just below the threshold value of 0,5% (0,492%) and therefore recommends pumpkins to be included in category 3.

22. It should be noted that only one CXL was set for pumpkins up to now and that the common practice is to set groups MRL for fruiting vegetable, cucurbits.

– Yams.

23. Yams consumption accounts for 0.6% of the total worldwide consumption (ie 9,0 g/capita/day). Yams is well above the threshold value of 0,5%. However some member country expressed their concern to see Yams placed in the table 1.

24. Only one CXL was set specifically on yams and it was based on 2 trials on yams and 4 on sweet potatoes (post harvest). At the moment, CXL on yams are likely to be covered by group MRL on root and tuber vegetable. It is also noted that although yams being a major crop it has not been selected as a representative commodity for tuberous and corm vegetable.

25. From the comments received during the round of comments, it appeared that the majority of members agreed that yam is a major contributor of food consumption both worldwide and in several clusters. However it was also noted that yam consumption is very low in a majority of clusters and is very high in at least four clusters where it appears to be a major food item (mainly "African" clusters). It was also recognized that CXL on yam can be obtained by extrapolation from other crops of the root and tuber vegetables (mainly potatoes and sweet potatoes) and that only one CXL on yam have been set up up to now.

26. It is recommended to place yams in table 3 according to the proposition of Kenya speaking on behalf of African countries during the CCPR 46th session, knowing that CXL on yam can be obtained from extrapolation from the root and tuber vegetable

27. Table 1 and 2 have been updated accordingly in the final document and included in the guidance to facilitate the establishment of MRLs for pesticides for minor crops (Annex 1)

3: Draft guidance to facilitate the establishment of MRLs for pesticides for minor crops

28. The EWG aims to propose a guidance document on minor crops for CCPR work. This work was initiated by the EWG from 2008 and a draft document was proposed in 2010 (CX/PR10/42/13) before the issue of minor crop definition was raised. A new draft document was presented last year (CX/PR 14/46/12 (Rev)) and updated this year including the classification of each commodity in the consumption categories, the agreed criteria selected for crop selection and recommendations to facilitate minor crops MRL settings.

4: Pilot project "minor crop data collection"

29. Considering that during last CCPR, The Committee agreed that the EWG would continue to identify issues and find solutions to facilitate the establishment of MRLs for minor crops based on establishment of Codex schedules and priority lists of pesticides, members of the EWG were consulted in the beginning of November:

30. It was proposed to conduct a pilot project, using the "Minor Crop Data Collection" proposed by the EWG on minor crops in 2013, it is a simple excel spread sheet to collect needs, existing label, GAP, residue data available and/or on going o be used by Codex member to support MRL proposals for minor crops in the framework of CCPR schedule and priority lists.

31. The table was beforehand filled with french data on minor crops for active substances considered in the priority list.

32. It was suggested that members fill this document with additional available/on going data of interest on minor crops for the same substances or others included in the priority list even if these data were not sufficient per se to establish a MRL, considering also that these data may complete a data set already proposed in the priority list or by a member of our EWG.

33. Members of the GMU steering committee in charge of data bases and data sharing were also consulted.

34. Data were sent by United States, Canada, Brazil and IR4

35. Netherlands and Germany pointed out the following difficulties considering the short deadline proposed:

- Identifying for which of the residue studies available it would be of interest to establish CXL and,
- Collecting the data and checking applicant's willingness to contribute to the list.

36. A member of the GMU steering committee in charge of data bases and data sharing mentioned that german Federal Länder's residue data were stored in a common database (part of EUMUDA) with public access and that an excel template to collect further information for this database from the EU member states was recently developed.

37. India sent 2009-2012 monitoring data on curry leaves (minor crop) for the pesticides that are on priority list of CCPR informing also that no GAP data was available at the moment on minor crops of India for providing that in the table. Curry leaves (and spices in general) are actually minor crops but monitoring data - used on the other hand by JMPR to establish MRLs on spices - are not considered in this document.

38. Considering the members of the EWG contributions, the following table has been sent to the EWG on priorities including:

- data on minor crops only
- data complementing residue trials already mentioned in the draft scheduled and priority list (extra trials on the same crop or crop group),
- data on supplemental commodities with a minimum of 4 trials (possibly from different regions)
- data not already submitted or to be submitted (ex: IR4 ongoing demand)
- data with a label available or soon available in one country

TOXICOLOGY	RESIDUE	Prioritisation Criteria	Commodities	Residue trials provided
	Pyrimethanil [Bayer CropScience] (226) France	Registered yes MRLs > LOQ yes	raspberry; black currant	FR data: raspberry (2), blackcurrant (4) (FR data could be added to residue trials on Blueberry (8); blackberry (3); raspberry (2) already scheduled in 2015)
	Pendimethalin (herbicide) (999) BASF – USA France	Registered yes MRLs > LOQ yes	celeriac	FR data: celeriac (4) (not yet registered in France) (FR data could be added to residue trials on celeriac (5) already scheduled in 2016)
	Difenoconazole (224) [Syngenta] France	Registered: not yet MRLs > LOQ yes	mint	FR data: mint (2) Awaiting information on additional european trials availability
	Imidacloprid (206) Bayer USA and Brazil (via EWG on minor crops)	Registered yes MRLs > LOQ yes	papaya	USA data: papaya (4) Awaiting information on additional brazilian trials availability

39. The EWG noticed a limited number of initial contributions and, furthermore, a limited number of possible proposals to eventually support MRL demands for minor crops in the framework of CCPR schedule and priority lists.

40. The conclusion of this pilot project seems to be that the time line of the priority list working group is too short to integrate a consultation of the minor crop working group leading to a significant contribution. One explanation may be that datasets need to be build up a long time in advance before submission and that the project to gather together data in the framework of the priority list working group didn't get full approval by all parties who hesitated to submit incomplete data sets.

41. So, the EWG recommends a direct contribution from Codex members, in the framework of the EWG on priority list, when they identify data of interest to establish CXL (available or ongoing). Furthermore, the EWG considers that earlier collaboration between members in the process would lead to more CXL demands for minor crops.

42. The ongoing development of a global need and data sharing database for minor crops by the GMU is a good way to identify projects of interest leading to CXL proposals including global data set.

43. At OECD level, a pilot project is also on going to develop collaborative data generation, focusing on priority minor uses and establishing a mechanism to allow sharing of minor use data.

44. The EWG recommends CCPR to invite Codex members to contribute to these projects.

5. Consideration by the 47th CCPR

45. The Committee is invited to consider the information provided and recommendations made under points 1. Feedback from the 2014 JMPR; 2. Refine the list of commodities in Tables 1 and 2 (CRD 22) for a limited set of borderline crops; 3. Draft guidance to facilitate the establishment of MRLs for pesticides for minor crops; and 4. Pilot project “minor crop data collection” in light of the mandate of the EWG given by the 46th CCPR³ and the reply from the 2014 JMPR⁴ in order to determine how to proceed further with work on minor crops / special crops in CCPR.

³ See paras 7-11 of this document.

⁴ See paras 14-15 of this document. The full reply of the 2014 JMPR can be found in report of the 2014 JMPR on general considerations – maximum residue limits for pesticides for minor/specialty crops (Section 2.7). The 2014 JMPR report is available for downloading at:

<http://www.fao.org/agriculture/crops/thematic-sitemap/theme/pests/jmpr/jmpr-rep/en/>

Annex 1: Draft guidance to facilitate the establishment of MRLs for pesticides for minor crops

1. Minimum number of trials to for setting MRL on minor crops

1. For setting MRL on minor crops, it is recognized that, due to lower importance in term of consumption, a lower number of trials than for major crops may be required.

2. In the past, the committee didn't agree on an international definition for minor crops. In order to assist member countries in identification of minor crops, it was considered appropriate to define criteria for use by CCPR and JMPR to determine the minimum number of trials necessary to support the establishment of MRLs for minor crops and to facilitate data submission to JMPR.

3. The committee had agreed on 3 categories based on consumption levels (% of total daily consumption/capita) for which a lower number of trials than for major crops can be required.

Category 1 - No data in FAO Stat and No GEMS Food Cluster data: to be considered on a case by case basis

Category 2 - < 0.5% worldwide and < 0.5% in all of the clusters: minimum of 4 trials

Category 3 - < 0.5% worldwide and > 0.5% in one or more clusters: minimum of 5 trials

4. A methodology was defined to assign crops to these categories. It is based on two tiers selection, the first tiers based on worldwide consumption and the second one on "local" consumption as defined in GEMS FOOD clusters (Annex).

5. In any case, it is recommended to the data submitter to present as many trials as possible to establish robust MRL. These trials must be usable to make a recommendation according to the Good Agricultural Practice. It has to be pointed out that this minimum number of trials is a recommendation and that JMPR, based on expert judgment, can require as many trials as necessary to constitute what can be considered a data set robust enough to set reliable MRL.

6. These minimum numbers of trials are only relevant to establish MRLs on individual crops. Group MRLs are not in the scope of this document. Furthermore, the use of monitoring data to set MRLs is neither considered in this document.

7. Based on this methodology, crops for which worldwide consumption values are above the threshold of 0.5% of the total daily consumption/capita are listed in Table 1. Crops for which worldwide consumption values are below this threshold of 0.5% enter the 3 above categories and are listed in Table 2.

8. These lists of crops were refined using national consumption data and on the request of member countries. On very specific cases, additional criteria were used considering seasonal crops that are major during part of the year and large portion instead of average consumption.

9. It is recommended that this list of crops and the minimum number of trials may be revised every 5 years in order to take into account the changes in worldwide consumption level and additional crops entering the codex classification.

2. Label

10. The Acceptance of residue field trial data available on a minor crop when there is no formal label available should be formalised by JMPR, the data should instead be accompanied by an official letter from a government agency that states the chemical is being used on the crop in that country and the letter outlines the use pattern (GAP) being used by growers in that country.

3. Global data set

11. It is recommended taking into account residue trials from different regions of the world for setting MRLs on minor crops.

12. Provided these data are conducted within the required 25% variation of the GAP, the JMPR is encouraged to accept data from several countries to support the establishment of a Codex MRL. On the other hand, there should also be acceptance of submissions on priority chemicals that are bundled from multiple countries and submitted by just one country that has agreed to take the lead on behalf of others.

13. This proposal is strengthened by the recommendation of the draft OECD Revised Crop Field Trial Guidance concerning geographical distribution of residue trials: “Based on the current evidence residue data generated at similar GAP in different geographical regions/climatic zones may be used as a consolidated global dataset for MRL setting” (evaluated data confirmed consistently that the variability of data within regions/climate is significantly higher than variability from trials across region/climate).

14. Considering furthermore that JMPR performs the evaluation of the submitted information and estimates maximum residue levels regardless of whether it represents worldwide use or is limited to a region and that Codex MRLs are applicable on imported products regardless of their origin. The use of global data set seems particularly relevant at Codex level.

4. Use of proportionality

15. The use of proportionality was recommended during the 45th session of CCPR. The Committee agreed that it was applicable to insecticides, fungicides, herbicides and plant growth regulators and that application rate is the only deviation from cGAP.

16. It was concluded that 100% scaled data could be used for large data set and that “at least 50% of trials at GAP may be requested on a case-by-case basis depending for example on the range of scaling factors”, and that some trials at GAP might be useful as confirmatory data. However using 100% scaled data may help facilitate setting MRLs even when a low number of trials is available for minor crops.

17. It is also encouraged to use proportionality principle on residue data from different parts of the world provided the overall uncertainty of the residue estimate is not increased.

18. In any case if distribution of the data appears not robust enough, JMPR can ask for more residue trial to complete the distribution.

5. Extrapolation

19. The EWG strongly recommends using existing extrapolation rules to set group MRL on minor crops according to the recommendations of the EWG on the revision of the Codex Classification for Foods and Feeds. It is recommended to identify the need for MRL on minor crops early in the priority list. This should allow for any active substance entering the priority list, to propose additional minor crops to the existing candidate crops and to identify the data package available worldwide the possible extrapolation. When group MRL could not be set (if insufficient trials were submitted for the representative(s) commodity(ies)) a limited number of additional trials could be planned to be available when the active substance is evaluated by the JMPR.

20. In case a minor crop is a representative commodity for a group of crop and a MRL is intended for the whole group, a sufficient number of trials should be required to cover the total group consumption level. In case a MRL is set only for the minor crop, a specific number of trials is required but no extrapolation is allowed to other crops based on this limited data set without considering the weight of the group in term of total consumption.

Table 1. List of crops for which consumption values are above the threshold of 0.5% worldwide total consumption.

CODEX CODE	Commodity	CODEX CODE	Commodity
001	CITRUS FRUITS	OR 0696	Palm fruit (oil)
FC 0003	Mandarin + mandarin-like hybrid	SO 0702	Sunflower seed*
FC 0004	Orange, sweet, sour + orange-like hybrid	012	FRUITING VEGETABLES OTHER THAN CUCURBITS
002	POME FRUITS	VO 0445	Peppers, sweet (incl. pim(i)ento) (bell pepper, paprika)*
FP 0226	Apple	VO 0440	Egg plant (aubergine)
FP 0230	Pear*	VO 0448	Tomato
003	STONE FRUITS	013	LEAFY VEGETABLES
FS 0013	Cherries*	VL 0466	Chinese cabbage, type pak-choi
FS 0014	Plum*	VL 0467	Chinese cabbage, type pe-tsai
004	BERRIES AND OTHER SMALL FRUITS	015	PULSES (dry harvested)
FB 0269	Grape	VD 0071	Beans (dry) (Phaseolus spp)
FB 0275	Strawberry*	VD 0072	Peas (dry) (Pisum spp, Vigna spp)
005	ASSORTED (SUB)TROPICAL FRUITS - EDIBLE PEEL	VD 0541	Soya bean (dry) (Glycine spp)
FT 0305	Olive*	016	ROOT AND TUBER VEGETABLES
006	ASSORTED (SUB)TROPICAL FRUITS-INEDIBLE PEEL	VR 0463	Cassava (Manioc, Tapioca)
FI 0327	Banana	VR 0508	Sweet potato
FI 0354	Plantain	VR 0577	Carrot
009	BULB VEGETABLES	VR 0589	Potato
VA 0385	Onion, bulb	VR 0596	Sugar beet
023	OILSEED	010	BRASSICA
SO 0495	Rapeseed*	VB 0041	Cabbage, head

011	FRUITING VEGETABLES, CUCURBITS	020	CEREAL GRAINS
VC 0046	Melons, except watermelon	GC 0640	Barley
VC 0424	Cucumber	GC 0645	Maize (corn)
		GC 0646	Millet
VC 0432	Watermelon	GC 0649	Rice
021	GRASSES FOR SUGAR OR SYRUP PRODUCTION	GC 0651	Sorghum (Chicken corn, Dari seed, Durra, Feterita)
GS 0659	Sugar cane	GC 0654	Wheat
022	TREE NUTS	024	SEED FOR BEVERAGES AND SWEETS
TN 0665	Coconut	SB 0716	Coffee beans
		066	TEAS
		DT 1114	Tea, green, black (black, fermented and dried)

* crops for which refinement criteria applied

Table 2: List of crops for which consumption values are below the threshold of 0.5% worldwide total consumption.

CODEX CODE	Commodity	Consumption weighted with population (g/hab/day)	% of total consumption	N° of Cluster > 0.5%	Consumption category	Comments
		tier 1		tier 2		
001	CITRUS FRUITS					
FC 0005	Shaddock or pomelo + shaddock-like hybrid	1.351	0.1%	1	3	
FC 0204	Lemon*	4.153	0.3%	3	3	
FC 0205	Lime	N/A	N/A	N/A	1	
002	POME FRUITS					
FP 0227	Crab-apple	N/A	N/A	N/A	1	
FP 0228	Loquat (Japanese medlar)	available under GEMS/FAO code 619: fruit fresh nes	N/A	N/A	2	
FP 0229	Medlar	available under GEMS/FAO code 619: fruit fresh nes	N/A	N/A	2	
FP 0231	Quince	0.174	0.01%	0	2	
003	STONE FRUITS					
FS 0240	Apricot	0.953	0.1%	0	2	
FS 0245	Nectarine	5.486	0.4%	4	3	
FS 0247	Peach					
004	BERRIES AND OTHER SMALL FRUITS					
FB 0019	Vaccinium berries (incl. Bearberry) (excl blueberries)	0.242	0.02%	0	2	
FB 0020	Blueberries					see vaccinium berries
FB 0021	Currants, red, black, white	0.309	0.02%	0	2	

CODEX CODE	Commodity	Consumption weighted with population (g/hab/day)	% of total consumption	N° of Cluster > 0.5%	Consumption category	Comments
FB 0264	Blackberries	available under GEMS/FAO code 558: berries nes	N/A	N/A	2	
FB 0266	Dewberries, incl boysen- & loganberry	available under GEMS/FAO code 558: berries nes	N/A	N/A	2	
FB 0267	Elderberries	available under GEMS/FAO code 619: fruit fresh nes	N/A	N/A	2	
FB 0268	Gooseberries	0.057	0.004%	0	2	
FB 0271	Mulberries	available under GEMS/FAO code 558: berries nes	N/A	N/A	2	
FB 0272	Raspberries, red, black	0.195	0.01%	0	2	
FB 0273	Rose hips	available under GEMS/FAO code 619: fruit fresh nes	N/A	N/A	2	
005	ASSORTED (SUB)TROPICAL FRUITS - EDIBLE PEEL					
FT 0287	Barbados cherry (acerola)	5,43	N/A	N/A	2	National data, 1 country
FT 0289	Carambola (= star fruit)	available under GEMS/FAO code 9024/603: Fruit. tropical fresh nes	N/A	N/A	2	
FT 0291	Carob (Locust Tree, St John's Bread)	0.068	N/A	N/A	2	no GEMS consumption data but FAO world production data/capita
FT 0292	Cashew apple	available under GEMS/FAO code 591: Cashewapple	N/A	N/A	2	

CODEX CODE	Commodity	Consumption weighted with population (g/hab/day)	% of total consumption	N° of Cluster > 0.5%	Consumption category	Comments
FT 0295	Date	2.249	0.1%	3	3	
FT 0297	Fig	0.305	0.02%	0	2	
FT 0300	Jaboticaba	N/A	N/A	N/A	1	
FT 0301	Jujube. Indian	available under GEMS/FAO code 619: fruit fresh nes	N/A	N/A	2	
FT 0302	Jujube. Chinese	available under GEMS/FAO code 619: fruit fresh nes	N/A	N/A	2	
FT 0303	Kumquats	available under GEMS/FAO code 512: citrus fruit nes	N/A	N/A	2	
FT 0307	Persimmon, Japanese	1.137	0.1%	0	2	
FT 0309	Rose apple	11.4			2	National data, 1 country
FT 0312	Tree tomato	N/A	N/A	N/A	1	
F10341	Kiwi Fruit*	0.442	0.03	0	3	
006	ASSORTED (SUB)TROPICAL FRUITS-INEDIBLE PEEL					
FI 0326	Avocado	1.257	0.1%	0	2	
FI 0329	Breadfruit	available under GEMS/FAO code 9024/603: Fruit. tropical fresh nes	N/A	N/A	2	
FI 0331	Cherimoya	available under GEMS/FAO code 9024/603: Fruit. tropical fresh nes	N/A	N/A	2	
FI 0332	Custard apple	available under GEMS/FAO code 9024/603: Fruit. tropical fresh nes	N/A	N/A	2	

CODEX CODE	Commodity	Consumption weighted with population (g/hab/day)	% of total consumption	N° of Cluster > 0.5%	Consumption category	Comments
FI 0334	Durian	available under GEMS/FAO code 9024/603: Fruit. tropical fresh nes	N/A	N/A	2	
FI 0335	Feijoa (Pineapple guava)	available under GEMS/FAO code 9024/603: Fruit. tropical fresh nes	N/A	N/A	2	
FI 0336	Guava	available under GEMS/FAO code 9024/603: Fruit. tropical fresh nes	N/A	N/A	2	Individual data provided in 2013
FI 0338	Jackfruit	available under GEMS/FAO code 9024/603: Fruit. tropical fresh nes	N/A	N/A	2	
FI 0339	Jambolan	N/A	N/A	N/A	1	
FI 0340	Java apple	N/A	N/A	N/A	1	
FI 0342	Longan	available under GEMS/FAO code 9024/603: Fruit. tropical fresh nes	N/A	N/A	2	
FI 0343	Litchi	available under GEMS/FAO code 619: fruit fresh nes	N/A	N/A	2	
FI 0345	Mango*	Individual data Gems Food 2006	<0,5%	5	3	Individual data provided in 2013
FI 0346	Mangosteen	available under GEMS/FAO code 571: Mangoes. mangosteens. guavas	N/A	N/A	2	Individual data provided in 2013
FI 0350	Papaya	3.174	0.2%	3	3	

CODEX CODE	Commodity	Consumption weighted with population (g/hab/day)	% of total consumption	N° of Cluster > 0.5%	Consumption category	Comments
FI 0351	Passion fruit	available under GEMS/FAO code 9024/603: Fruit. tropical fresh nes	N/A	N/A	2	
FI 0352	Persimmon, American	1.137	0.1%	0	2	
FI 0353	Pineapple	5.880	0.4%	6	3	
FI 0355	Pomegranate	available under GEMS/FAO code 619: fruit fresh nes	N/A	N/A	2	
FI 0356	Prickly pear (Indian fig)	available under GEMS/FAO code 619: fruit fresh nes	N/A	N/A	2	
FI 0358	Rambutan	available under GEMS/FAO code 603/9024: Fruit. tropical fresh nes	N/A	N/A	2	
FI 0359	Sapodilla	available under GEMS/FAO code 603/9024: Fruit. tropical fresh nes	N/A	N/A	2	
FI 0360	Sapote, black	available under GEMS/FAO code 603/9024: Fruit. tropical fresh nes	N/A	N/A	2	
FI 0364	Sentul	N/A	N/A	N/A	1	
FI 0365	Soursop (Guanabana)	0.134	N/A	N/A	2	National data, 1 country
FI 0367	Star apple	available under GEMS/FAO code 603/9024: Fruit. tropical fresh nes	N/A	N/A	2	
FI 0369	Tamarind (sweet)	available under GEMS/FAO code 619: fruit fresh nes	N/A	N/A	2	

CODEX CODE	Commodity	Consumption weighted with population (g/hab/day)	% of total consumption	N° of Cluster > 0.5%	Consumption category	Comments
009	BULB VEGETABLES					
VA 0380	Fennel, bulb	available under GEMS/FAO code 711: Anise. badian. fennel. corian and 463: Vegetables fresh nes	N/A	N/A	2	
VA 0381	Garlic	5.422	0.3%	1	3	
VA 0384	Leek	2.115	0.14%	1	3	
VA 0386	Onion, Chinese					
VA 0387	Onion, Welsh (Japanese bunching onion, multiplying onion)					
VA 0388	Shallot (i.e. dry harvested small onion)					
VA 0389	Spring onion					
010	BRASSICA					
VB 0402	Brussels sprouts	1.18	N/A	N/A	2	National data (15 countries)
VB 0405	Kohlrabi	0.78	N/A	N/A	2	National data (4 countries)
VB 0400	Broccoli	6.141	0.4%	3	3	
VB 0404	Cauliflower				3	
011	FRUITING VEGETABLES, CUCURBITS					
VC 0421	Balsam pear (Bitter cucumber, Bitter gourd, Bitter melon)	1,619	N/A	N/A	2	National data, 2 Countries.
VC 0422	Bottle gourd (Cucuzzi)	0,53	N/A	N/A	2	National data, one country
VC 0423	Chayote (Christophine)	1.325	N/A	N/A	2	National data, 4 countries

CODEX CODE	Commodity	Consumption weighted with population (g/hab/day)	% of total consumption	N° of Cluster > 0.5%	Consumption category	Comments
VC 0425	Gherkin	available under GEMS/FAO code 397:Cucumbers and gherkins	N/A	N/A	2	
VC 0427	Loofah, Angled (Sinkwa, Sinkwa towel gourd)	N/A	N/A	N/A	1	
VC 0428	Loofah, Smooth	N/A	N/A	N/A	1	
VC 0429	Pumpkins*	7.641	0.5%	8	3	
VC 0430	Snake gourd	N/A	N/A	N/A	1	
VC 0431	Squash, summer (courgette, marrow, zucchetti, zucchini)	available under GEMS/FAO code 394: pumpkins, squash and gourds			3	
012	FRUITING VEGETABLES OTHER THAN CUCURBITS					
VO 0444	Peppers, chili*	0.02	N/A	N/A	3	National data (20 countries)
VO 0442	Okra (Lady's finger)	2.388	0.2%	2	3	
VO 0443	Pepino (Melon pear, Tree melon)	N/A	N/A	N/A	1	
VO 0447	Sweet corn (corn-on-the-cob)	2.768	0.18%	3	3	
VO 0449	Fungi, edible (mainly wild, not including mushrooms)	1.142	0.1%	1	3	
VO 0450	Mushrooms (cultivated)					
013	LEAFY VEGETABLES					
VL 0269	Grape leaves	N/A	N/A	N/A	1	
VL 0460	Amaranth (Bledo)	Amaranthus caudatus available under GEMS/FAO code 9004/108: Cereals. nes	N/A	N/A	2	

CODEX CODE	Commodity	Consumption weighted with population (g/hab/day)	% of total consumption	N° of Cluster > 0.5%	Consumption category	Comments
VL 0464	Chard (silver beet)	available under GEMS/FAO code 463: Vegetables fresh nes	N/A	N/A	2	
VL 0465	Chervil	available under GEMS/FAO code 463: Vegetables fresh nes	N/A	N/A	2	
VL 0469	Chicory leaves (sugar loaf)	available under GEMS/FAO code 372: Lettuce and chicory	N/A	N/A	2	
VL 0470	Corn salad (lamb's lettuce)	0.132	N/A	N/A	2	National data, 1 country
VL 0472	Cress, garden	0.252	N/A	N/A	2	National data, 4 countries
VL 0473	Watercress	available under GEMS/FAO code 463: Vegetables fresh nes	N/A	N/A	2	
VL 0474	Dandelion leaves	0.01	N/A	N/A	2	National data, 3 countries
VL 0478	Indian mustard (Amsoi)	available under GEMS/FAO code 358: Cabbages and other brassicas	N/A	N/A	2	
VL 0479a	Japanese greens: Chrysanthemum leaves (Chrysanthemum spp)	0.56	N/A	N/A	2	National data, 1 country
VL 0479b	Japanese greens: Mizuna (Brassica rapa nipposinica)	N/A	N/A	N/A	1	
VL 0480	Kale (borecole, collards)	available under GEMS/FAO code 358: Cabbages and other brassicas	N/A	N/A	2	

CODEX CODE	Commodity	Consumption weighted with population (g/hab/day)	% of total consumption	N° of Cluster > 0.5%	Consumption category	Comments
VL 0481	Komatsuna	N/A	N/A	N/A	1	
VL 0482	Lettuce, head*	8,241	0,5%	4	3	National Data (20 countries) suggest 50% each variety
VL 0483	Lettuce, leaf*				3	
VL 0476	Endive	0.8	N/A	N/A	3	Individual data were submitted. European cluster might be above the threshold of 0.5%
VL 0485	Mustard greens	0.104	N/A	N/A	2	National data, 1 country
VL 0492	Purslane	0.067	N/A	N/A	2	National data, 2 countries
VL 0495	Rape greens	5.79	N/A	N/A	2	National data, 1 country
VL 0496	Rucola (arrugula, rocket salad, roquette)	0.23	N/A	N/A	2	National data, 4 countries
VL 0501	Sowthistle	N/A	N/A	N/A	1	
VL 0502	Spinach	4.776	0.3%	1	3	
VL 0505	Taro leaves	N/A	N/A	N/A	1	
VL 0506	Turnip greens (Namenia, Tendergreen)	N/A	N/A	N/A	1	
VL 0507	Kangkung (water spinach)	3.86	N/A	N/A	2	National data, 1 country
VL 0510	Cos lettuce	4.218	N/A	N/A	2	National data, 1 country
014	LEGUME VEGETABLES					
VP 0061	Beans except broad bean & soya bean (green pods & immature seeds) (Phaseolus spp)	3.216	0.2%	1	3	No individual Data were submitted. however the consumption is

CODEX CODE	Commodity	Consumption weighted with population (g/hab/day)	% of total consumption	N° of Cluster > 0.5%	Consumption category	Comments
VP 0062	Beans, shelled (immature seeds)	3.216	0.2%	1	3	very high for some countries
VP 0063	Peas (green pods & immature seeds) (Pisum spp, Vigna spp)	3.014	0.2%	1	3	No individual Data
VP 0064	Peas, shelled (immature seeds) (Pisum spp, Vigna spp)	3.014	0.2%	1	3	
VP 0520	Bambara groundnut (immature seeds) (Voandzeia spp)	available under GEMS/FAO code 9016/203: Groundnuts and bambara Shelled/Bambara beans	N/A	N/A	2	
VP 0522	Broad bean (green pods & immature seeds) (Vicia spp)	0.485	0.03%	0	2	
VP 0523	Broad bean, shelled (immature seeds) (Vicia spp)					
VP 0541	Soya bean (immature seeds) (Glycine spp)	available under GEMS/FAO code 236: Soybeans	N/A	N/A	2	
VP 0542	Sword bean (young pods and bean) (Canavalia spp)	available under GEMS/FAO code 211: Pulses. nes	N/A	N/A	2	
VP 0553	Lentil (young pods) (Lens spp)	1.150	0.1%	1	3	
015	PULSES (dry harvested)					
VD 0523	Broad bean (dry) (Vicia spp)	1.049	0.1%	0	2	
VD 0524	Chick-pea (dry) (Cicer spp)	2.97	0.2%	1	3	
VD 0531	Hyacinth bean (dry) (Lablab spp)	available under GEMS/FAO code 211	0.1%	0	2	no individual data (pulse_nes)

CODEX CODE	Commodity	Consumption weighted with population (g/hab/day)	% of total consumption	N° of Cluster > 0.5%	Consumption category	Comments
VD 0537	Pigeon pea (dry) (Cajanus spp)	1.107	0.1%	0	2	
VD 0533	Lentil (dry) (Lens spp)	1.150	0.1%	1	3	
VD 0545	Lupin (dry) (Lupinus spp)	0.378	-	N/A	2	no GEMS consumption data but FAO world production data/capita
016	ROOT AND TUBER VEGETABLES					
VR 0469	Chicory, roots	0.111	0.01%	1	3	
VR 0494	Radish	available under GEMS/FAO code 463: Vegetables fresh nes	N/A	N/A	2	
VR 0497	Swede (rutabaga)	available under FAO code 463: Vegetables fresh nes	N/A	N/A	2	
VR 0498	Salsify (Oyster plant)	available under FAO code 463: Vegetables fresh nes	N/A	N/A	2	
VR 0504	Tannia (tanier, yautia)	0.118	0.01%	1	3	
VR 0505	Taro (dasheen, eddoe)	2.378	0.2%	6	3	
VR 0506	Turnip, garden	available under GEMS/FAO code 426: Carrots and turnips	N/A	N/A	2	grouped with carrot. no individual data. however turnip consumption are assumed to be very low compared to carrot's.
VR 0573	Arrowroot	available under GEMS/FAO code 149: Roots and Tubers. nes	N/A	N/A	2	

CODEX CODE	Commodity	Consumption weighted with population (g/hab/day)	% of total consumption	N° of Cluster > 0.5%	Consumption category	Comments
VR 0574	Beetroot	0.98	N/A	N/A	2	National data (17 countries)
VR 0575	Burdock, greater or edible	0,855	N/A	N/A	2	National data, country
VR 0578	Celeriac	available under GEMS/FAO code 463: Vegetables fresh nes	N/A	N/A	2	
VR 0583	Horseradish	available under GEMS/FAO code 463: Vegetables fresh nes	N/A	N/A	2	
VR 0585	Jerusalem artichoke	available under GEMS/FAO code 149: Roots and Tubers. nes	N/A	N/A	2	
VR 0587	parsley. turnip-rooted	available under GEMS/FAO code 463: Vegetables fresh nes	N/A	N/A	2	
VR 0588	Parsnip	available under GEMS/FAO code 463: Vegetables fresh nes	N/A	N/A	2	
VR 0590	Radish, black	available under GEMS/FAO code 463: Vegetables fresh nes	N/A	N/A	2	
VR 0591	Radish, Japanese (Chinese radish, Daikon)	available under GEMS/FAO code 463: Vegetables fresh nes	N/A	N/A	2	
VR 0600	Yams*	9.075	0.6%	5	3	

CODEX CODE	Commodity	Consumption weighted with population (g/hab/day)	% of total consumption	N° of Cluster > 0.5%	Consumption category	Comments
017	STALK AND STEM VEGETABLES					
VS 0469	Witloof chicory (sprouts)	N/A	N/A	N/A	1	
VS 0620	Artichoke globe	0.485	0.03%	0	2	
VS 0621	Asparagus	2.417	0.2%	0	2	
VS 0622	Bamboo shoots	available under GEMS/FAO code 463: Vegetables fresh nes	N/A	N/A	2	
VS 0623	Cardoon	available under GEMS/FAO code 463: Vegetables fresh nes	N/A	N/A	2	
VS 0624	Celery	available under GEMS/FAO code 463: Vegetables fresh nes	N/A	N/A	2	
VS 0626	Palm hearts	0.211	N/A	N/A	2	National data, 6 countries
VS 0627	Rhubarb	available under GEMS/FAO code 463: Vegetables fresh nes	N/A	N/A	2	
020	CEREAL GRAINS					
GC 0641	Buckwheat	0.133	0.01%	0	2	
GC 0643	Hungry rice (fonio)	0.074	0.005%	0	2	
GC 0644	Job's tears	adlay or Job's tears (Coix lacryma-jobi) available under GEMS/FAO code 9004/108: Cereals. nes	N/A	N/A	2	
GC 0647	Oats	0,760	0.05%	0	2	

CODEX CODE	Commodity	Consumption weighted with population (g/hab/day)	% of total consumption	N° of Cluster > 0.5%	Consumption category	Comments
GC 0648	Quinoa	0.026	-	-	2	no GEMS consumption data but FAO world production data/capita
GC 0650	Rye	1.842	0.1%	3	3	
GC 0653	Triticale	5.5	-	-	2	no GEMS consumption data but FAO world production data/capita.
GC 0655	Wild rice	N/A	N/A	N/A	1	
021	GRASSES FOR SUGAR OR SYRUP PRODUCTION					
GS 0658	Sorgho or sorghum, sweet	N/A	N/A	N/A	1	
022	TREE NUTS					
TN 0295	Cashew nut	1.129	0.1%	1	3	
TN 0660	Almonds	0.421	0.03%	0	2	
TN 0662	Brazil nut	0.022	0.001%	0	2	
TN 0664	Chestnuts	0.488	0.03%	0	2	
TN 0666	Hazelnut	0.146	0.01%	0	2	
TN 0669	Macadamia nut	available under GEMS/FAO code 434: Nuts. nes	N/A	N/A	2	
TN 0672	Pecan	available under GEMS/FAO code 434: Nuts. nes	N/A	N/A	2	
TN 0673	Pine nut	available under GEMS/FAO code 434: Nuts. nes	N/A	N/A	2	
TN 0675	Pistachio nut	0.168	0.01%	0	2	
TN 0678	Walnut	0.380	0.02%	0	2	

CODEX CODE	Commodity	Consumption weighted with population (g/hab/day)	% of total consumption	N° of Cluster > 0.5%	Consumption category	Comments
?	Arecanut	0.353	0.02%	0	2	No codex code found. But under the FAO code 236:Arecanuts
023	OILSEED					
SO 0090	Mustard seed	0.153	0.01%	0	2	
SO 0691	Cotton seed	5.875	-	0	2	expressed in raw commodities: standard industrial yield used. For cottonseed oil. a factor of 5 was applied from oil to seed: 1.175 x 5 = 5.875 g prod/hab/day
SO 0692	Kapok	0.145	-	-	2	no GEMS consumption data but FAO world production data/capita
SO 0693	Linseed (Flax-seed)	0.830	-	-	2	no GEMS consumption data but FAO world production data/capita
SO 0697	Peanut, shelled (groundnut)	6.077	0.4%	4	3	
SO 0698	Poppy seed	0.012	0.001%	0	2	
SO 0699	Safflower seed	0.045	0.003%	0	2	
SO 0700	Sesame seed	0.772	0.05%	0	2	
024	SEED FOR BEVERAGES AND SWEETS					
SB 0715	Cocoa beans	1.272	0.1%	0	2	
SB 0717	Cola nut	0.091	0.01%	0	2	

CODEX CODE	Commodity	Consumption weighted with population (g/hab/day)	% of total consumption	N° of Cluster > 0.5%	Consumption category	Comments
027	HERBS					
HH 0624	Celery leaves	available under GEMS/FAO code 463: Vegetables fresh nes	N/A	N/A	2	
HH 0720	Angelica, including Garden Angelica	0,002	N/A	N/A	2	National data 1 country
HH 0722	Basil	0,104	N/A	N/A	2	National data 11 countries
HH 0723	Bay leaves	available under GEMS/FAO code 723: Spice. nes	N/A	N/A	2	
HH 0727	Chives	available under GEMS/FAO code 407: Leeks. other alliaceous veg	N/A	N/A	2	
HH 0730	Dill	available under GEMS/FAO code 723: Spice. nes	N/A	N/A	2	
HH 0731	Fennel	available under GEMS/FAO code 711: Anise. badian. fennel. corian and 463: Vegetables fresh nes	N/A	N/A	2	
HH 0733	Hyssop	N/A	N/A	N/A	1	
HH 0735	Lovage	N/A	N/A	N/A	1	
HH 0736	Marjoram (incl Oregano)	available under GEMS/FAO code 463: Vegetables fresh nes	N/A	N/A	2	
HH 0738	Mints	0.031	0.002%	0	2	

CODEX CODE	Commodity	Consumption weighted with population (g/hab/day)	% of total consumption	N° of Cluster > 0.5%	Consumption category	Comments
HH 0740	Parsley	available under GEMS/FAO code 463: Vegetables fresh nes	N/A	N/A	2	
HH 0741	Rosemary	0.003	N/A	N/A	2	National data, 4 countries
HH 0743	Sage and related salvia species	0.01	N/A	N/A	2	National data, 4 countries
HH 0745	Savory, summer, winter	available under GEMS/FAO code 463: Vegetables fresh nes	N/A	N/A	2	
HH 0749	Tarragon	available under GEMS/FAO code 463: Vegetables fresh nes	N/A	N/A	2	
HH 0750	Thyme	available under GEMS/FAO code 723: Spice, nes	N/A	N/A	2	
HH 0751	Land cress	N/A	N/A	N/A	1	
028	SPICES					
HS 0624	Celery seed	available under GEMS/FAO code 463: Vegetables fresh nes	N/A	N/A	2	
HS 0730	Dill seed	available under GEMS/FAO code 723: Spice, nes	N/A	N/A	2	
HS 0731	Fennel, seed	available under GEMS/FAO code 711: Anise, badian, fennel, corian and 463: Vegetables fresh nes	N/A	N/A	2	

CODEX CODE	Commodity	Consumption weighted with population (g/hab/day)	% of total consumption	N° of Cluster > 0.5%	Consumption category	Comments
HS 0771	Anise seed	0,181	0.01%	0	2	
HS 0773	Caper buds	available under GEMS/FAO code 463: Vegetables fresh nes	N/A	N/A	2	
HS 0774	Caraway seed	available under GEMS/FAO code 711: Anise, badian, fennel, corian	N/A	N/A	2	
HS 0775	Cardamom seed	0.033	0.002%	0	2	
HS 0777	Cinnamon bark	0.061	0.004%	0	2	
HS 0778	Cloves. buds	0.019	0.001%	0	2	
HS 0779	Coriander, seed	available under GEMS/FAO code 711: Anise, badian, fennel, corian	N/A	N/A	2	
HS 0780	Cumin seed	available under GEMS/FAO code 711: Anise, badian, fennel, corian	N/A	N/A	2	
HS 0782	Fenugreek, seed	available under GEMS/FAO code 723: Spice, nes	N/A	N/A	2	
HS 0783	Galangal, rhizomes	0.00005	N/A	N/A	2	National data, 1 country
HS 0784	Ginger, root	0.504	0.03%	0	2	
HS 0786	Juniper, berry	available under GEMS/FAO code 711: Anise, badian, fennel, corian	N/A	N/A	2	
HS 0787	Liquorice, roots	N/A	N/A	N/A	1	

CODEX CODE	Commodity	Consumption weighted with population (g/hab/day)	% of total consumption	N° of Cluster > 0.5%	Consumption category	Comments
HS 0788	Mace	available under GEMS/FAO code 702: Nutmeg, mace and cardamoms	N/A	N/A	2	
HS 0789	Nutmeg	available under GEMS/FAO code 702: Nutmeg, mace and cardamoms	N/A	N/A	2	
HS 0790	Pepper (black, white)	0.171	0.01%	0	2	
HS 0792	Pimento, fruit (allspice fruit)	available under GEMS/FAO code 689: Chillies and peppers, dry	N/A	N/A	2	
HS 0794	Turmeric, root	0.028	N/A	N/A	2	National data, 2 countries
HS 0795	Vanilla, beans	0.004	0.0002%	0	2	
057	DRIED HERBS					
DH 1100	Hops, dry	0.008	0.0005%	0	2	
066	TEAS					
DT 0446	roselle, dry	N/A	N/A	N/A	1	
DT 1110	camomile or chamomile	0.001	N/A	N/A	2	National data, 1 country
DT 1111	Lemon verbena (dry leaves)	N/A	N/A	N/A	1	
DT 1112	lime blossoms	N/A	N/A	N/A	1	
DT 1113	mate (dry leaves)	0.335	0.02%	0	2	

* crops for which refinement criteria applied

Annex 2: Methodology to assign crops into consumption categories:

Tiers 1 Calculation:

Tier one ranking was calculated from GEMS/FOOD Cluster Diet as follow:

Items from the same origins were grouped together. Basic grouping was proposed to have only one item per crop if possible, which is more in line with the process of MRL setting and residue trials, for example all commodities containing wheat and wheat extracts were tentatively grouped together.

For each country, consumption data (GEMS/FOOD five years average: 2002-2007) were compiled in accordance with the predefined list for each group of commodities, the corresponding consumption value were added.

Then, each compiled consumption value was weighed with the corresponding country population and divided by the world population. The resulted sum for each commodity consequently simulates better the relative importance of each commodity in the world and was considered to fit better with the tier 1 approach.

Hence, for each commodity, the following calculation was realized:

$$\%_i = \left(\frac{\sum_c \frac{\text{consumption}_{i,c} \times \text{population}_c}{\text{population}_w}}{\sum_c \frac{\text{total consumption}_c \times \text{population}_c}{\text{population}_w}} \right) \times 100$$

- $\%_i$: percentage of the commodity "i" in worldwide
- $\text{consumption}_{i,c}$: consumption of the commodity "i" in the corresponding country "c" (g/hab/day):
- $\text{total consumption}_c$: total consumption (including sugars, beverages and commodities from animal origins, etc.) in the corresponding country "c" (g/hab/day):
- population_c : population in the country "c" (hab)
- population_w : world population (hab)

Tiers 2 calculation:

Tier 2 focuses on different existing consumption profiles within each cluster. Indeed a crop considered of minor importance calculated on a world basis could be of relative high importance in a national diet (depending on the quantity and variety of crops or commodities consumed in the country).

The clustering system gathers together similarities between diets and gets a good overview of consumption profiles in the world. Nevertheless, in order not to influence excessively the results by a high local consumption inside a cluster, and in addition since a very local consumption is in all likelihood not the commodity the most subjected to international trade and consequently for which a CXL is required, each country consumption was weighted by its population inside its cluster to get a better consumption profile of the cluster. This better takes into account the real number of consumer within each cluster.

Hence, for each commodity and each cluster, the following calculation was realized:

$$\%_j = \left(\frac{\sum_c \frac{\text{consumption}_{j,c} \times \text{population}_c}{\text{population}_z}}{\sum_c \frac{\text{total consumption}_c \times \text{population}_c}{\text{population}_z}} \right) \times 100$$

- $\%_j$: percentage of the commodity "j" in the cluster
- $\text{consumption}_{j,c}$: consumption of the commodity "j" in the corresponding country "c" (g/hab/day):
- $\text{total consumption}_c$: total consumption (including sugars, beverages and commodities from animal origins, etc.) in the corresponding country "c" (g/hab/day):
- population_c : population in the country "c" (hab)
- population_z : total population in the cluster (hab)

Annex 3: List of Participants

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