Preliminary results of the 2020 Zambia Food Consumption and Micronutrient Status Survey

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Background

- Zambia has a high burden of under-nutrition with stunting levels around 35 %.

- Prevalence differentials in the rates for stunting between rural and urban areas also imply rural-urban inequity.

- Elsewhere stunting is also used as proxy for Zinc deficiency.

Background 2

- Micronutrient deficiencies are in general of public health concern in Zambia.

- Anaemia for example, a proxy of iron deficiency is a severe public health problem, with no significant reduction in anaemia among children 6 to 59 months over the past two decades

Background 3

- Vitamin A deficiency is also of concern with previous reports indicating a prevalence of 54% in 2003

- Recent studies have also indicated that hypervitaminosis A may be co-existing with Vitamin A Deficiency

- Prevalence of neural tube defects (Vitamin B9 deficiency) in Zambia is unknown but cases encountered in health facilities show this should not be ignored

Background – Programme response

- To address micronutrient deficiencies and undernutrition, Zambia has put in place various interventions:
  - Dietary modification
  - Micronutriment Supplémentation
  - Food Fortification

Rationale for the survey

- While multiple interventions are implemented over years to address micronutrient deficiencies throughout the country, there are considerable knowledge gaps in the coverage and effects of those interventions.

- Representative, population-based survey data are necessary to inform policy makers and programme managers on the scope and quality of programme coverage and the potential impact of programmes on reducing micronutrient deficiencies in the country.

Rationale 2

- A national Food Consumption and Micronutrient status survey was therefore conducted in 2020/2021 in order to fill the information gap

Objectives of the survey

- To assess population micronutrient status by evaluating dietary intake and nutrient status among specific groups (6-23 months; 10-14 years; & Women in the Reproductive Age group)

Objectives of the survey 2

1) Prevalence of micronutrient deficiencies in children 6-59, Adolescent girls 10-14 years, and Women of Reproductive Age (WRA) 15-49 at provincial and national levels.

2) Daily intake of macronutrients (energy, protein, fat and carbohydrates) and critical vitamins and minerals (calcium, iron, zinc, vitamin A, vitamin C and B-vitamins) for children 6-59 months, Adolescent girls 10-14 years, and Women of Reproductive Age (WRA) 15-49 years at provincial and national levels.

Objectives of the survey 3

3) Household and individual coverage of fortified sugar and iodized salt and contribution to total diet intake of vitamin A and iodine at provincial and national levels;

4) Individual coverage of the following nutrition interventions implemented at scale at the national and provincial level:

- Receipt of vitamin A supplementation for children 6-59 months of age based on recall period of 6 months;

- Receipt of postnatal vitamin A supplementation for women of WRA within 8 weeks of delivery based on the recall during their most recent pregnancy.

- Receipt of deworming tablets for children 12-59 months of age in the previous 6 months

- Zinc supplementation for the treatment of diarrheal for children 6 – 59 months

Methodology

- This was a cross-sectional, countrywide representative survey of selected children 6 to 59 months; adolescent girls aged 10 to 14 years and WRA 15 to 49 years
- The Gibson & Ferguson Modified interactive 24-hour recall for assessing the adequacy of nutrient intakes methodology was used.
- Blood samples were collected from the antecubital vein for micronutrient status assessment
- Salt and sugar samples were collected for adequacy of fortification

Sample calculation

$$n = z^2 * \left\{ \frac{p * (1 - p)}{d^2} \right\} * DEFF$$

Where:

n = sample size

z= for a 95% confidence interval (1.96)

p = expected prevalence (fraction of 1)

d = Desired absolute precision

DEFF = Design Effect (2)

Sample calculation

National and Provincial Level: Number of required survey participants for key target groups and indicators

Target Group	Number per Province	Number of Provinces	Total Number of Participants (National level)
Households			
Salt sample	540	10	5,400
Sugar sample	540	10	5,400
Individual food consumption			
Children 6-59 months	453	10	4,530
Adolescents girls 11-19 years	540	10	5,400
WRA 15-49 years	540	10	5,400
Adult men aged 21-59 years	540	10	5,400
Individual biological indicators			
Children 6-59 months	453	10	4,530
Adolescents girls 11-19 years	318	10	3,800
WRA 15-49 years	360	10	3,600
Adult men aged 21-59 years	318	National	318

Ethical clearance

- Obtained from Tropical Diseases Research Centre Ethics Review Committee

- Permission was granted by the National Health Research Authority

- Informed consent was obtained from participants ≥ years of age and assent for children < 18 years of age
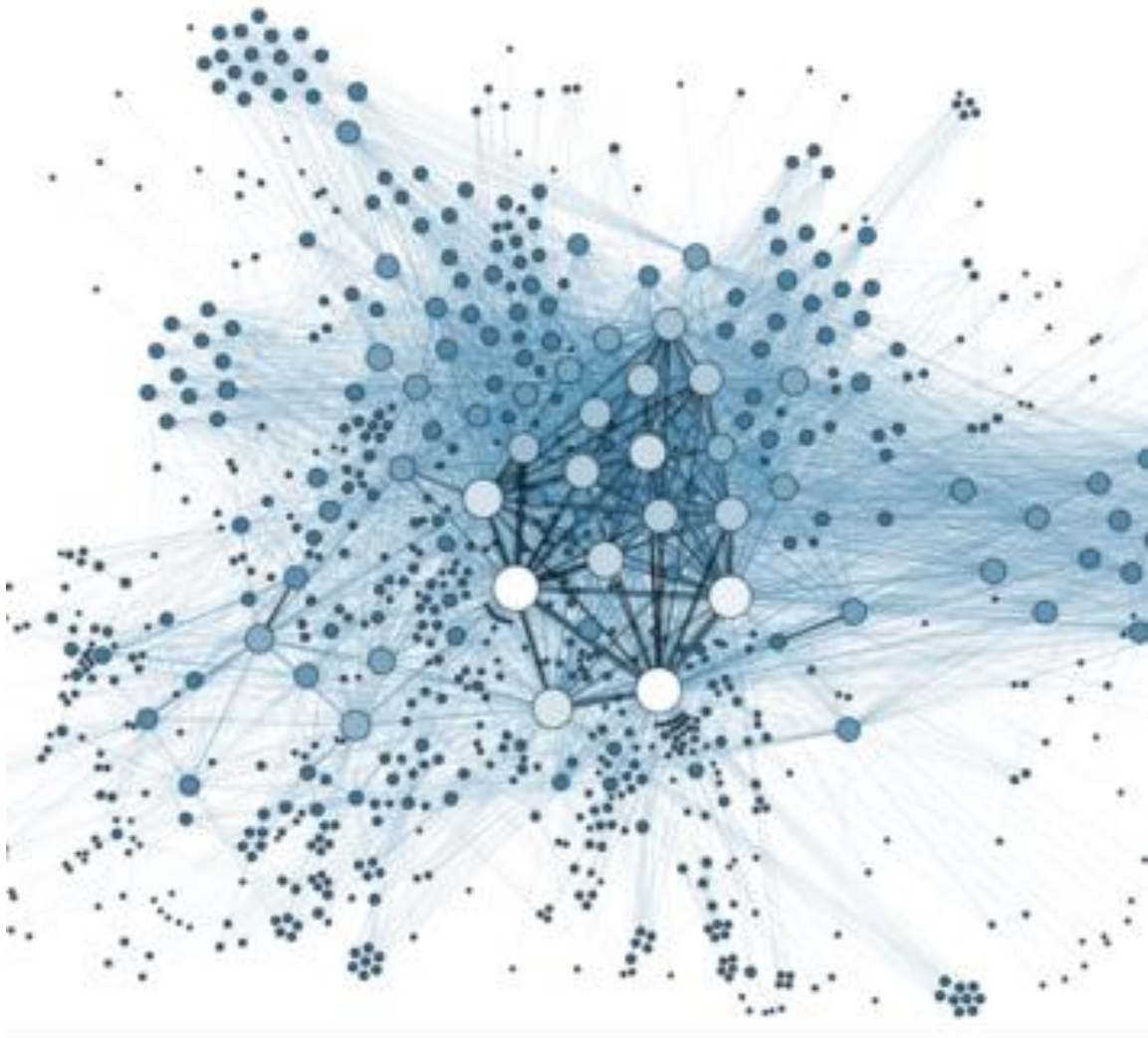
RESULTS

NOTE: In this presentation data on nutrient intake will not be presented as analysis is being finalized. A final report is expected at the end of July

Characteristics of survey participants

	Residence		
Characteristic	**Rural**	**Urban**	
Mean household size	5.4	5.1	5.3
Household head Education level			
Primary	72.4	27.6	100
Secondary	40.1	59.9	100
Higher education	22.3	77.7	100
No education	81.6	18.4	100
Total	**55.7**	**44.3**	**100**

Characteristics of survey participants 2

Age group	Region			
	Rural		Urban	
	n	%	n	%
6-59 Months	1084	78.6%	296	21.4%
10-14 YRS	745	72.0%	290	28.0%
WRA	2177	71.3%	877	28.7%
Total	**4006**	**73.2%**	**1463**	**26.8%**

Sample characteristics at Provincial level

Province	6-59 Months		10-14 YRS		WRA		Total	
	n	%	n	%	n	%	n	%
Total	1380	25.2%	1035	18.9%	3054	55.8%	5469	100.0%
CENTRAL	92	19.4%	114	24.0%	269	56.6%	475	100.0%
COPPERBELT	85	17.0%	105	21.0%	310	62.0%	500	100.0%
EASTERN	189	28.3%	100	14.9%	380	56.8%	669	100.0%
LUAPULA	70	15.6%	91	20.3%	288	64.1%	449	100.0%
LUSAKA	81	21.5%	87	23.1%	208	55.3%	376	100.0%
MUCHINGA	159	27.9%	99	17.4%	312	54.7%	570	100.0%
NORTHERN	209	35.4%	106	17.9%	276	46.7%	591	100.0%
NORTH--WESTERN	162	25.4%	120	18.8%	355	55.7%	637	100.0%
SOUTHERN	158	29.4%	92	17.1%	288	53.5%	538	100.0%
WESTERN	175	26.4%	121	18.2%	368	55.4%	664	100.0%

Coverage of biofortified foods

- only 10 percent of households across the country with women of reproductive age and with children aged 2 years and below were using vitamin A rich maize.

- only 25 percent of households were using Vitamin A rich sweet potato

- Only 19.9 percent of households with women in the reproductive age and with children under the age of 2 years were using iron and zinc rich beans.

Utilisation of the orange maize among households

Response	Frequency	Percent
Use of Orange maize		
Yes	227	9.9
No	2057	90.1
Total	**2284**	**100.0**
Frequency use of orange maize		
Always	22	9.8
Often	33	14.7
Sometimes	99	44.0
Rarely	71	31.6
Total	**225**	**100.0**

Proportion of households consuming the orange fleshed sweet potato

Response	Frequency	Percentage
Use of orange fleshed sweet potato		
Yes	555	24.1%
No	1744	75.9%
Total	**2299**	**100.0%**
Frequency of consumption of orange fleshed sweet Potato		
Always	41	7.5%
Often	103	18.8%
Sometimes	238	43.4%
Rarely	167	30.4%
Total	**549**	**100.0%**

Proportion of households reported using Mbereshi Beans (Zinc & Iron rich)

Response	Frequency	Percentage
Use of Mbereshi Beans		
Yes	409	17.9%
No	1877	82.1%
Total	2286	100.0%
Frequency consumption of Mbereshi Beans		
Always	43	10.5%
Often	206	50.2%
Sometimes	0	0.0%
Rarely	156	38.0%
Not sure	5	1.2%

Source of biofortified foods

Biofortified food	National		Rural		Urban	
	N	N %	N	N %	N	N %
Orange maize						
Purchased	63	28.5%	38	23.3%	25	43.1%
Own production	128	57.9%	104	63.8%	24	41.4%
Other	30	13.6%	21	12.9%	9	15.5%
Orange Fleshed Sweet Potato						
Purchased	299	54.5%	137	39.6%	162	79.8%
Own production	214	39.0%	186	53.8%	28	13.8%
Other	36	6.6%	23	6.6%	13	6.4%
Iron & Zinc rich beans (Mbereshi)						
Purchased	281	68.9%	162	60.7%	119	84.4%
Own production	86	21.1%	77	28.8%	9	6.4%
Other	41	10.0%	28	10.5%	13	9.2%

Percentage households using fortifiable foods

	Cooking oil		Wheat Flour		Mealie meal	
	Yes	No	Yes	No	Yes	No
Central	97.1	2.9	42.8	57.2	98	2
Copperbelt	100	0	25.6	74.4	99.7	0.3
Eastern	95.3	4.8	11.3	88.7	100	0
Luapula	99.3	0.7	14.8	85.2	99.8	0.3
Lusaka	99.7	0.4	34.5	65.5	99.9	0.1
Muchinga	98.4	1.6	26.9	73.1	98.8	1.2
Northern	87.1	13	6.7	93.3	95.1	4.9
North-Western	96.8	3.3	15.7	84.3	99.3	0.6
Southern	96.1	3.9	26.7	73.2	99.9	0.1
Western	66	34.1	1	99	95.3	4.7
Total	95.3	**4.7**	23.1	**76.9**	99	**1.1**

Biomarker analysis

Adequacy of fortification

National vitamin A content in sugar samples from participating households

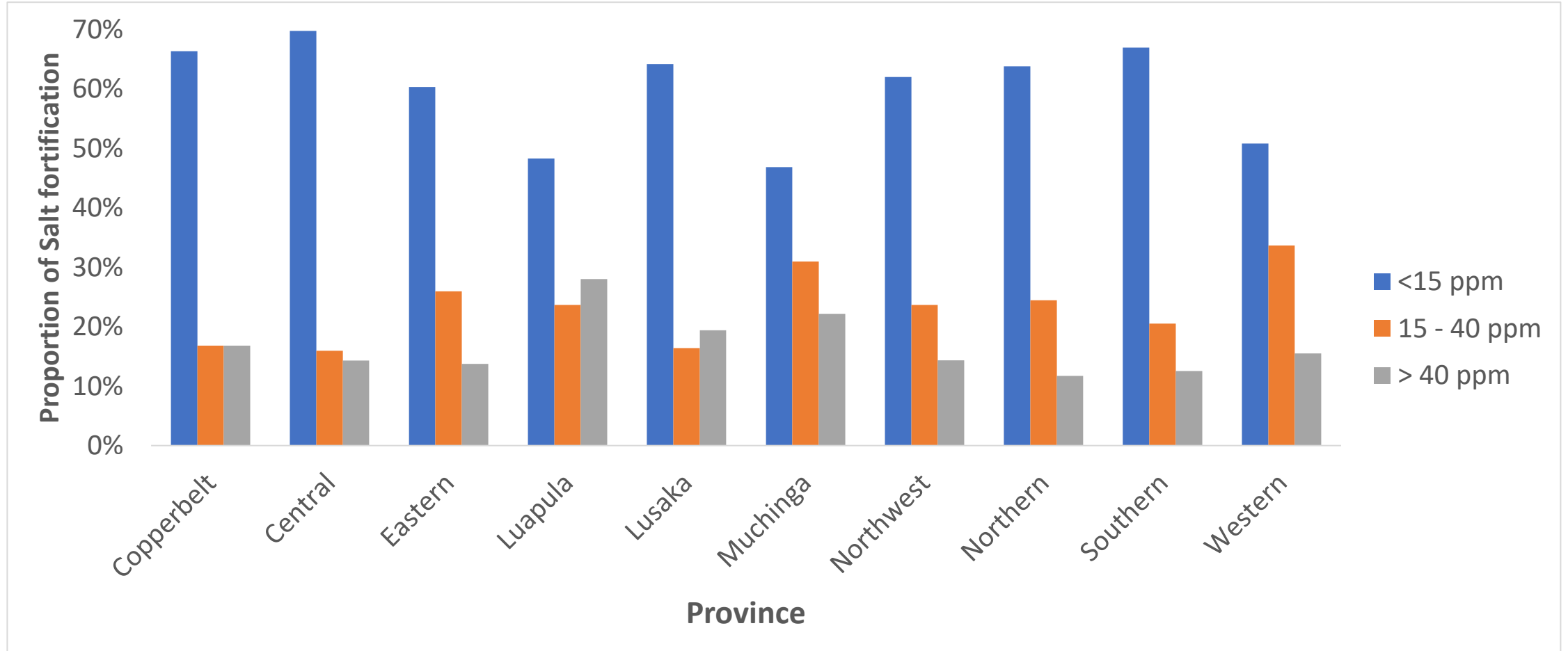| Limits	Number of samples	Proportion (%)
Not adequate (<10mg/Kg)	974	78
Adequate (≥10mg/Kg)	275	22
Total	1249	100

Adequacy of vitamin A fortification in sugar per province
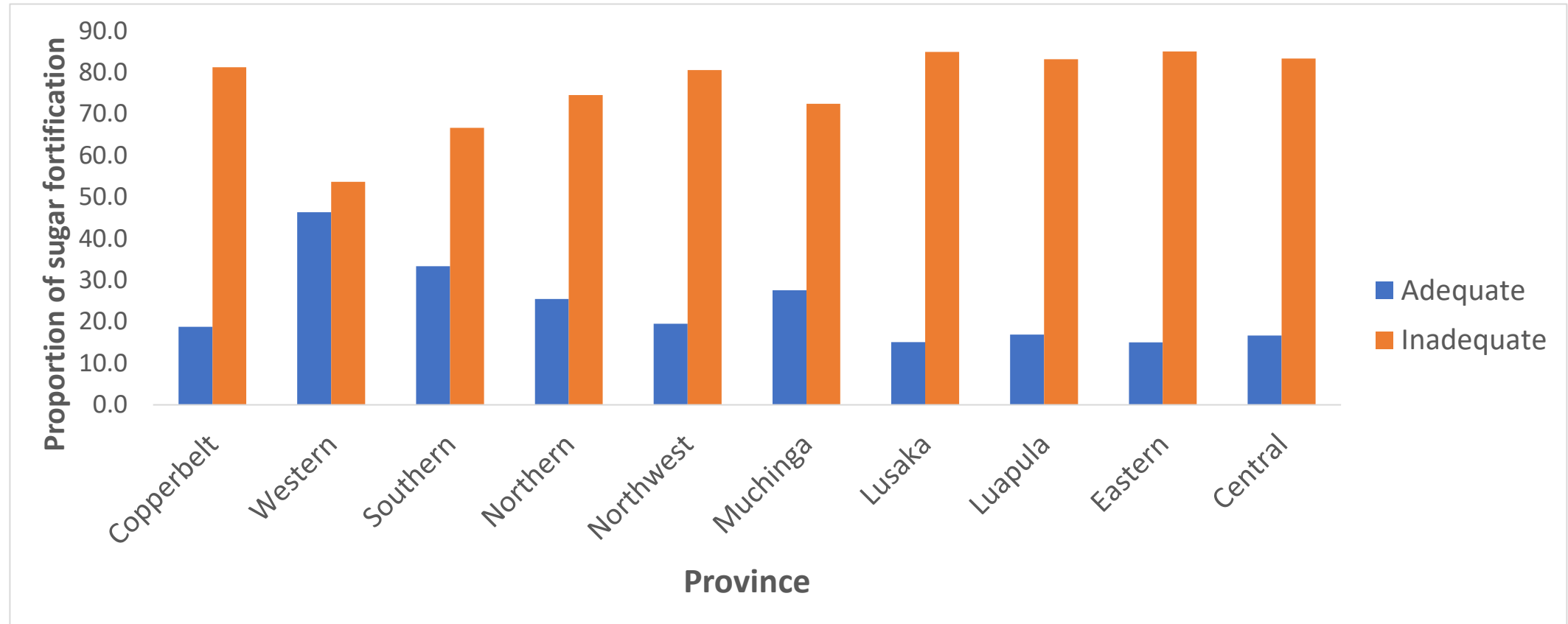
Iodine concentrations in salt samples
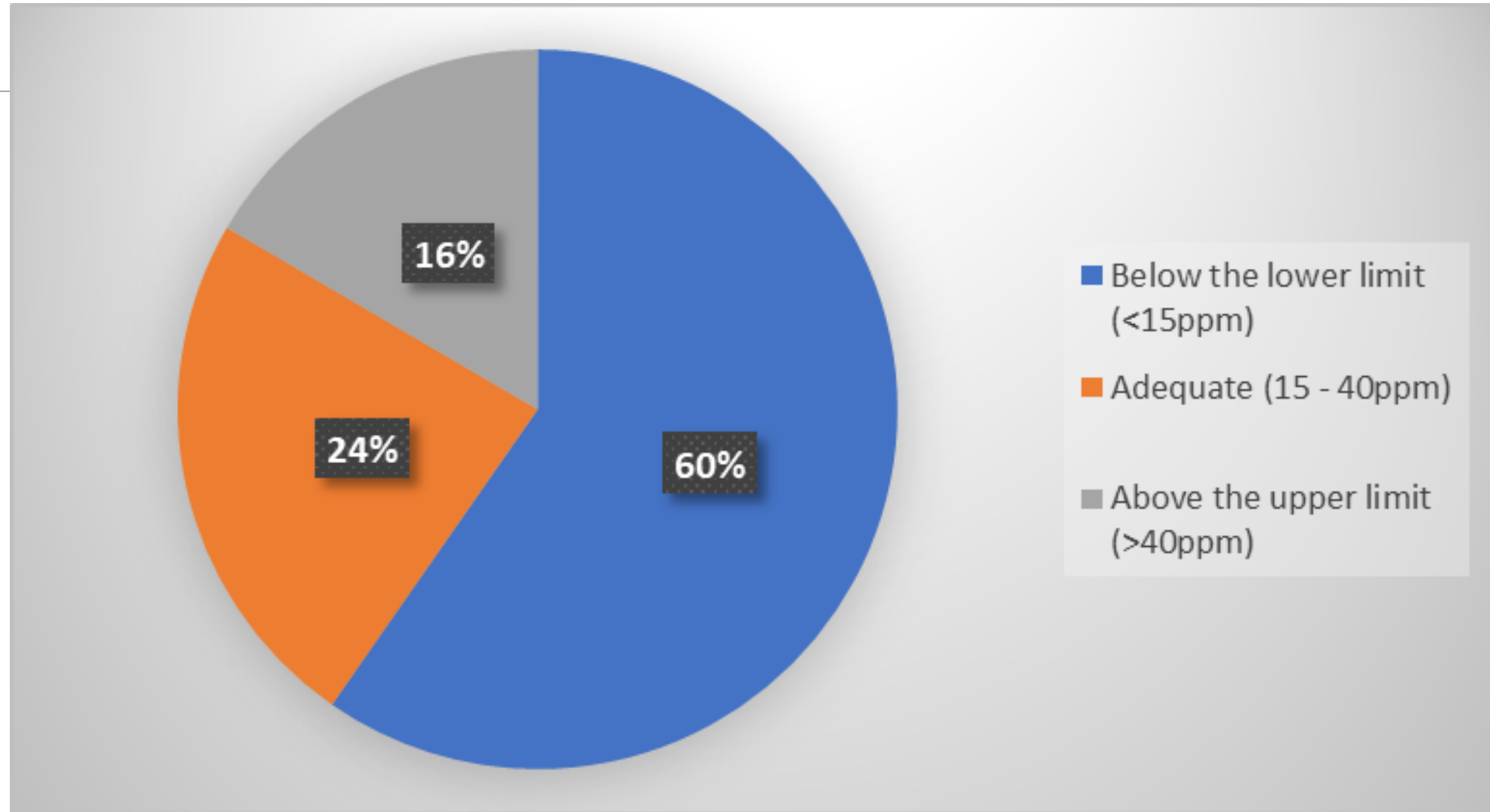
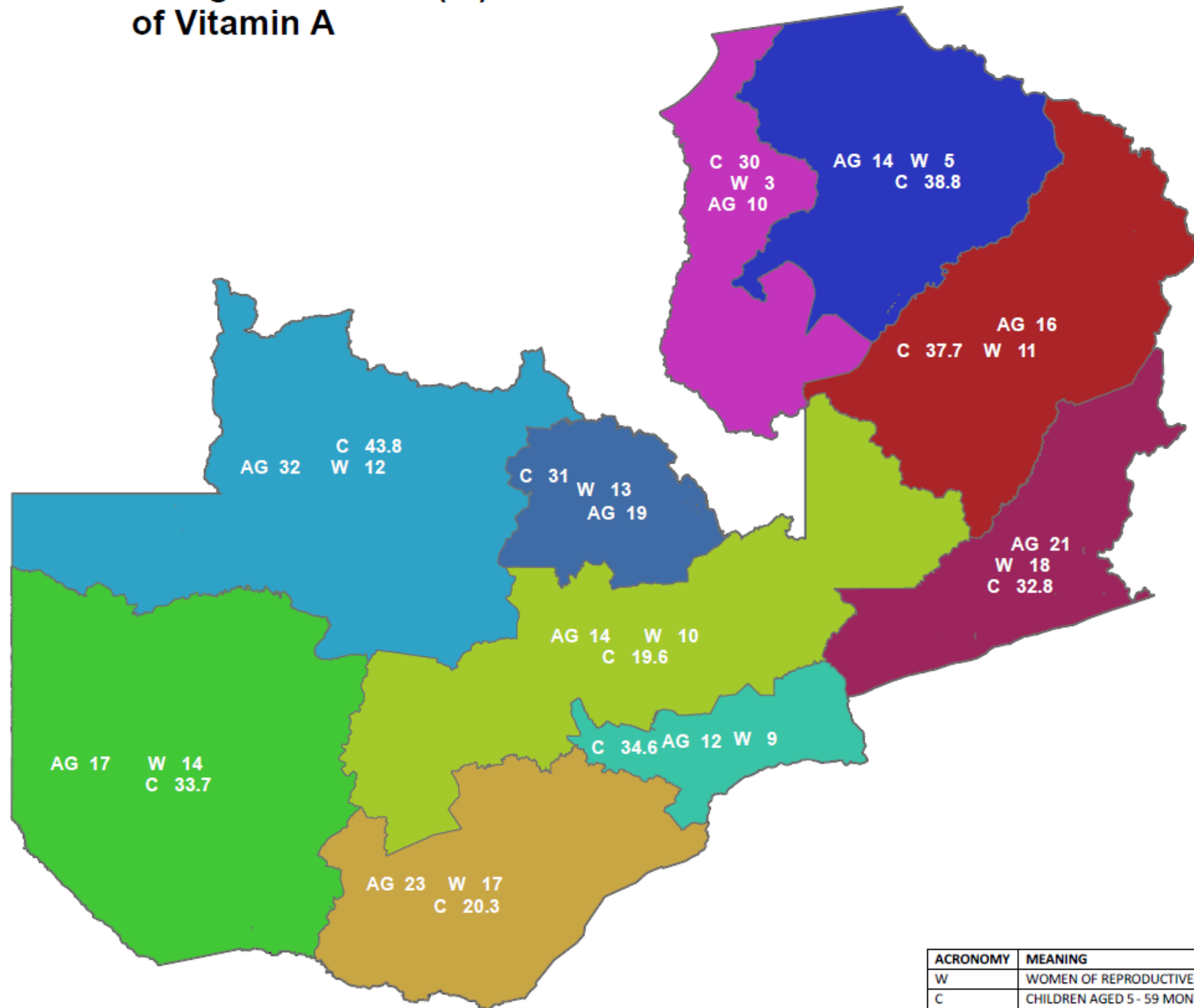# Iodine concentrations in salt samples by province

Micronutrient status

Micronutrient Deficiencies - National
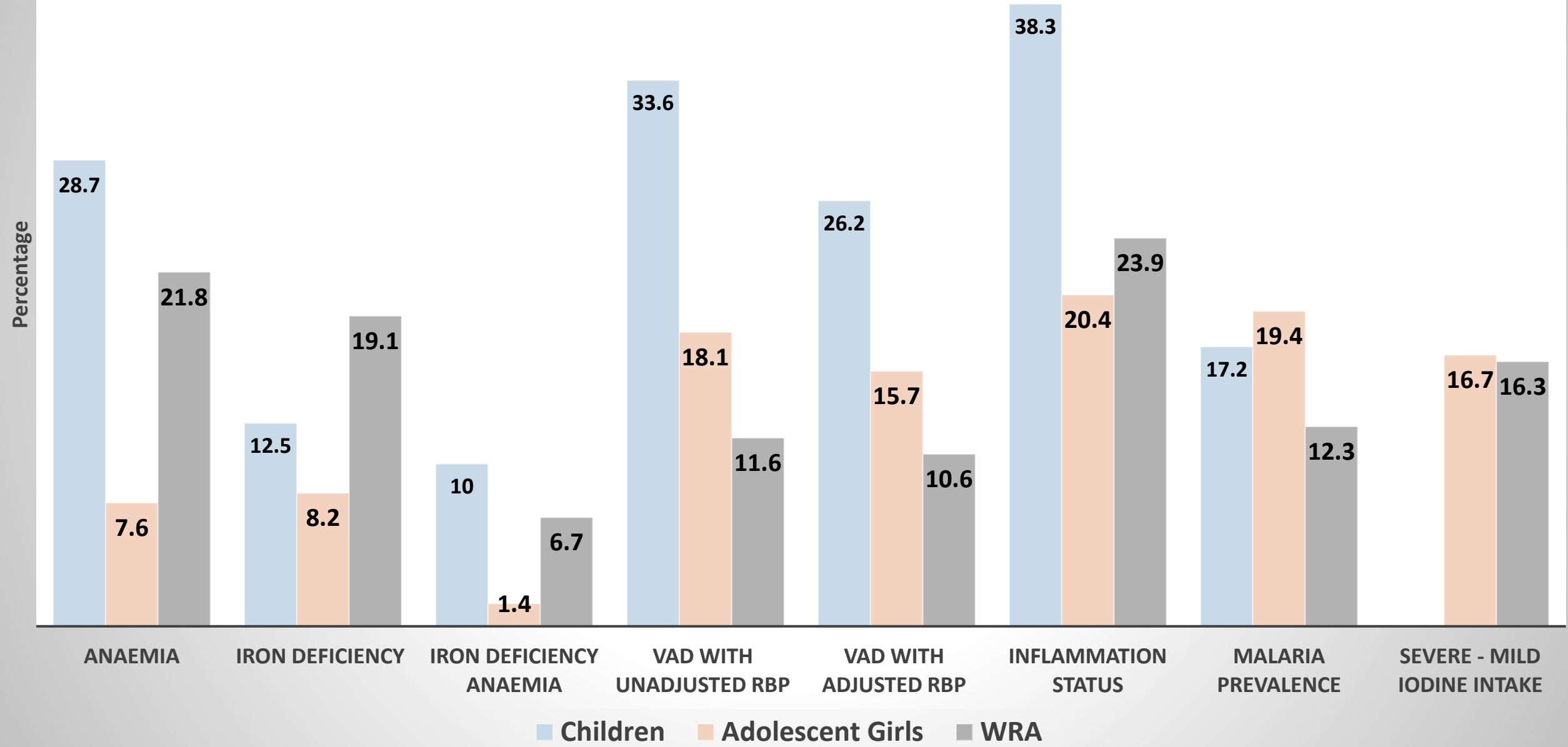
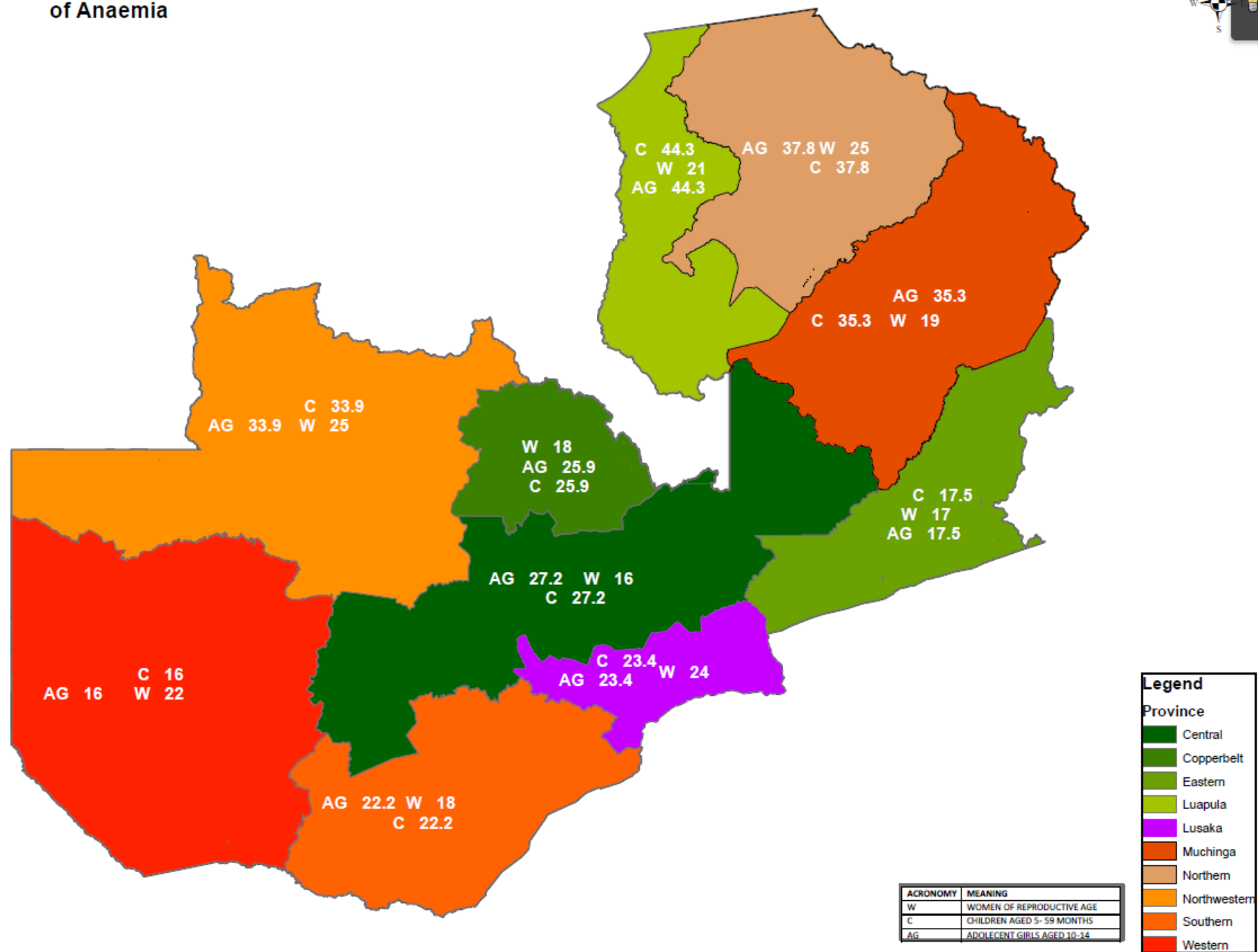Map of Zambia showing Prevalence (%) of Vitamin A

Map of Zambia showing Prevelance (%) of Anaemia

Luapula: C 44.3 W 21 AG 44.3

Northern: AG 37.8 W 25 C 37.8

Muchinga: AG 35.3 C 35.3 W 19

Northwestern: C 33.9 AG 33.9 W 25

Copperbelt: W 18 AG 25.9 C 25.9

Central: AG 27.2 W 16 C 27.2

Eastern: C 17.5 W 17 AG 17.5

Lusaka: C 23.4 AG 23.4 W 24

Western: C 16 AG 16 W 22

Southern: AG 22.2 W 18 C 22.2

Legend

Province

- Central
- Copperbelt
- Eastern
- Luapula
- Lusaka
- Muchinga
- Northern
- Northwestern
- Southern
- Western

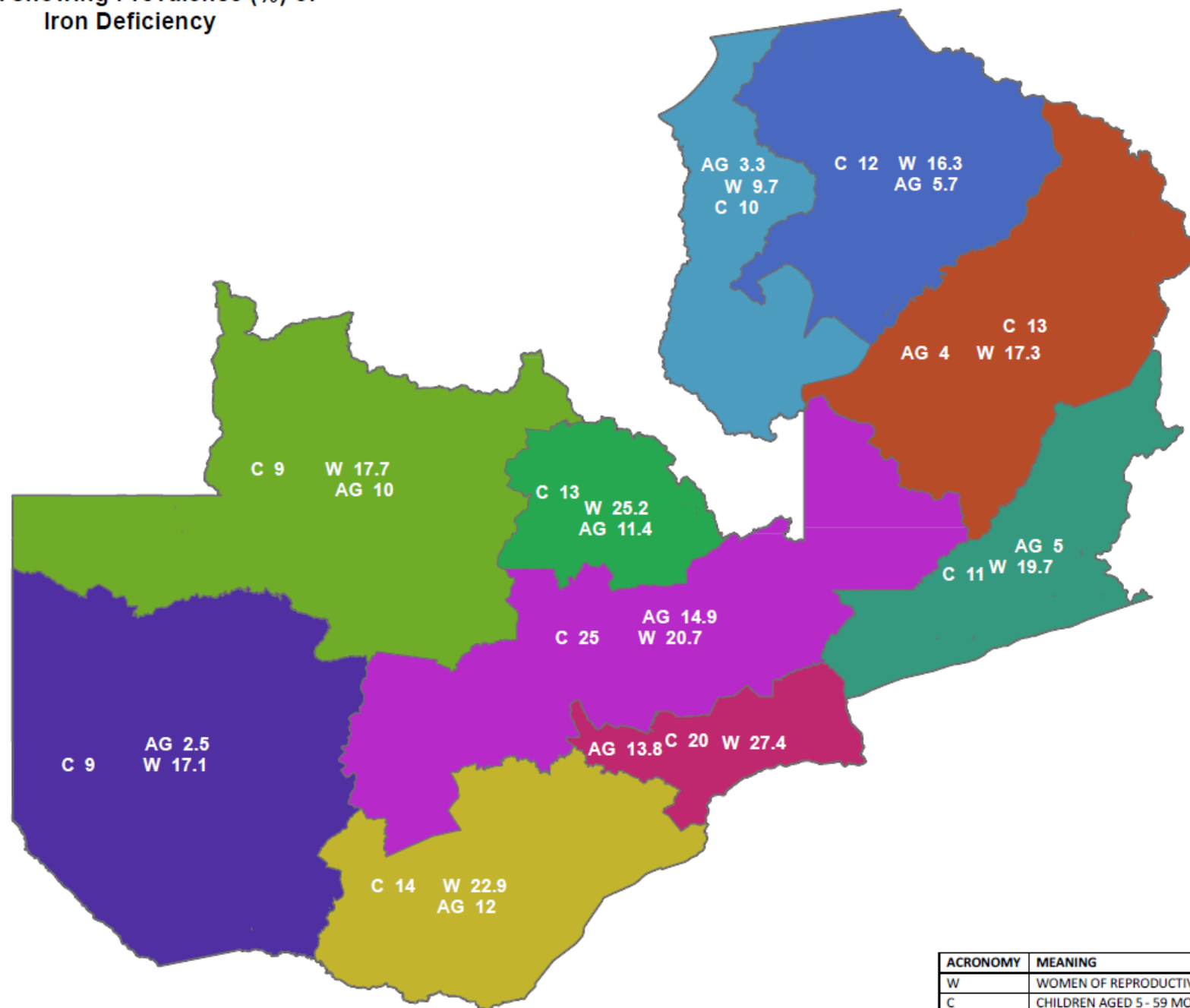| ACRONOMY	MEANING
W	WOMEN OF REPRODUCTIVE AGE
C	CHILDREN AGED 5- 59 MONTHS
AG	ADOLECENT GIRLS AGED 10-14

Map of Zambia showing Prevalence (%) of Iron Deficiency

AG 3.3
W 9.7
C 10

C 12   W 16.3
AG 5.7

C 13
AG 4   W 17.3

C 9   W 17.7
AG 10

C 13
W 25.2
AG 11.4

AG 5
C 11 W 19.7

AG 14.9
C 25   W 20.7

AG 2.5
C 9   W 17.1

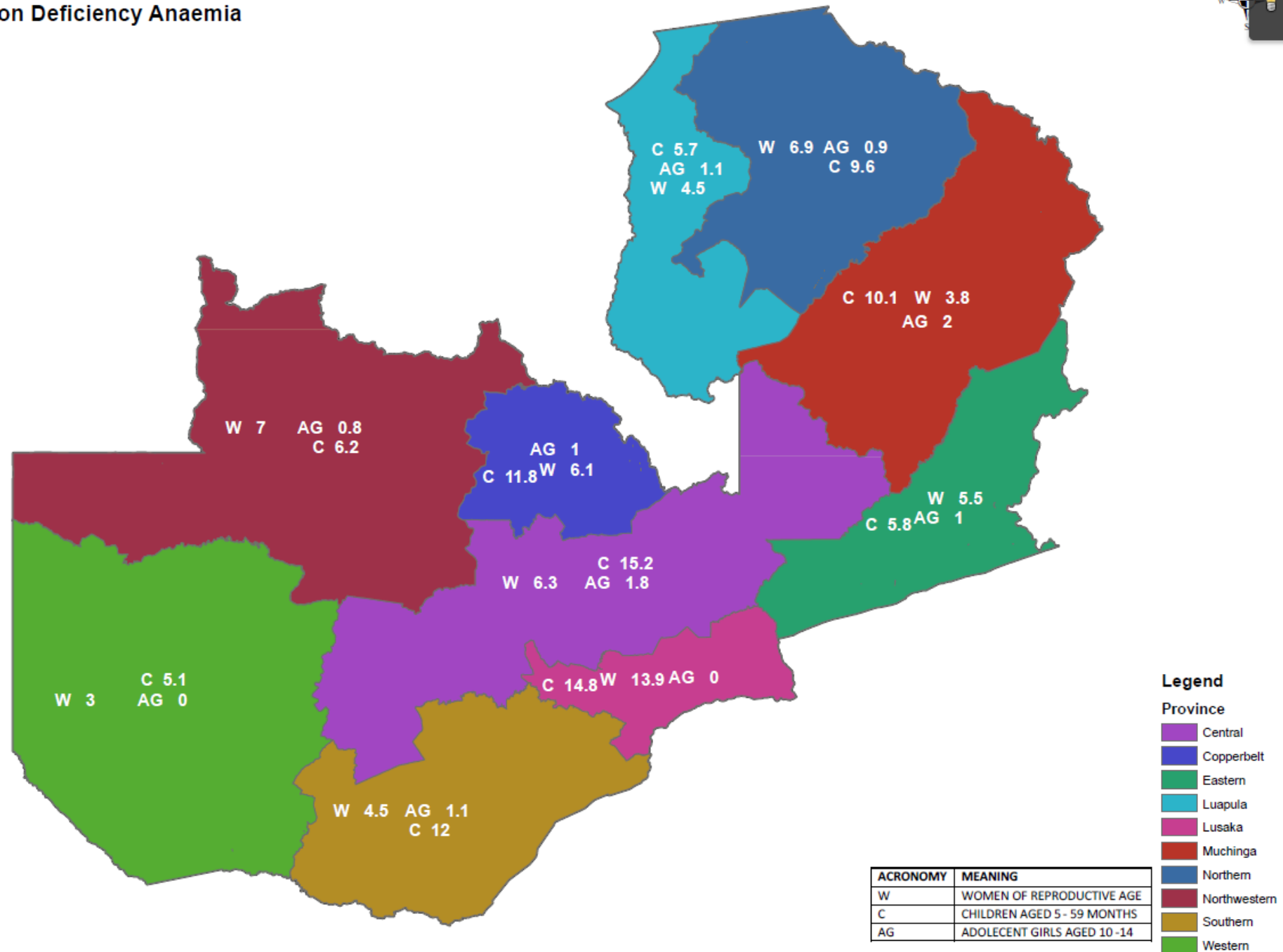AG 13.8 C 20 W 27.4

C 14   W 22.9
AG 12

Legend

Province
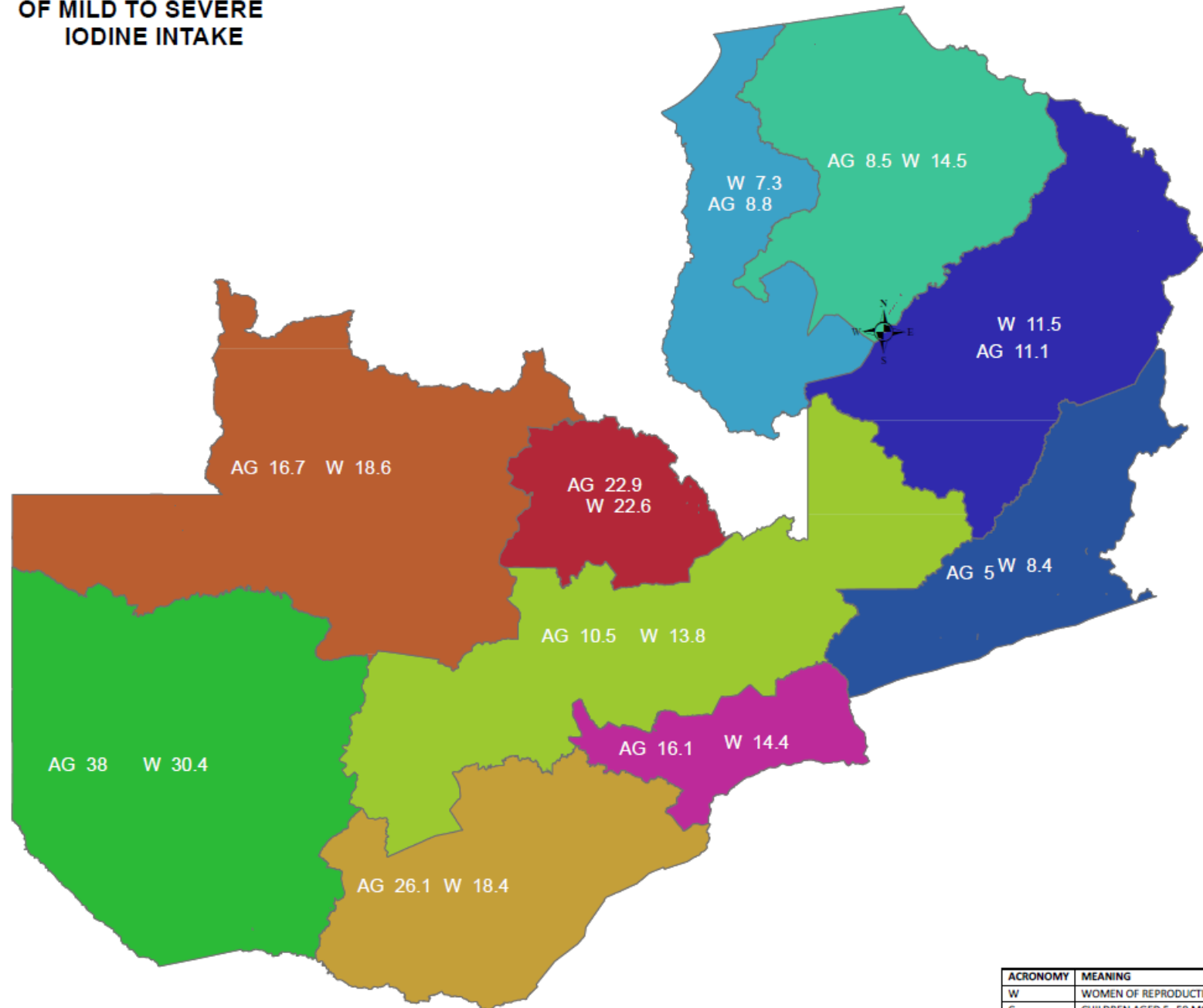- Central
- Copperbelt
- Eastern
- Luapula
- Lusaka
- Muchinga
- Northern
- Northwestern
- Southern
- Western

ACRONOMY	MEANING
W	WOMEN OF REPRODUCTIVE AGE
C	CHILDREN AGED 5 - 59 MONTHS
AG	ADOLECENT GIRLS AGED 10 -14

Map of Zambia showing Prevalence (%) of Iron Deficiency Anaemia

MAP OF ZAMBIA SHOWING PREVALENCE (%)
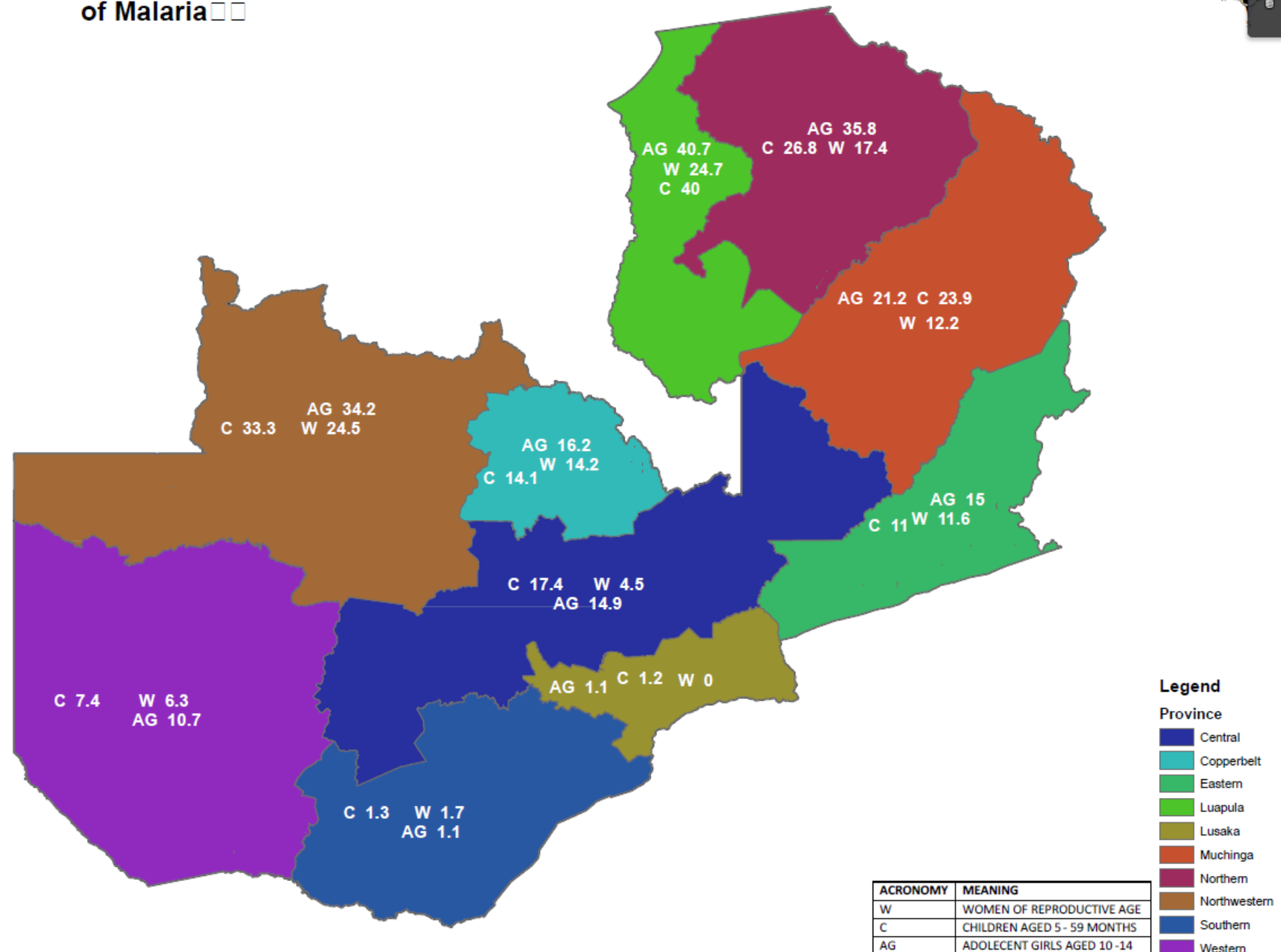OF MILD TO SEVERE
IODINE INTAKE

W 7.3
AG 8.8
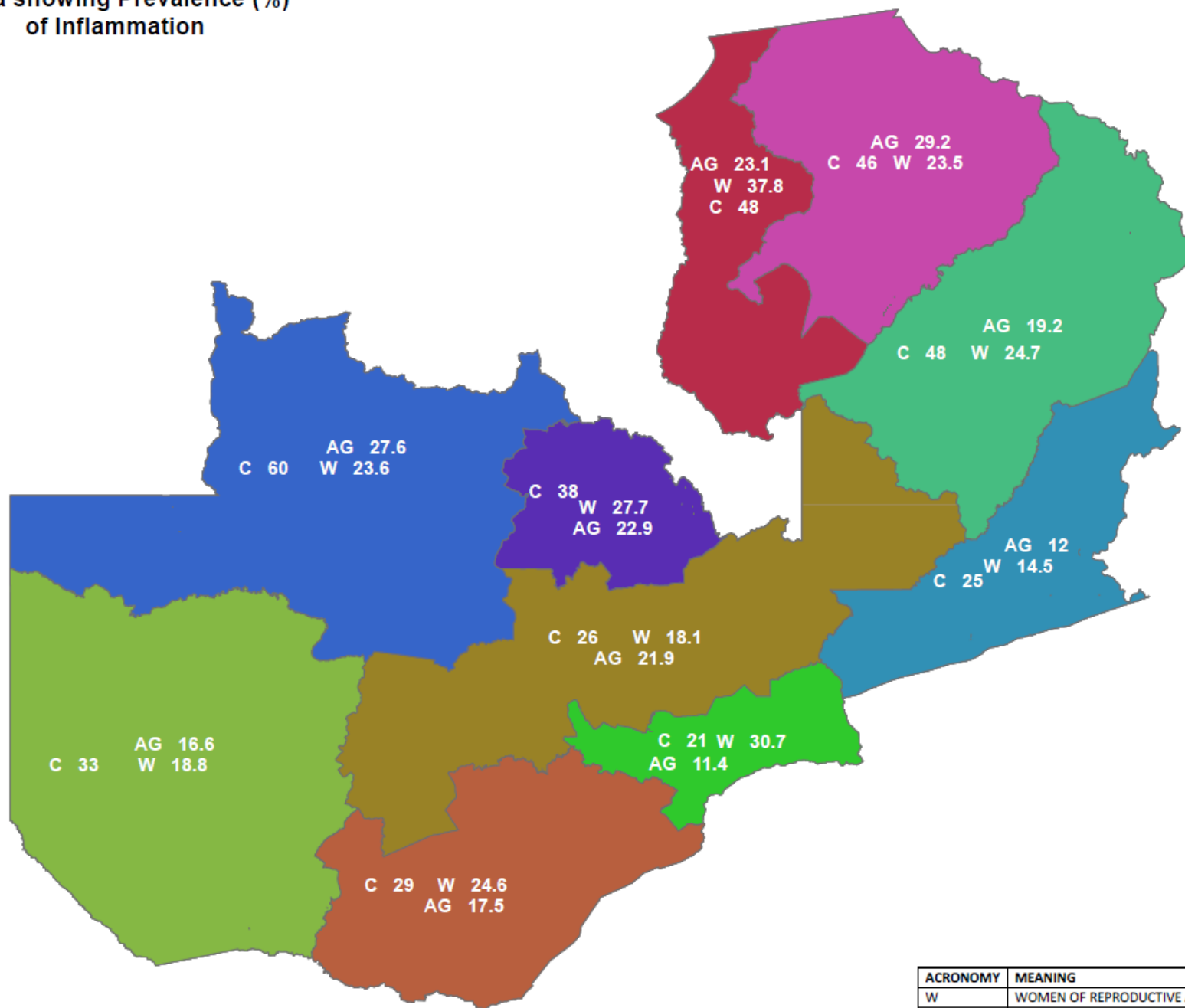
AG 8.5 W 14.5

W 11.5
AG 11.1

AG 16.7 W 18.6

AG 22.9
W 22.6

AG 10.5   W 13.8

AG 5 W 8.4

AG 38   W 30.4

AG 16.1   W 14.4

AG 26.1 W 18.4

Legend

Province

Color	Province
	Central
	Copperbelt
	Eastern
	Luapula
	Lusaka
	Muchinga
	Northern
	Northwestern
	Southern
	Western

ACRONOMY	MEANING
W	WOMEN OF REPRODUCTIVE AGE
C	CHILDREN AGED 5- 59 MONTHS
AG	ADOLECENT GIRLS AGED 10-14

Map of Zambia showing Prevalence (%) of Malaria

Map of zambia showing Prevalence (%)
of Inflammation

AG 23.1
W 37.8
C 48

AG 29.2
C 46 W 23.5

AG 19.2
C 48 W 24.7

AG 27.6
C 60 W 23.6

C 38
W 27.7
AG 22.9

AG 12
W 14.5
C 25

C 26 W 18.1
AG 21.9

C 21 W 30.7
AG 11.4

AG 16.6
C 33 W 18.8

C 29 W 24.6
AG 17.5

Legend

Province

	Central
	Copperbelt
	Eastern
	Luapula
	Lusaka
	Muchinga
	Northern
	Northwestern
	Southern
	Western

ACRONOMY	MEANING
W	WOMEN OF REPRODUCTIVE AGE
C	CHILDREN AGED 5- 59 MONTHS
AG	ADOLECENT GIRLS AGED 10-14

Malaria and Anaemia

	Children (6-49 months)		Adolescent girls (10-14 years)		WRA (15-49 years)	
	Malaria%	Anaemia %	Malaria %	Anaemia %	Malaria %	Anaemia %
Luapula	40.0	44.3	40.7	7.7	24.7	21.2
Muchinga	23.9	35.3	21.2	9.1	12.2	19.2
Northern	26.8	37.8	35.8	12.3	17.4	25.3
North-western	33.3	33.9	34.2	7.5	24.5	24.8

Malaria and Anaemia

	Children (6-49 months)		Adolescent girls (10-14 Years)		WRA (15-49 years)	
	Malaria%	Anaemia%	Malaria%	Anaemia %	Malaria%	Anaemia %
Southern	1.3	22.2	1.1	8	1.7	17.7
Eastern	11	17.5	15	3	11.6	16.7
Central	17.4	27.2	14.9	6.2	4.5	16
Lusaka	1,2	23.4	1.1	1.1	0	23.5
Western	7.4	16	10.7	9.1	6.3	22
Copperbelt	14.1	25.9	16.2	3.8	14.2	18.3

Policy, Regulatory and programme implication

Policy and Programme action

1. The National Food and Nutrition Commission should convene a national dialogue to discuss the implications of these findings on Policy and Programming for 2023 and beyond
2. A policy dialogues led by Ministry of Agriculture should be convened to understand the levels of planting material multiplication, adoption and diffusion across the country
3. A policy dialog led by Ministry of Health should be convened to discuss extent of consumption promotion for biofortified foods across the country.
4. A detailed research should be underrated to understand the determinant of biofortified food adoption and understand if Corvid-19 pandemic has had any effect in the promotion of biofortified foods in Zambia.

Policy and Programme action

- Government through the Ministry of Health should convene the National Fortification Alliance meeting to discuss the results and recommend appropriate action for the industry.

- As required by the Law, the Public Analyst (Food and Drugs Control Laboratory) should be engaged to provide more information on the levels of monitoring and compliance levels by the players in the industry to protocols and procedures at industry level

Acknowledgements