Impact of the nuclear accident on rural agriculture and 5 year summary

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Trends of agricultural products in Fukushima Prefecture

Market: total trading amount, trading price, trading order (market evaluation)

① Vegetables and fruit trees are being returned to the price before the earthquake.

Seasonal crops. Limited trading on time of season

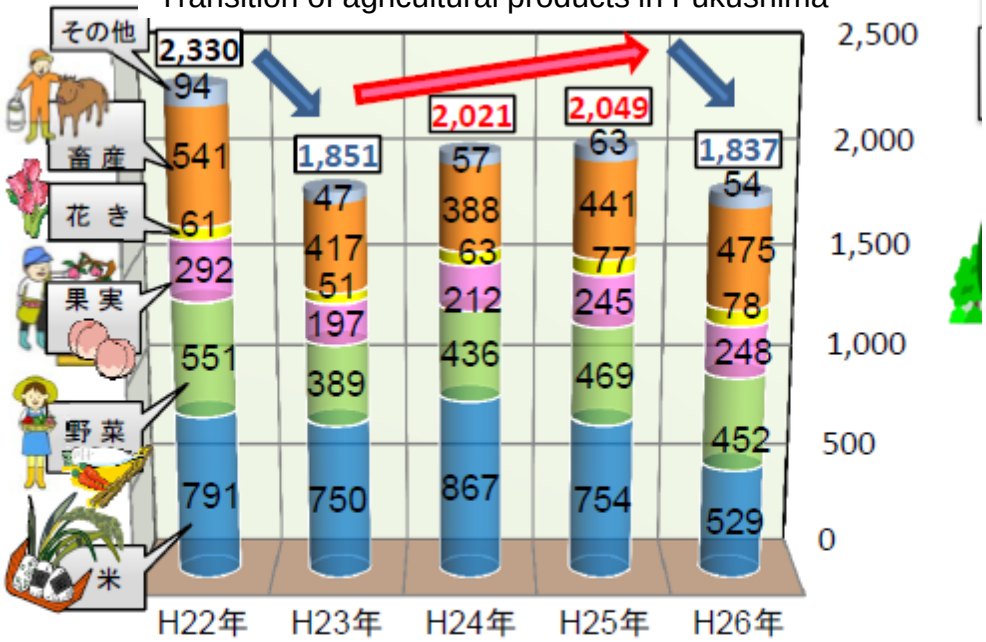
High share in Tokyo market originally

② Market structure for livestock and rice is changed by itself.

From retail rice for households (with label of producing area) to rice for business use (displaying made in Japan)

Fukushima Prefecture, Fukushima Reconstruction History 17th edition (July 2016)

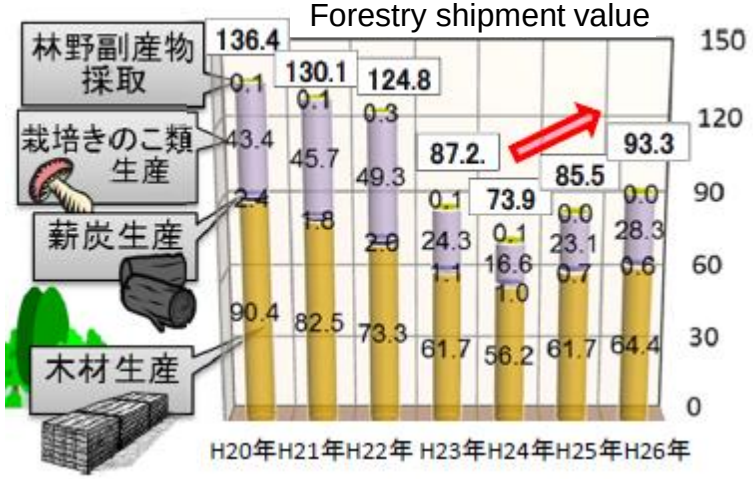
Transition of agricultural products in Fukushima



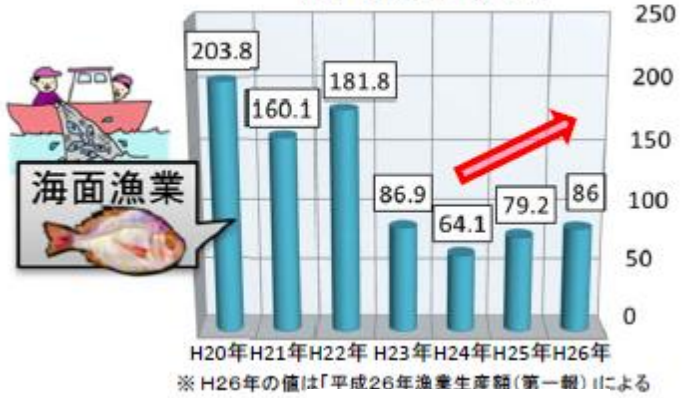
※ 項目毎の四捨五入により年計と年の各項目の総和は一致しない。
※ 米について、H24年以降、作付面積、収穫量とも増加傾向にあるものの、H26年は全国的に米価が大きく下落し、本県の米の産出額も大幅に減少した。

【出典】農林水産省　生産農業所得統計、生産林業所得統計報告書、漁業生産額より作成

Forestry shipment value



Fishery production

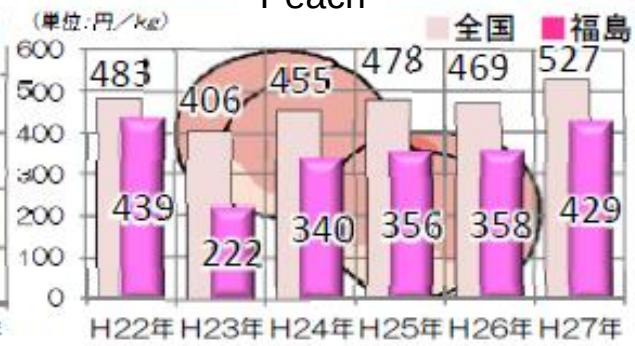


※ H26年の値は「平成26年漁業生産額（第一報）」による

Rice

【出典】農林水産省「米の相対取引価格」に基づく県推計
H27年の価格はH28年1月までの数値に基づく暫定値

Peach

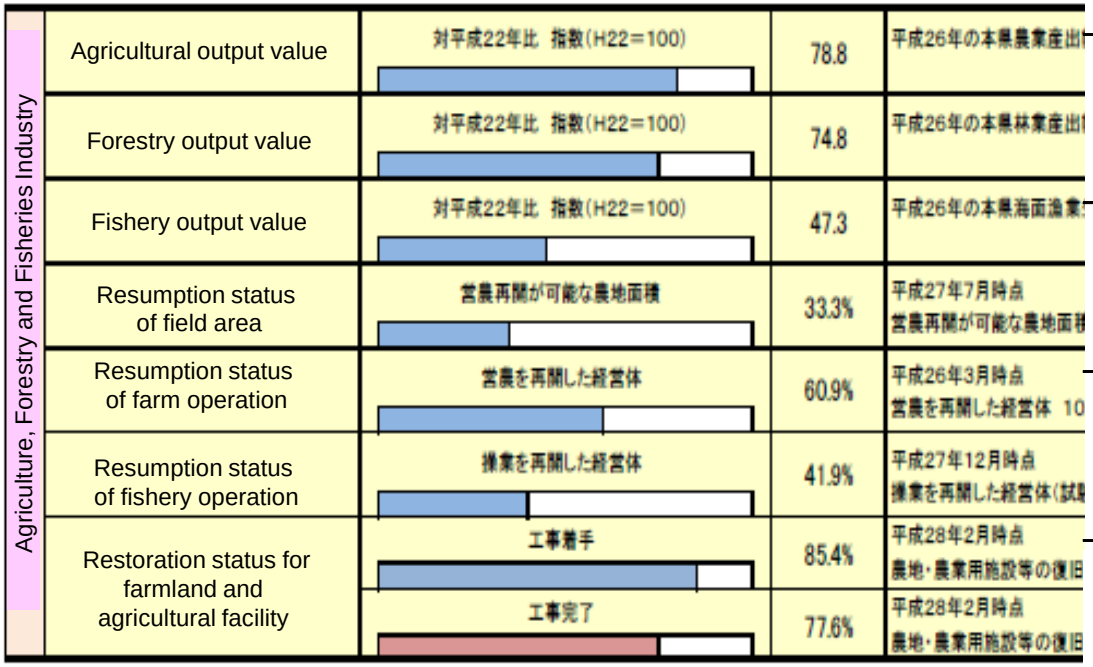


Japanese cattle

【出典】東京都中央卸売市場ホームページ市場統計情報

Resumption rate of agriculture for 5 and half years after the earthquake

- Resumption of management for agriculture: 60.9%
- Available agricultural area: 33.3%



Transition of restricted rice cropping area by the nuclear disaster

		Area (ha)	Rate (%)
2011	Restricted rice cropping area	8,500	11
	Self-control area	1,600	2
	Total	10,100	13
2012	Restricted rice cropping area	7,300	9
	Self-control area	3,200	4
	Total	10,500	13
2013	Restricted rice cropping area	6,000	7
	Resumption preparation	6,200	8
	Total	12,200	15
2014	Restricted rice cropping area	2,100	3
	Maintenance & Test	700	1
	Resumption preparation	5,100	6
	Total	7,900	10
2015	Restricted rice cropping area	2,100	3
	Maintenance & Test	500	1
	Resumption preparation	5,100	6
	Total	7,700	10
2016	Restricted rice cropping area	2,100	3
	Maintenance & Test	500	1
	Resumption preparation	4,600	6
	Total	7,200	9

Reference: 2011-2012 from Fukushima pref.
2013-2016 from Ministry of Agriculture, Forestry and Fisheries

*Rate is the ratio to 80,600ha, the restricted area in 2010

How about animal husbandry in Fukushima?

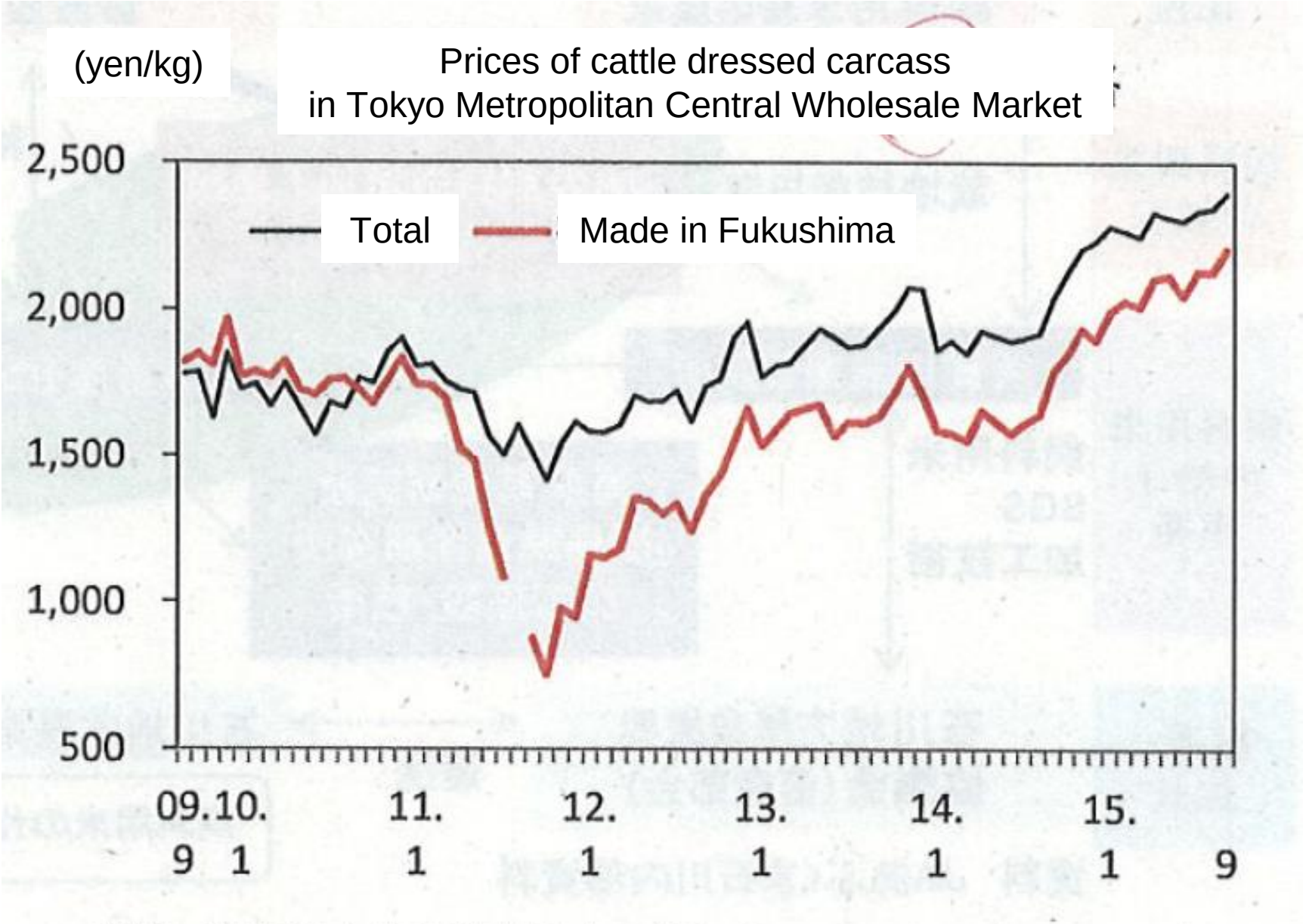
Transition of the number of livestock farmers

(Million, %)

		05	10	15年	05–10年 Increase rate	10–15年 Increase rate
Dairyman	National	277.0	219.0	174.0	△ 20.9	△ 20.5
	Fukushima	7.4	5.7	3.8	△ 23.1	△ 33.9
Reproduction Farmer	National	762.0	639.0	472.0	△ 16.1	△ 26.1
	Fukushima	47.9	36.5	23.1	△ 23.8	△ 36.7
Fattening Farmer	National	136.0	117.0	82.1	△ 14.0	△ 29.8
	Fukushima	6.6	4.5	3.2	△ 32.1	△ 29.7

Reference: “animal husbandry statistics”, Ministry of Agriculture, Forestry and Fisheries

Reference: Norinchukin Research Institute Co., Ltd.

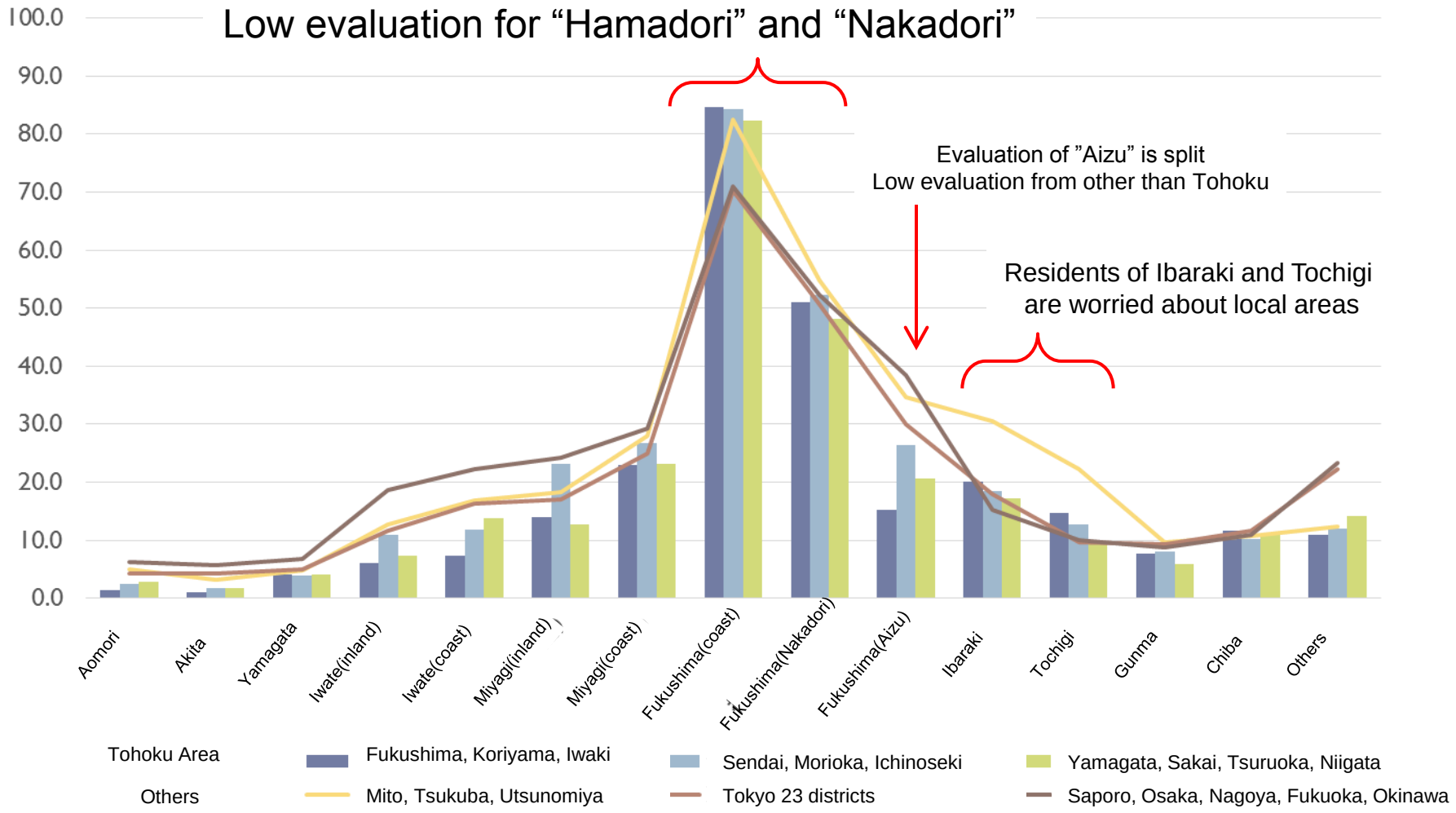


Reference: Tokyo Metropolitan Central Wholesale Market WEB site
* Prices of raw cattle dressed carcass

Image from consumers

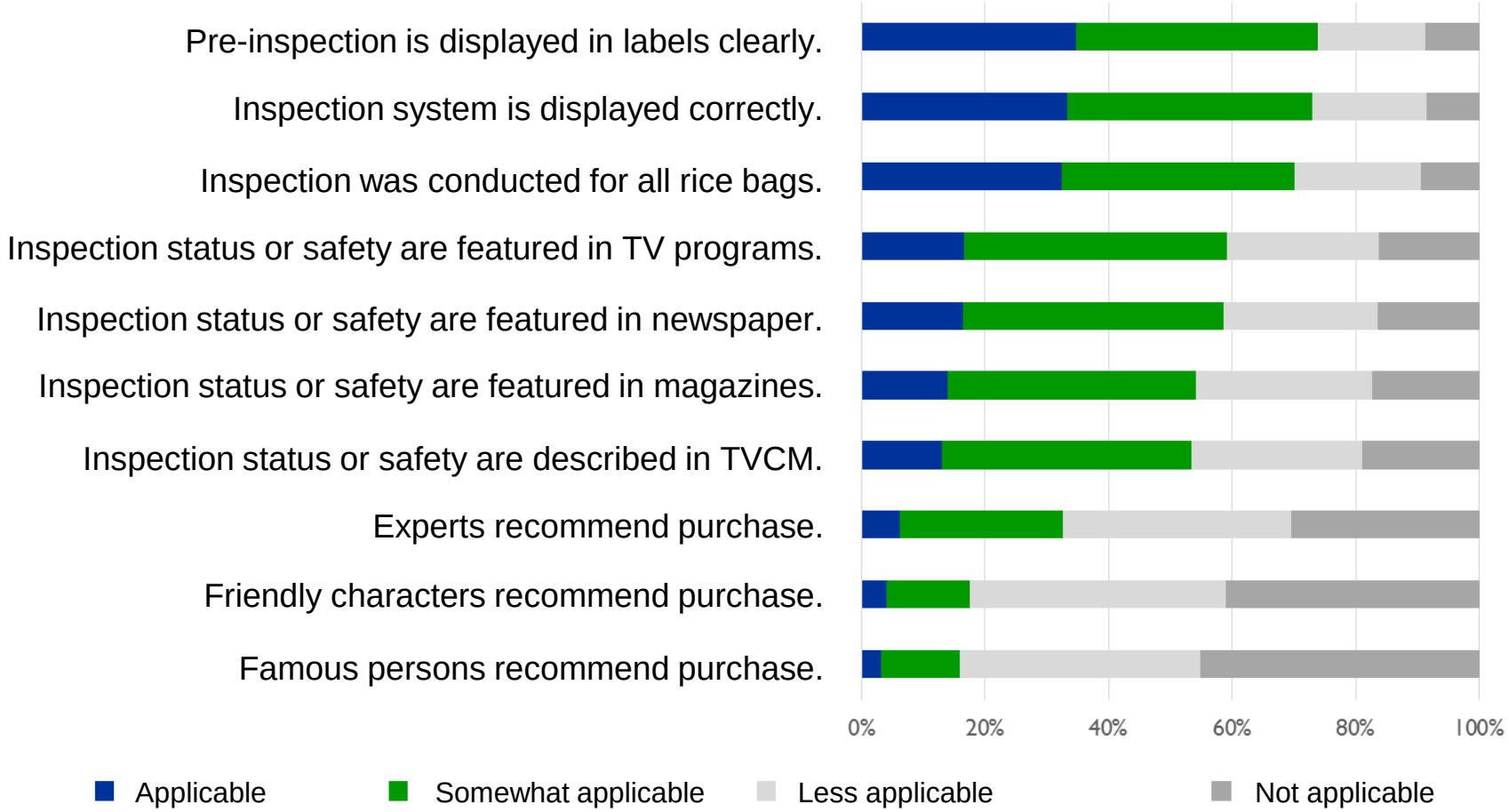
Seikiya, Koyama, Nakamura, Norifuji: Local Area study in Koroyama
～ Current harmful rumors by the nuclear accident and efforts to eliminate them～Study Report
March 2015, Chogakusaiteki Research Institute

Q9.1 Please raise areas which are contaminated by radioactive material to the extent not suitable for food production after the accident (multiple).



Consumers' needs

Q11. What kind of information do you need to buy more food? Please choose those that apply.



Nakamura "How consumers think now – Analysis of buying behavior and attitude through consumer

3,600 answers from 12 prefectures (Jan 16, 2015 – Feb 5, 2015)

"Clear safety reason" display, rather than "image strategy"

Issues from the five years after the disaster

- Rumor problem①The image after the accident is still being fixed.
- Rumor problem ②High level inspection is established only in Fukushima
- Efforts of production areas
- ①Test results in 2014：No sample exceeding the standard.
- ②Producers need to grasp current status correctly.
- ③The reason why no sample exceeds the standard should be sent from the producer side.
- Distribution phase
- ①Even though low risk (safety) is proved scientifically, it is not certain that society accepts it (reliability, safety).
- ②Appropriate information sharing（reduction measure, all rice bags test, etc.）is needed.

JA Fukushima Central, solution of radioactivity countermeasures

Systematic radioactivity countermeasures from entrance (production) to exit (distribution)

取り組み 1

Measuring Soil

以前調べた同じ場所の土壌を採取して調べるのね。

JAグループ福島では、安全な農産物を生産するため、福島県や福島大学等関係機関の協力を得て、田んぼや畑などの農地の土壌調査を実施しています。

具体的には、震災直後の平成23年に国や県が測定した県内ほ場約2,000地点と同一ほ場で土壌を採取し、放射性物質濃度を測定（3年前と比べどの程度低減しているかを確認）するとともに、農作物が放射性物質の吸収を抑制する効果のある交換性カリウムが土壌中にどのくらい含まれているか（※注）を測定し、結果を生産者に通知し土壌改良していただくとともにJAの営農指導活動に役立てています。

（※注）水稲では乾燥土壌100g中に交換性カリウムが25mg以上含まれていることが理想です。

採土管で田んぼのサンプル土壌を採取

ゲルマニウム半導体検出器を用いて土壌の放射性物質濃度を測定

取り組み 3

Measuring agricultural and stockbreeding products

安全性を確認しているのね。

生産された米は、「食品中の放射性セシウムスクリーニング法（厚生労働省）」に基づき、ベルトコンベア式検査機器による全量全袋検査を行い安全性を確認しています。

園芸品目（野菜・果実・きのこ・山菜等）は、JA独自の取組として、スクリーニング法に基づく出荷前全品目全戸検査を行い安全性を確認しています。

牛肉は、出荷された肉牛の全頭検査を出荷先で実施し、安全性を確認しています。

このほか県では、出荷前に出荷する全ての品目についてモニタリング検査を実施し、安全性を確認しています。

スクリーニング検査とは 生産現場に近い方で迅速に出荷の可否を判断するため、NaIシンチレーションスペクトロメータ等の簡易分析装置で検査を行います。また、一定以上の放射性セシウムが検出された場合には、ゲルマニウム半導体検出器により精密検査を実施します。

モニタリング検査とは 出荷前に出荷する全ての品目の安全性を確認し、出荷の可否を判断するとともに、消費者に正確な情報を提供するため、ゲルマニウム半導体検出器による検査を実施します。

Agricultural and stockbreeding products are sold at stores through many inspections and countermeasures

消費者等への情報提供

安全・安心の確保

取り組み 2

Countermeasure to control absorption

吸収されないように様々な対策をとっているんだね。

土壌中の放射性物質を取り除いたり、作物が養分を吸収する土の層（実際に根が張る地面から約10～15cmまでの層）の放射性物質濃度を下げるため、農地の状況に応じて、表土の削り取りや土壌の天地返し、土壌をていねいに深く耕す作業に取り組んでいます。

また果樹類は、原発事故の影響により放射性物質が空中飛散し、その後降下して木の表面に放射性物質が付着したことから、木の表面を削ったり、高圧洗浄機で放射性物質を洗い流したり、古い枝を切ったりする作業に取り組みました。

さらに、できるだけ放射性物質を作物が吸収しないよう、必要十分なカリ肥料（上記1参照）を散布しています。放射性セシウムはカリウムと化学的性質がよく似ているため、十分なカリウムを散布し放射性セシウムの吸収を抑制します。

土壌の天地返し（反転耕）

高圧洗浄機によるモモの樹体洗浄

カリ肥料等の散布

取り組み 4

Information sharing with consumers

Webで測定結果がわかるんだね。

消費者等への情報提供は、全国の生活協同組合や地産地消ふくしまネット等とも連携して取り組んでいます。また、消費者等がいつでも安全性を確認できるよう、測定結果はすべて公表されています。

JAが取り組む自主検査の結果は、ふくしまの恵み安全対策協議会または県内各JAのHPをご覧ください。県が行うモニタリング検査結果は、福島県のHPまたは「ふくしま新発売。」HPをご覧ください。

JAグループ福島のパンフレットより

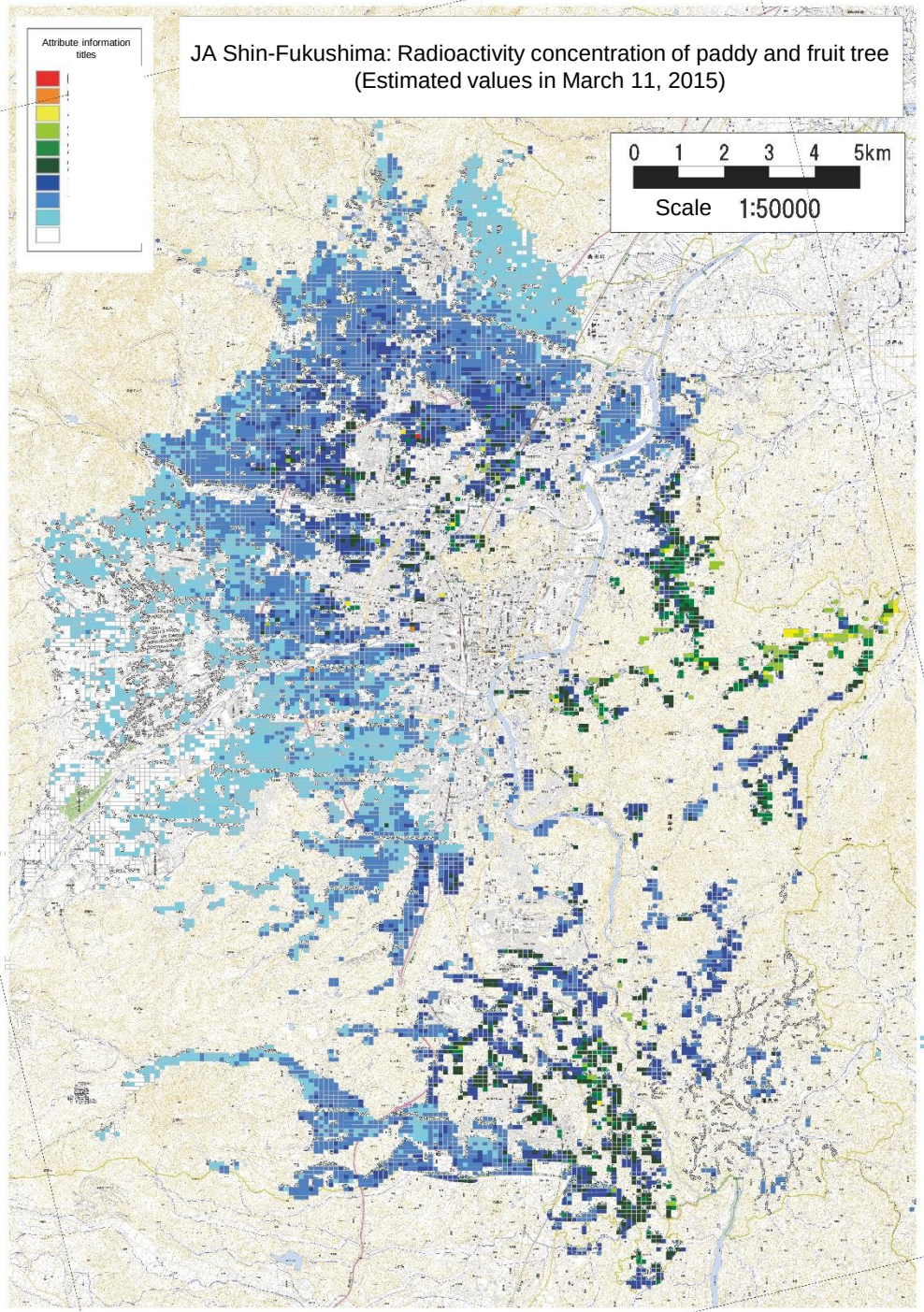
Radioactivity measurement for fields one by one (JA Shin-Fukushima)

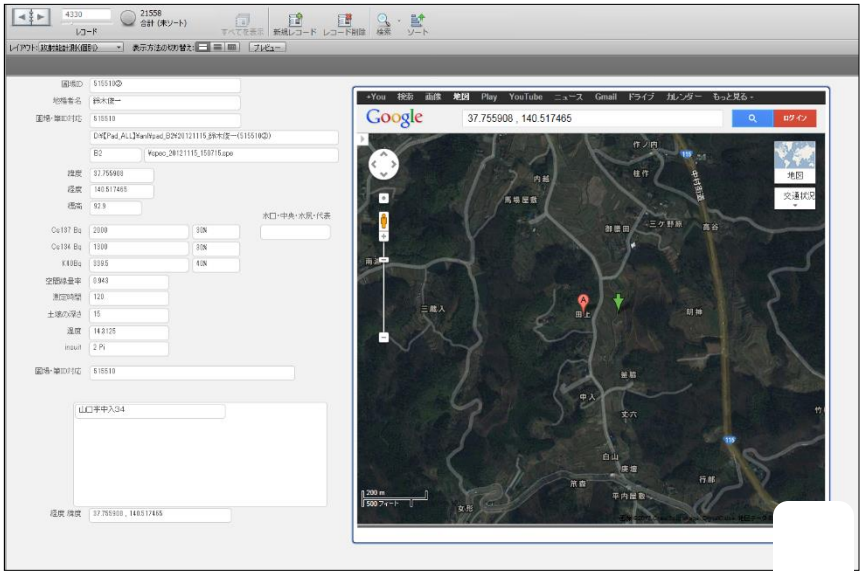
For available countermeasures based on understanding of contamination status

	Paddy	Fruit Tree	Soy field and others
The number on Ledger	24480	10158	-
Achievement rate	100%	100%	-
Measurement points	63677 (provisional)	27308 (provisional)	1465
Measurement term	May 2012 – June 2012 Oct 2012 – Apr 2013 Oct 2013 – Apr 2013 Oct 2014 – Dec 2014	July 2012 – Oct 2012 May 2012 – Oct 2013	July 2014 – Sep 2014

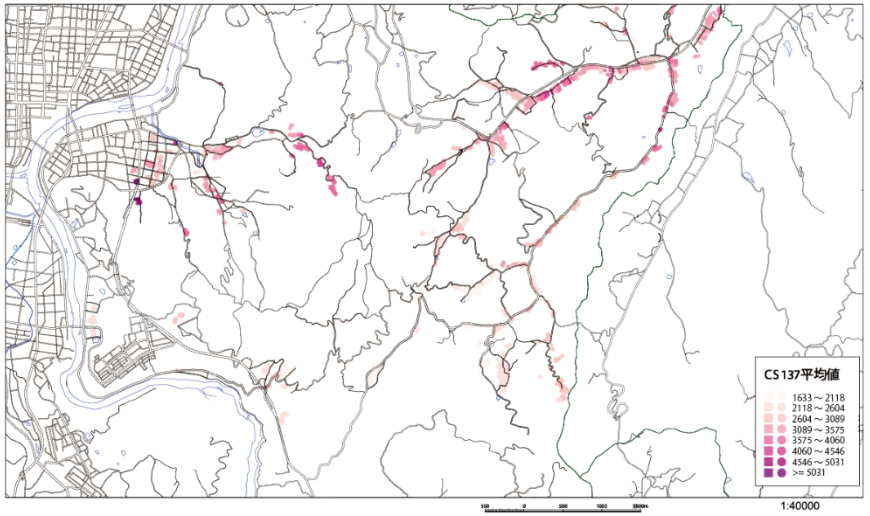
Soil screening measuring instrument (made in Belarus)

Various map display

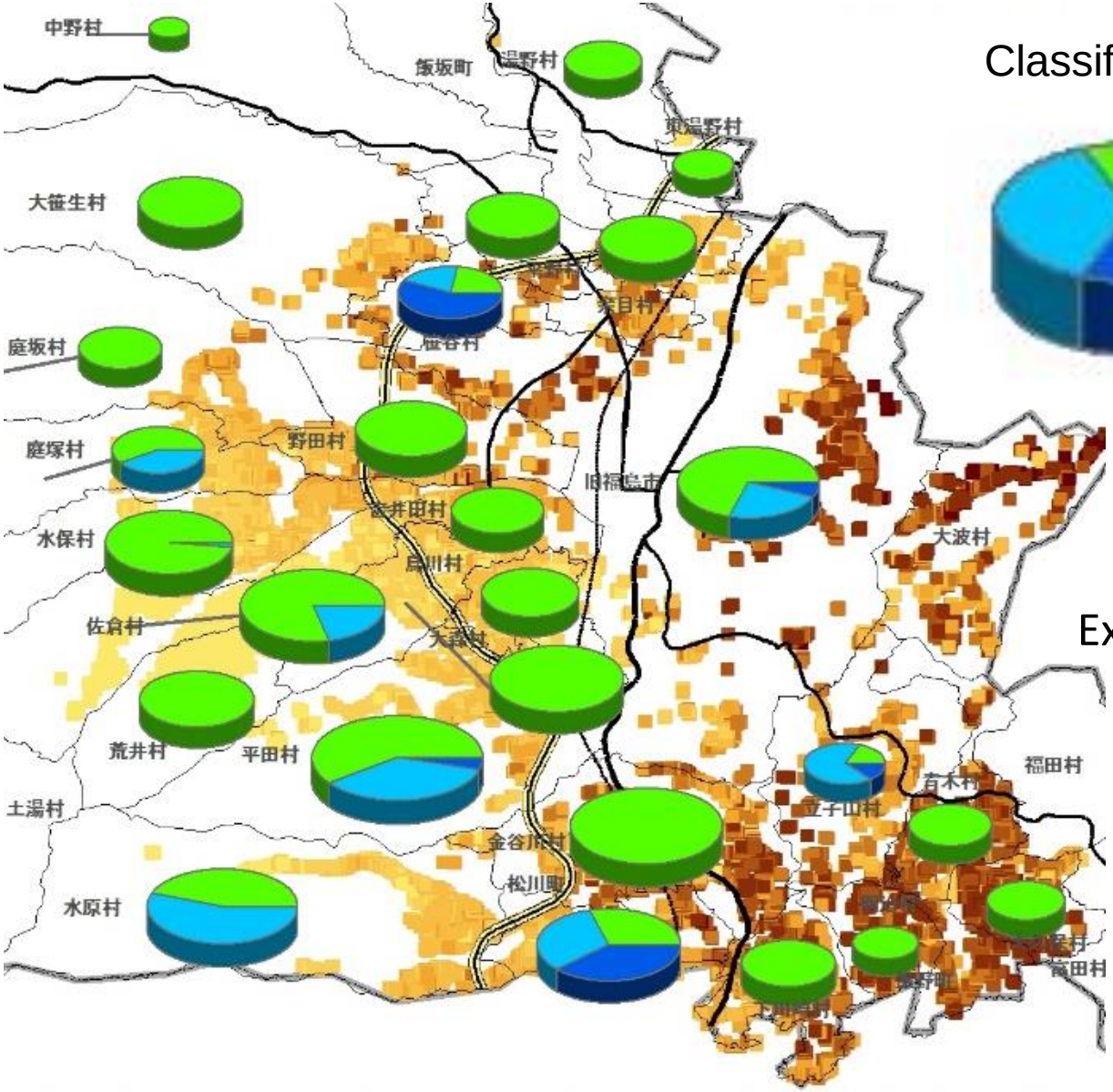




Watari & Oonami district, Cesium 137 distribution



【All rice bags tests in 2012】



Classification in detail

51 - 75

76 - 100

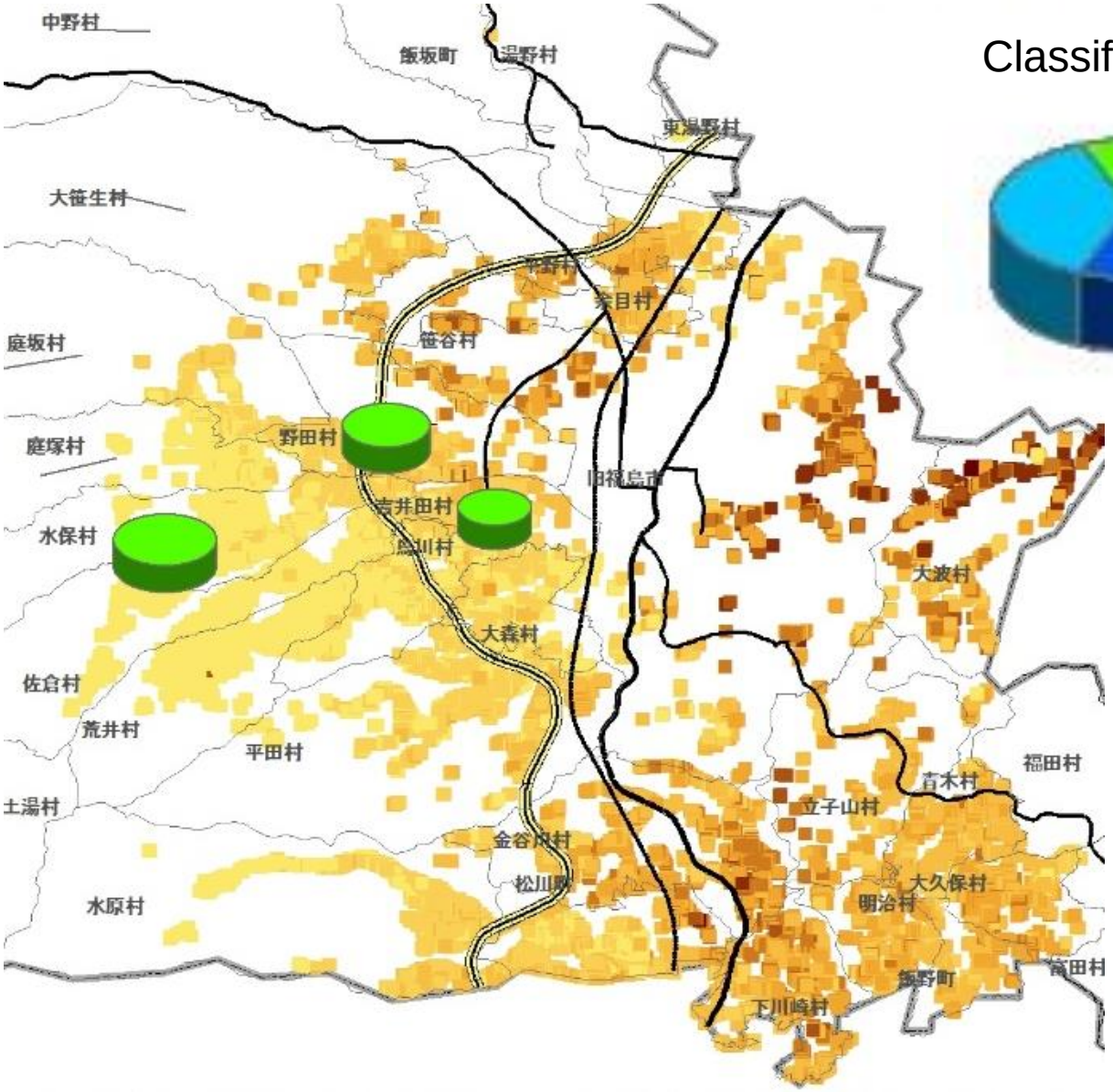
Over 100

Total samples: 314,555

Detection rate : 0.29%

Excess of the standard: 0.01%

【All rice bags tests in 2014】



Classification in detail

51 - 75

76 - 100

Over 100

Total samples: 338,674

Detection rate: 0.0009%

Excess of the standard: 0%

Fukushima City Association for Securing Safety of Agricultural Products

Monitoring Center (JA Shin-Fukushima)

Table 1: The results of self-inspection for agricultural products in Fukushima (Summary table)

(unit: number, %)

Item	Year	Number rate	Sum of Cesium 134 and 137 (Bq/kg)					Total
			Under 25	25～50	51～75	76～100	Over 100	
Fruit	2012	number	11,887	154	0	0	0	12,041
		rate	98.72	1.28	0	0	0	100
	2013	number	19,743	33	0	0	0	19,776
		rate	99.83	0.17	0	0	0	100
	2014	number	20,571	13	0	0	0	20,584
		rate	99.94	0.06	0	0	0	100
	2015	number	13,612	7	0	0	0	13,619
		rate	99.95	0.05	0	0	0	100
	Total	number						66,020
Vegetable	2012	number	2,152	4	0	0	0	2,156
		rate	99.81	0.19	0	0	0	100
	2013	number	23,260	24	0	0	0	23,284
		rate	99.90	0.10	0	0	0	100
	2014	number	21,156	7	0	0	0	21,163
		rate	99.97	0.03	0	0	0	100
	2015	number	14,802	4	0	0	0	14,806
		rate	99.97	0.03	0	0	0	100
	Total	number						61,409
Rice	2012	number	10,323,586	20,357	1,678	389	71	10,346,081
		rate	99.78	0.2	0.02	0.004	0.001	100
	2013	number	10,999,222	6,484	493	323	28	11,006,550
		rate	99.93	0.06	0.004	0.003	0.0003	100
	2014	number	10,984,161	1,909	12	2	0	10,986,084
		rate	99.98	0.02	0.0001	0.00002	0	100
	2015	number	10,403,015	628	17	1	0	10,403,661
		rate	99.99	0.006	0.0002	0.00001	0	100
	Total	number						42,742,376
Soy	2012	number	1	0	0	0	0	1
		rate	100	0	0	0	0	100
	2013	number	127	0	0	0	0	127
		rate	100	0	0	0	0	100
	2014	number	147	4	0	0	0	151
		rate	97.35	2.65	0	0	0	100
	2015	number	47	0	0	0	0	47
		rate	100	0	0	0	0	100
	Total	number						326

Reference: JA Fukushima Central

*1 These data are from data on the Fukushima City Association for Securing Safety of Agricultural Products Home Page.

*2 Year period is from Apr 1 to March 31.

*3 Data in 2016 is from Apr 1 to Feb 3.

The results of all rice bags test (2016)

	【2012】	【2013】	【2014度】	【2015】 In process
～25 (Bq/kg)	10,323,674 （99.78%）	10,999,222 （99.93%）	11,008,211 (99.98%)	10,399,235 (99.994%)
25～ (Bq/kg)	20,357 （0.2%）	6,484 （0.06%）	1,910 (0.02%)	626 (0.006%)
50～ (Bq/kg)	1,678 （0.0129%）	493 （0.0044%）	12 (0.0001%)	17 (0.0002%)
75～ (Bq/kg)	389 （0.0038%）	323 （0.003%）	2 (0.00002%)	1
100～ (Bq/kg)	71 （0.0007%）	28 （0.0003%）	2 (0.00002%)	0
合計	10,346,169 （100%）	11,006,550 （100%）	11,010,137 (100%)	10,399,879 (100%)

Reference: Fukushima City Association for Securing Safety of Agricultural Products
https://fukumegu.org/ok/kome/

Transition of costs and inspectors for all rice bags test

Costs for all rice bags test

Thousand yen

	2012	2013	2014	Total
Subsidy	3, 768, 631	502, 703	635, 059	4, 906, 393
Maintenance for belt conveyer inspection instrument	3, 343, 113	71, 985	96, 000	3, 511, 098
Operation for safety management system, inspection by Fukushima Pref. conferences	67, 293	92, 976	114, 100	274, 369
Operation for inspection by local conferences	358, 225	337, 742	424, 959	1, 120, 926
Compensation for damage	4, 707, 998	4, 972, 960	5, 000, 000	14, 680, 958
Total	8, 476, 629	5, 475, 663	5, 635, 059	19, 587, 351

Reference: Fukushima City Association for Securing Safety of Agricultural Products
* Subsidy in 2014 is budget amount, compensation in 2014 is prediction

14,700 million yen from Tokyo Electric Power out of 19,600 million yen

Inspectors & inspection centers for all rice bags test

Unit: number

	2012	2013	2014
The number of Inspectors	1, 374	1, 674	1, 932
The number of centers	163	173	173

Reference: Fukushima City Association for Securing Safety of Agricultural Products, Feb 27, 2015

*One Inspector should be located in an inspection center, and the prefecture asks them.
A lot of labor for delivering rice, coordinating with schedules, etc., by delivery companies and local government is necessary for all rice bags test.

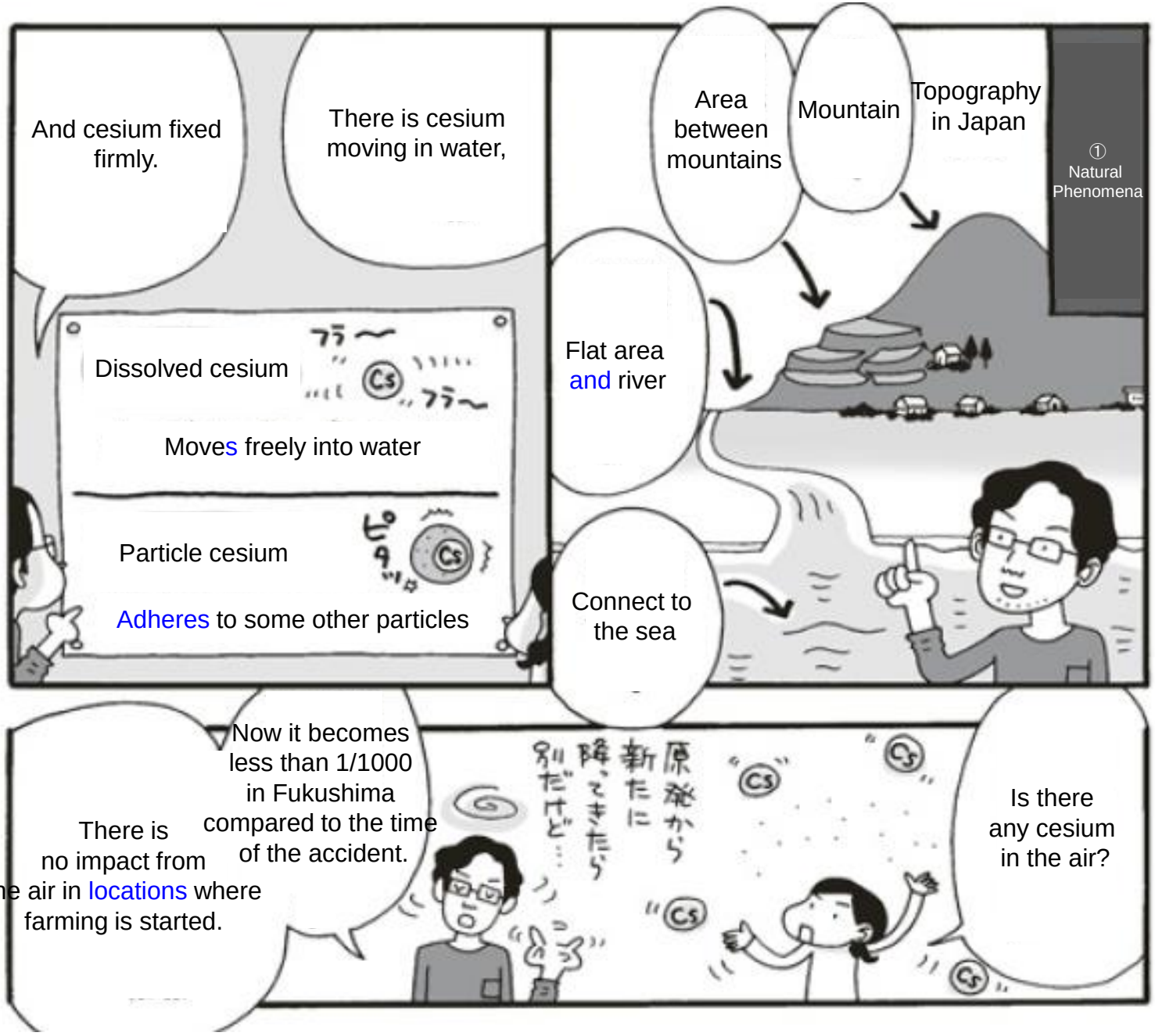
Amount of damage by the nuclear disaster

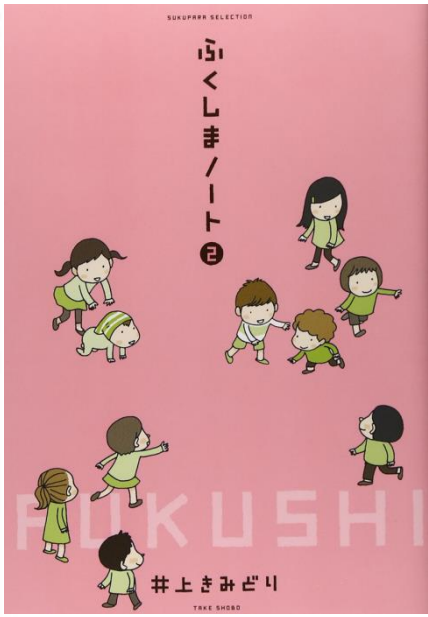
Item	Content		Amount
Compensation for damage	Compensation		4.9088 trillion yen
Cost of coverage and reactor decommissioning	1 – 6 units of Fukushima Dai-ichi power plant		1.684 trillion yen
	Additional funds (the next ten years)		1 trillion yen
Cost of reinstatement	Cost of decontamination		2.5 trillion yen
	Radioactive material storage container		1.1 trillion yen
Damage of discontinued additional plan for Fukushima No. 7 & 8 power plants			39.4 billion yen
Cost of administration	Cost of restoration for nuclear disaster by the government	Supplementary budget in 2011	275.4 billion yen
		Supplementary budget in 2011	329.4 billion yen
		Supplementary budget in 2012	481.1 billion yen
		Budget in 2013	709.4 billion yen
	Measurement for contaminated water		47.88 billion yen
	Additional measurements by local government		N/A
Total			13.753 trillion yen

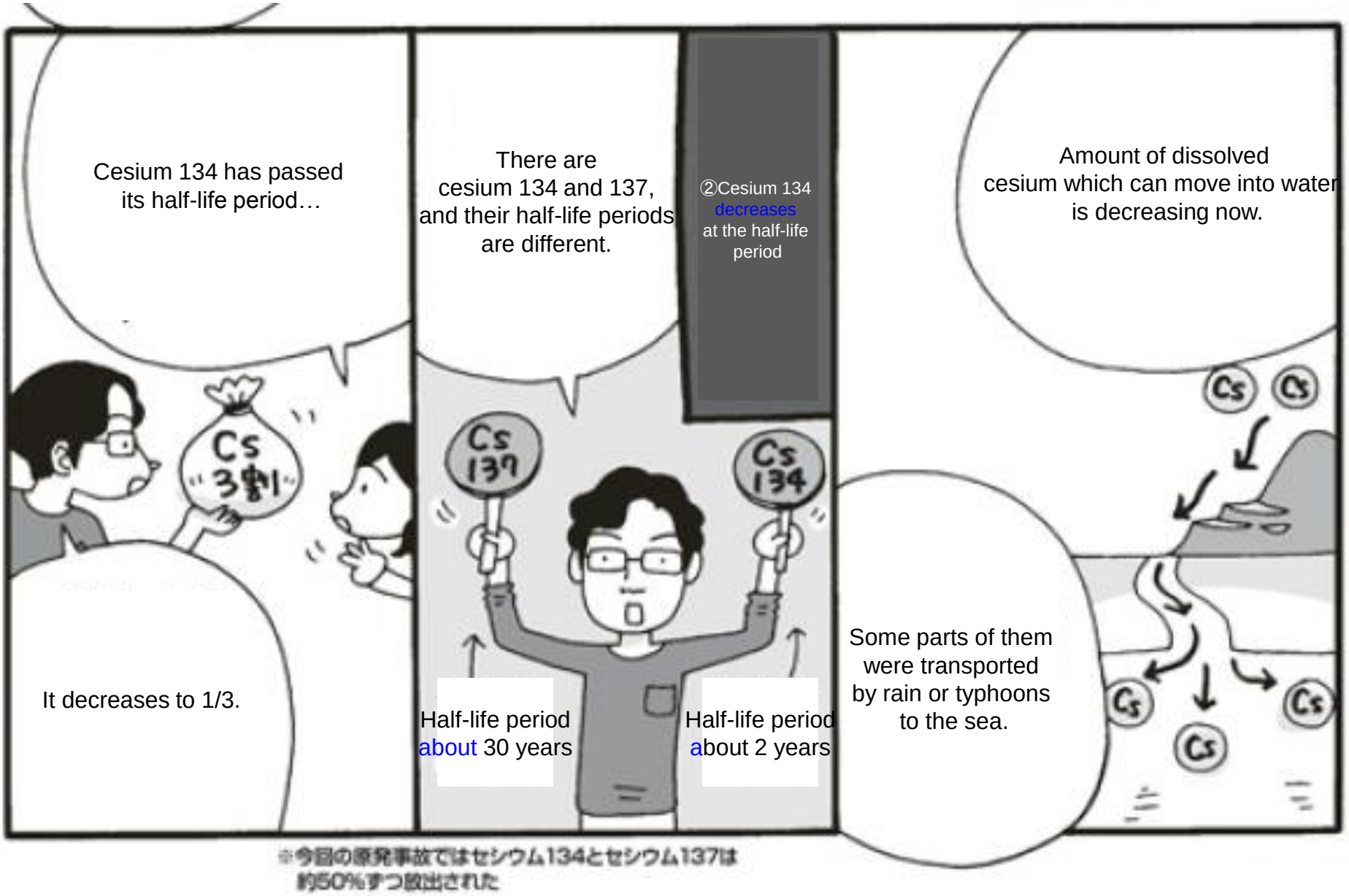
Reference: Kenichi Ooshima “Non-nuclear power forum” Apr 13, 2014. Nuclear citizen committee “Road to zero nuclear power”

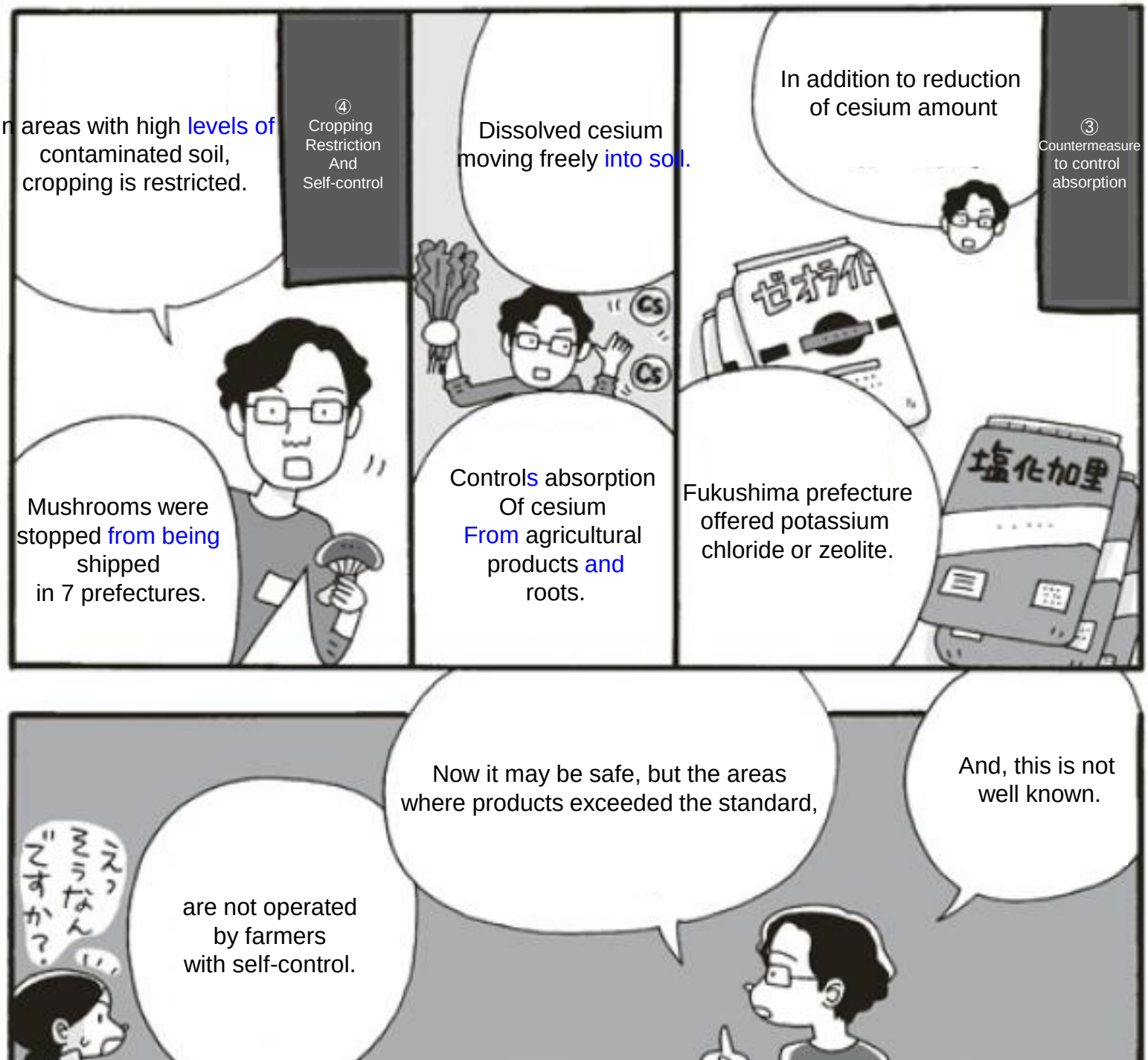
21 trillion yen for compensation, coverage, and decommissioning for 4 years will continue for the next 40-100 years

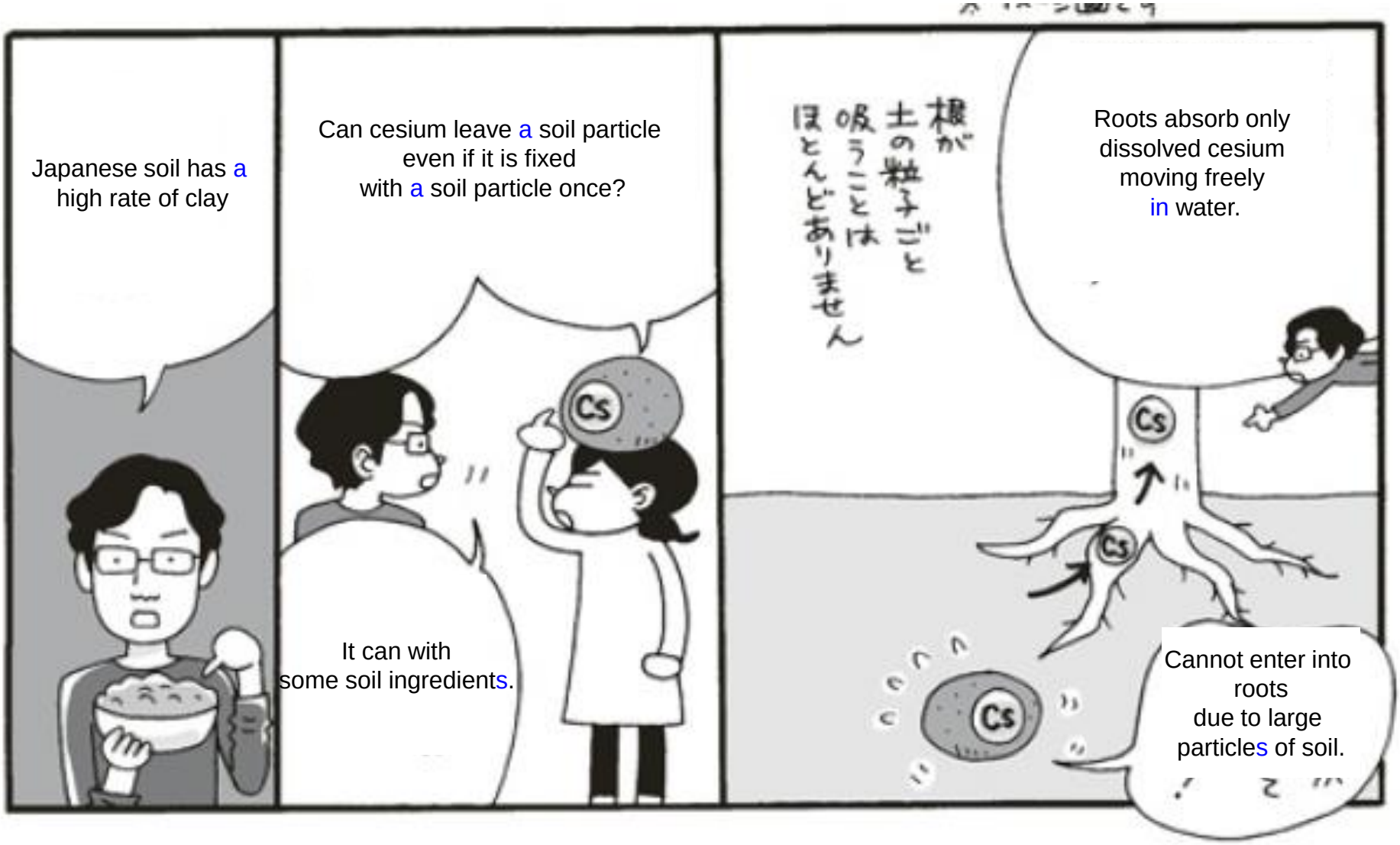
井上きみどり「ふくしまノート」18話『すくすくパラダイス』竹書房、2015/3/11

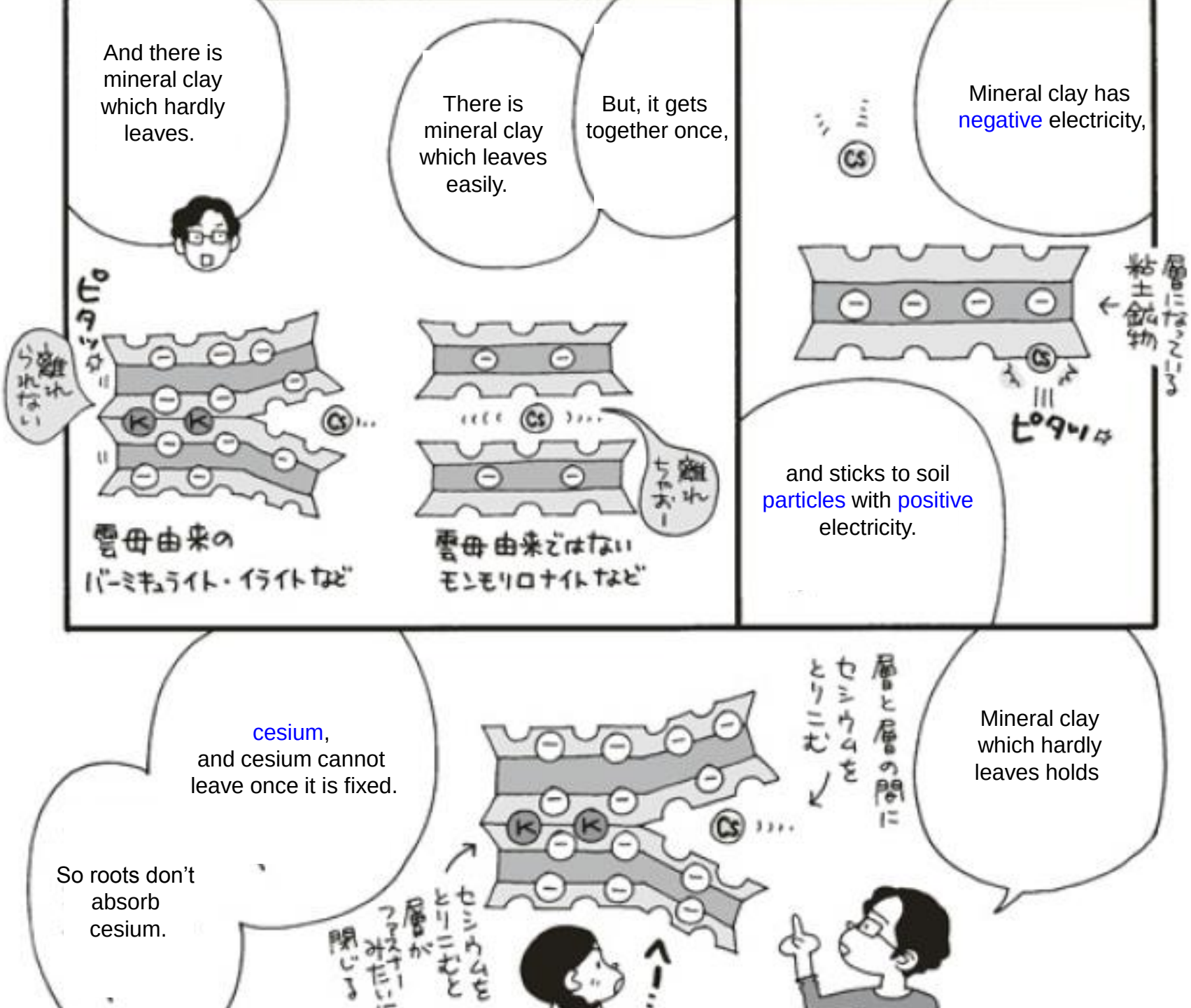





Cesium 134 has passed its half-life period…
Cs 3割
It decreases to 1/3.
There are cesium 134 and 137, and their half-life periods are different.
②Cesium 134 decreases at the half-life period
Cs 137
Cs 134
Half-life period about 30 years
Half-life period about 2 years
Some parts of them were transported by rain or typhoons to the sea.
Amount of dissolved cesium which can move into water is decreasing now.
Cs
※今回の原発事故ではセシウム134とセシウム137は約50%ずつ放出された


In areas with high levels of contaminated soil, cropping is restricted.
④ Cropping Restriction And Self-control
Mushrooms were stopped from being shipped in 7 prefectures.
Dissolved cesium moving freely into soil.
Cs
Cs
Controls absorption Of cesium From agricultural products and roots.
In addition to reduction of cesium amount
③ Countermeasure to control absorption
ゼオライト
塩化加里
Fukushima prefecture offered potassium chloride or zeolite.
えっ そうなんですか？
are not operated by farmers with self-control.
Now it may be safe, but the areas where products exceeded the standard,
And, this is not well known.

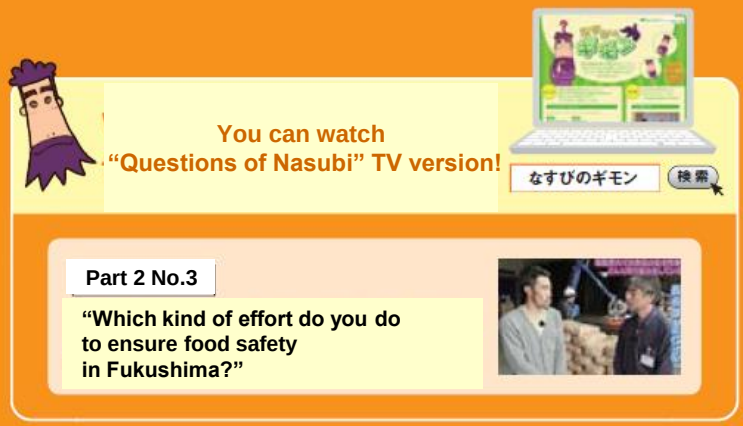

Japanese soil has a high rate of clay
Can cesium leave a soil particle even if it is fixed with a soil particle once?
It can with some soil ingredients.
根が土の粒子ごと吸うことはほとんどありません
Roots absorb only dissolved cesium moving freely in water.
Cannot enter into roots due to large particles of soil.
Cs


And there is mineral clay which hardly leaves.
There is mineral clay which leaves easily.
But, it gets together once,
Mineral clay has negative electricity,
層になっている粘土鉱物
ピタッ!!
and sticks to soil particles with positive electricity.
離れられない
雲母由来のバーミキュライト・イライトなど
離れちゃおー
雲母由来ではないモンモリロナイトなど
Mineral clay which hardly leaves holds
層と層の間にセシウムをとり込む
cesium, and cesium cannot leave once it is fixed.
So roots don't absorb cesium.
セシウムをとり込むと層がファスナーみたいに閉じる
へ!?

Understand by data!!

Detailed Explanation!

In this section, experts explains contents with data and drawings.
There is much data on the internet, so please take a look at the data which you are interested in.



事前に知っておこう！

放射性セシウムの現状

＊セシウム134の半減期は約2年。セシウム137の半減期は約30年。

次のページで、「放射性セシウムと土の関係」を解説します！