RISK MANAGEMENT AND RESIDUE ANALYSIS OF CHEMICALS FOR ENVIRONMENTAL SAFETY, JAPAN 2011 - ISKUSTVA, POGLEDI, PRIMENA

Dr Vladimir P. BEŠKOSKI
IHTM-Centar za hemiju

10.01.2012. Beograd

JICA TRAINING COURSE FOR DEVELOPING COUNTRIES - RISK MANAGEMENT AND RESIDUE ANALYSIS OF CHEMICALS FOR ENVIRONMENTAL SAFETY
februar – avgust 2011

РЕПУБЛИКА СРБИЈА
Министарство животне средине, рударства и просторног планирања
Омладинских бригада 1, 11000 Београд

Participanti:

1. Mayumis VELOSO BORGES - Kuba
2. Isil ORHAN – Turska
3. LE Thu Thuy - Vijatnam
4. Vesna MILOVANOVIĆ - Srbija
5. Parviz SOLEIMANI DINANI - Iran
6. Ayman Ahmed ABDELWAHED - Egipat
7. Sameer Mohamed BEKHIT - Egipat
8. Vladimir BEŠKOSKI - Srbija

JICA TRAINING COURSE FOR DEVELOPING COUNTRIES - RISK MANAGEMENT AND RESIDUE ANALYSIS OF CHEMICALS FOR ENVIRONMENTAL SAFETY
februar – avgust 2011

РЕПУБЛИКА СРБИЈА
Министарство животне средине, рударства и просторног планирања
Омладинских бригада 1, 11000 Београд

Rukovodstvo:

Prof. emeritus Hideo Ohkawa, Kobe University

Eizen IREI – Director JICA Hyogo

Megumi Tsukizoe – JICA officer

Kimie Yokotani – JICE coordinator

Rika Kojima – JICE coordinator

JICA TRAINING COURSE FOR DEVELOPING COUNTRIES - RISK MANAGEMENT AND RESIDUE ANALYSIS OF CHEMICALS FOR ENVIRONMENTAL SAFETY
februar – avgust 2011

РЕПУБЛИКА СРБИЈА
Министарство животне средине, рударства и просторног планирања
Омладинских бригада 1, 11000 Београд

Rukovodstvo:

Prof. emeritus Hideo Ohkawa, Kobe University

Eizen IREI – Director JICA Hyogo

Megumi Tsukizoe – JICA officer

Kimie Yokotani – JICE coordinator

Rika Kojima – JICE coordinator

JICA TRAINING COURSE FOR DEVELOPING COUNTRIES - RISK MANAGEMENT AND RESIDUE ANALYSIS OF CHEMICALS FOR ENVIRONMENTAL SAFETY
februar – avgust 2011

РЕПУБЛИКА СРБИЈА
Министарство животне средине, рударства и просторног планирања
Омладинских бригада 1, 11000 Београд

Rukovodstvo:

Prof. emeritus Hideo Ohkawa, Kobe University

Eizen IREI – Director JICA Hyogo

Megumi Tsukizoe – JICA officer

Kimie Yokotani – JICE coordinator

Rika Kojima – JICE coordinator

JICA TRAINING COURSE FOR DEVELOPING COUNTRIES - RISK MANAGEMENT AND RESIDUE ANALYSIS OF CHEMICALS FOR ENVIRONMENTAL SAFETY

februar – avgust 2011

РЕПУБЛИКА СРБИЈА
Министарство животне средине, рударства и просторног планирања
Омладинских бригада 1, 11000 Београд

Rukovodstvo:

Prof. emeritus Hideo Ohkawa, Kobe University

Eizen IREI – Director JICA Hyogo

Megumi Tsukizoe – JICA officer

Kimie Yokotani – JICE coordinator

Rika Kojima – JICE coordinator

JICA TRAINING COURSE FOR DEVELOPING COUNTRIES - RISK MANAGEMENT AND RESIDUE ANALYSIS OF CHEMICALS FOR ENVIRONMENTAL SAFETY
februar – avgust 2011

РЕПУБЛИКА СРБИЈА
Министарство животне средине, рударства и просторног планирања
Омладинских бригада 1, 11000 Београд

<u>Rukovodstvo:</u>

Prof. emeritus Hideo Ohkawa, Kobe University

Eizen IREI – Director JICA Hyogo

Megumi Tsukizoe – JICA officer

Kimie Yokotani – JICE coordinator

<u>Rika Kojima – JICE coordinator</u>

1. ***JICA training course*** **– iskustva, pogledi, primena**

2. **Akcioni plan**

3. **Putovanje proizvoda – očima hemičara (zašto je Japan – “Japan”)**

4. **O Japanu –** ***Ichi go, Ichi e***

1. JICA training course – iskustva, pogledi, primena

RISK MANAGEMENT AND RESIDUE ANALYSIS OF CHEMICALS FOR ENVIRONMENTAL SAFETY

- u brojevima

Predavanja / Celodnevni kursevi / Radionice / Radne grupe [radnih dana]	**> 60**
Laboratorijski rad [radnih dana]	**> 70**
Predavača / konsultanata	**> 80**
Posećene institucije / laboratorije / fabrike / postrojenja (obuka u okviru kursa):	**16**

Cilj – upoznati se sa prilikama u Japanu u oblasti procene rizika i hemijske analize uzoraka iz životne sredine, usvojiti nove metode i najnovija saznanja i prepoznati (primeniti) kako situaciju možemo popraviti u našim državama koje su u razvoju!

POSEĆENE INSTITUCIJE / LABORATORIJE / FABRIKE / POSTROJENJA U JAPANU (OBUKA U OKVIRU KURSA):

1. Sumitomo Chemical Co. (Osaka);
2.Horiba (Kyoto),
3. Hitachi High Technologies Corp. (Osaka);
4. Shimadzu Co. (Kyoto);
5. Hyogo Prefectural Technology Center for Agriculture, Forestry and Fisheries (Kasai);
6. National Institute for Minamata Disease (Minamata);
7. Kumamoto Prefectural Environmental Center, Minamata City and Minamata Disease Archives (Minamata);
8. Kobe Quarantine Station, Center for Inspection of Imported Foods and Infectious Diseases, (Kobe);
9. Hyogo Prefectural Institute of Environmental Science (Kobe);
10. Communal Waste Treatment Plant (Nishinomiya);
11. Kobe Offshore Reclamation Disposal Site - Phoenix plan (Osaka bay);
12. Advance Industrial Science & Technology (Tokyo);
13. National Institute of Agro-Envi. Science (Tsukuba);
14. National Institute of Technology and Evaluation (Tsukuba);
15. Kobe University, Research Center for Environmental Genomics (Kobe);
16. Kansai Electric Co. (Kobe);

NEKE OD OBRADJIVANIH TEMA

- Procena rizika upotrebe hemijskih jedinjenja
- Upravljanje rizikom
- Medjunarodni standardi o proceni i upravljanju rizikom
- Baze podataka za izradu procene rizika za poznata jedinjenja, smeše i cross analizu
- Biodegradacija
- Bioakumulacija
- Biotransformacija
- Bioremedijacija
- Mikroorganizmi u upravljanju rizikom
- Ekotokikološki i toksikološki aspekti upotrebe hemikalija
- Upotreba agrohemikalija
- Predvidjanje ponašanja, kretanja i ekoloških efekata upotrebe agrohemikalija
- Persistent Organic Pollutants - POPs
- Dioksini – postanak, dejstvo, eliminacija
- Procena rizika od karcinogeneze
- Profesionalne bolesti
- Analitika štetnih supstanci (instrumentalne i imunohemijske metode)
- Tretman (komunalnog i industrijskog) čvrstog otpada
- Tretman voda

3/7	Mon	Course Orientation (L) Regulatory Science【1】	Kobe University Prof. of Emeritus	OHKAWA Hideo	JICA Hyogo SR#6
3/8	Tue	(L) The Basics for Risk Assessment and Management of Chemicals【1】	Kobe University Prof. of Emeritus	OHKAWA Hideo	JICA Hyogo SR#6
3/9	Wed	(L) Recent International Requirement of Risk Assessment and Management Including REACH【1】	Graduate School of Agriculture Kyoto University	LEE Philip W.	JICA Hyogo SR#7, CR#2
3/10	Thu	(L) Chemicals Control and Chemicals Assessment in the World and its Trend 1 (Biodegradation & Bioaccumulation)【1】	Chemicals Evaluation and Research Institute, Japan	MIYACHI Shigeki	JICA Hyogo SR#6
3/11	Fri	(L) Chemicals Control and Chemicals Assessment in the World and its Trend 2 (Eco-Toxicology)【1】	Chemicals Evaluation and Research Institute, Japan	MIYACHI Shigeki	JICA Hyogo SR#6
3/15	Tue	(L) Research, Development and Safety Use of Pesticide【1】	Sumitomo Chemical Takeda Agro Co.,Ltd.	TASHIRO Shigeki	JICA Hyogo SR#1&2
16	Wed	Workshop for Action Pan 1【4】	JICE Kansai (Hyogo)	YOKOTANI Kimie	JICA Hyogo SR#5
17	Thu	(L) Biotransformation of Chemicals in Mammals【1】	Sumitomo Chemical Co.,Ltd.	ISOBE Naohiko	JICA Hyogo SR#5
18	Fri	(O) Environmental Health Science Lab., Sumitomo Chemical Co.,Ltd.【1】	Sumitomo Chemical Co.,Ltd.	ISOBE Naohiko	Osaka City

RISK ASSESMENT - PROCENA RIZIKA

Rizik = Opasnost/Toksičnost × Izloženost

Ukoliko je izloženost 0 i rizik je 0 bez obzira na opasnost!

Ukoliko je izloženost velika i rizik može biti veliki, čak i kada je opasnost mala!

"Sve supstance su otrovi. Nema ni jedne koja nije otrov. Prava doza razlikuje otrov od leka."

Paracelsus (1493-1541)

RISK ASSESMENT - PROCENA RIZIKA

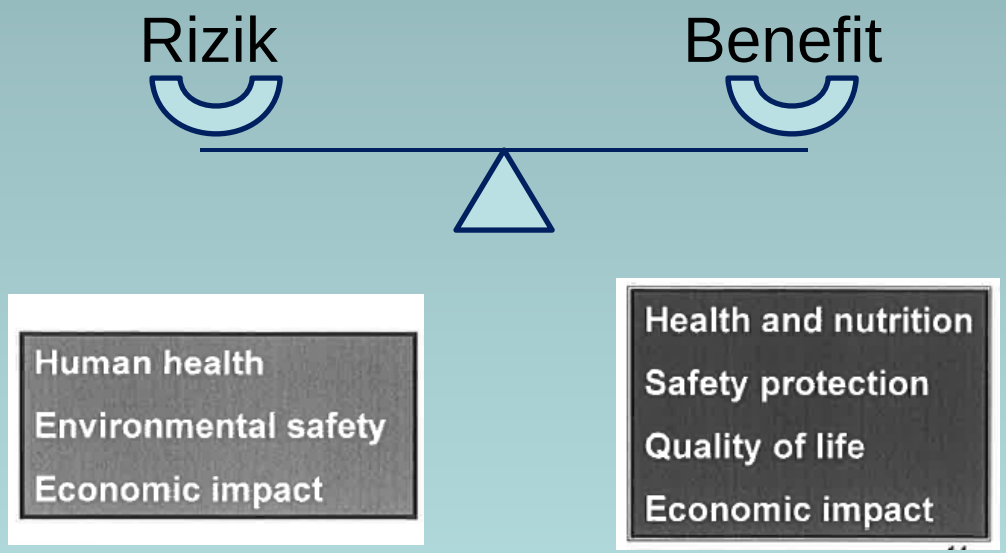
- Risk assessment is the study the relationship between hazard and exposure

Risk = *f* (hazard, exposure)

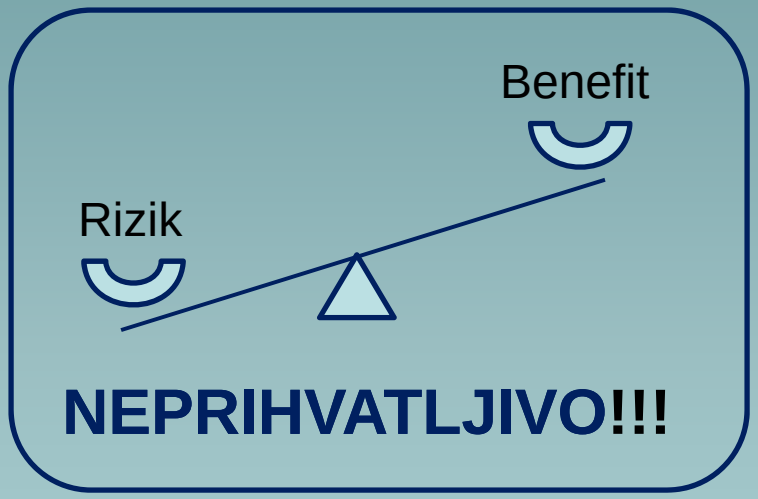
Risk	Hazard	Exposure
1. Acute 2. Chronic 3. Aggregated 4. Cumulative	1. Mammalian Toxicity 2. Environmental Toxicity 3. Persistence, Bioaccumulative, Toxicity (PBT)	Nature of exposure (dietary, nondietary, occupational, environmental) Magnitude of exposure

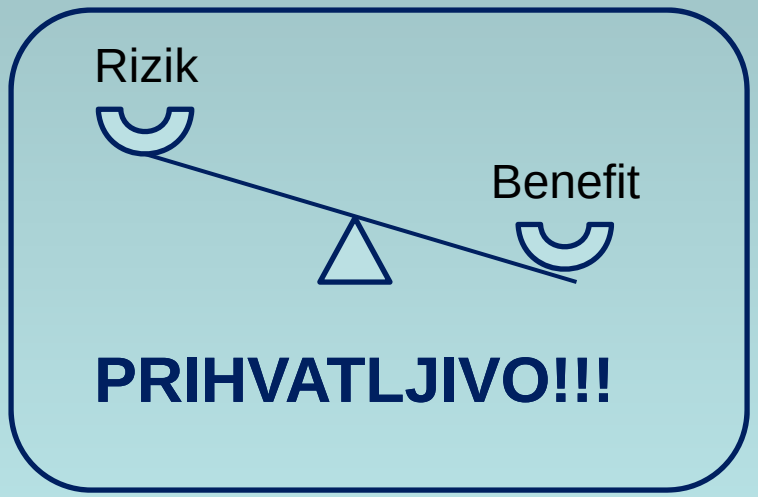
RISK MANAGEMENT - UPRAVLJANJE RIZIKOM

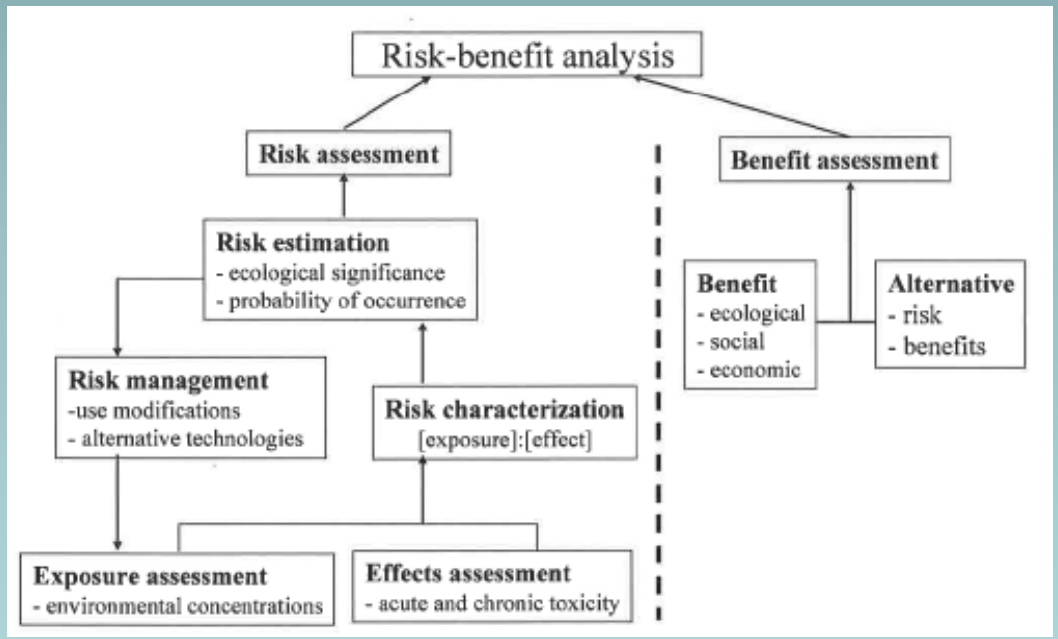
Sve supstance imaju dva aspekta upotrebe:



RISK MANAGEMENT - UPRAVLJANJE RIZIKOM







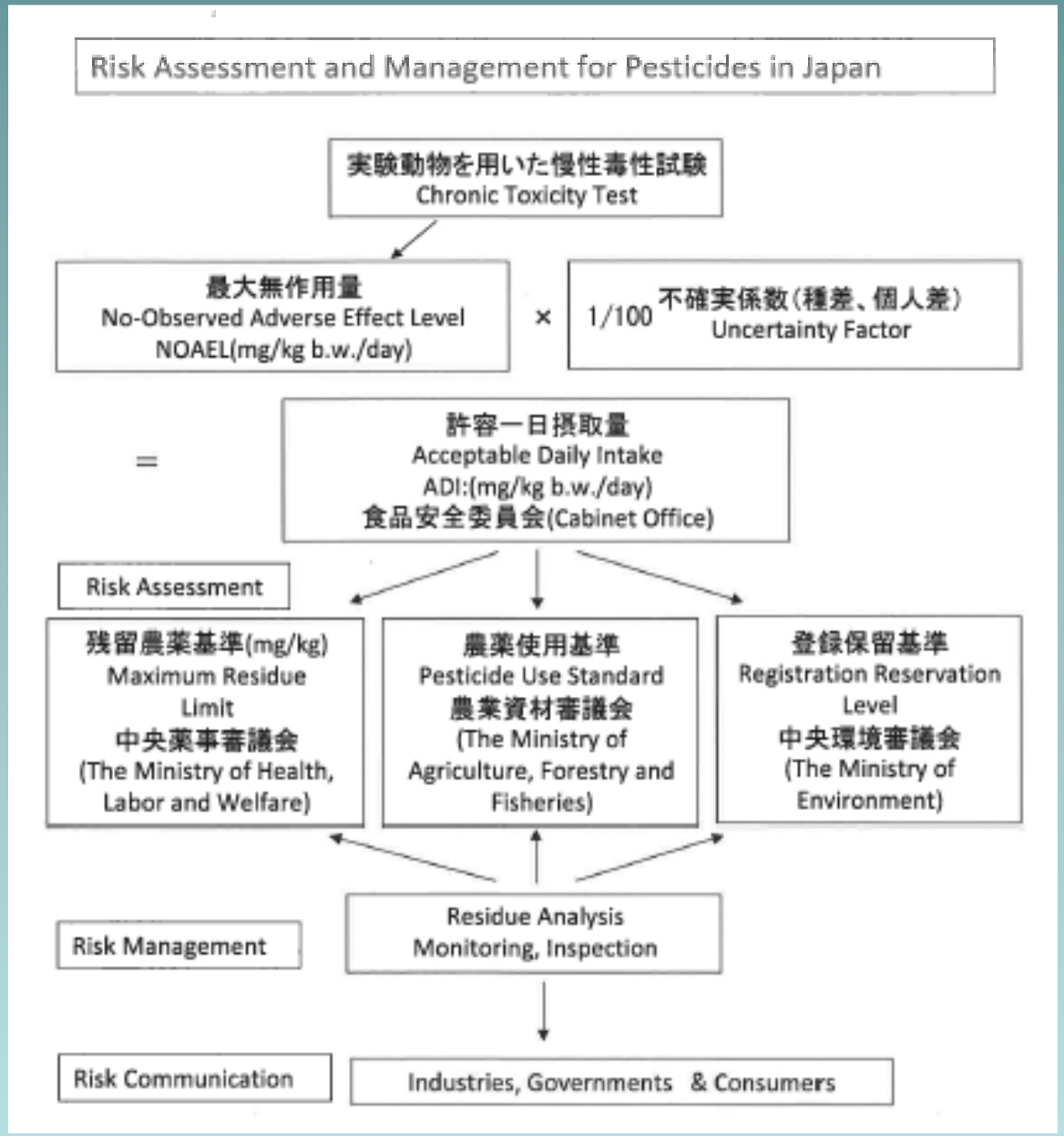
HEMIJSKE SUPSTANCE, ZAGADJIVAČI ŽIVOTNE SREDINE

1) **Agrochemicals (or Pesticides)**
   Insecticides, fungicides, herbicides
   bioregulators and natural enemies
   (gene-modified crops)
2) **Persistent Organic Pollutants (POPs)**
   Persistence, long-distance transport and high bioaccumulation
3) **High Production Volume Chemicals (HPV)**
   >1,000 ton/year in more than 2 countries, or >10,000 ton/year in a country

Hemijske supstance - toksikanti

- 23 000 000 poznatih jedinjenja
- **100 000 supstanci se proizvodi smišljeno, namerno**
- 23 000 hemijskih supstanci na listi za upotrebu u domaćinstvu (Kanada)
- 63 000 organskih hemikalija u SAD (industrija, domaćinstvo poljoprivreda)
- **5 000 supstanci - proizvodnja veća od jedne tone godišnje**
- **300 miliona tona organskih supstanci se proizvede svake godine**
- **1200-1500 godišnja registracija novih supstanci**
- 400-500 supstanci detektovano u okolini
- 50 supstanci sa “poznatim” ponašanjem u okolini
- ~ 100 supstanci koje se razmatraju pri ispitivanju kvalitetu vode
- ~ 250 antropogenih supstanci u svakom čoveku

RISK COMMUNICATION


Risk Assessment and Management for Pesticides in Japan
実験動物を用いた慢性毒性試験
Chronic Toxicity Test
最大無作用量
No-Observed Adverse Effect Level
NOAEL(mg/kg b.w./day)
×
1/100
不確実係数(種差、個人差)
Uncertainty Factor
=
許容一日摂取量
Acceptable Daily Intake
ADI:(mg/kg b.w./day)
食品安全委員会(Cabinet Office)
Risk Assessment
残留農薬基準(mg/kg)
Maximum Residue Limit
中央薬事審議会
(The Ministry of Health, Labor and Welfare)
農薬使用基準
Pesticide Use Standard
農業資材審議会
(The Ministry of Agriculture, Forestry and Fisheries)
登録保留基準
Registration Reservation Level
中央環境審議会
(The Ministry of Environment)
Risk Management
Residue Analysis
Monitoring, Inspection
Risk Communication
Industries, Governments & Consumers

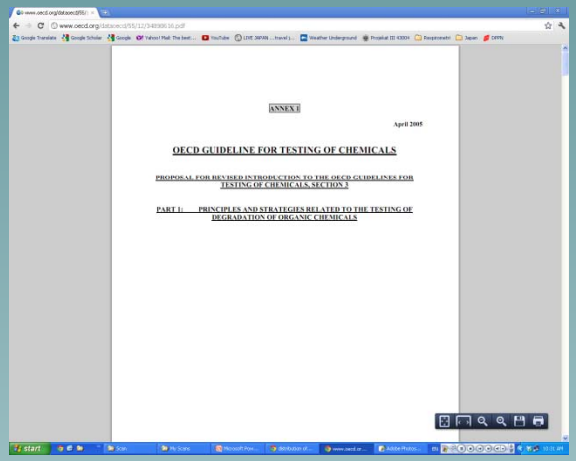
BIODEGRADACIJA

$$\text{Biodegradability (\%)} = \frac{\text{BOD} - \text{BOD}_{\text{blank}}}{\text{ThOD}} \times 100$$

ThOD is Theoretical Oxygen Demand.
$\text{BOD}_{\text{blank}}$ is BOD of blank bottle.

Test conditions

OECD Test-guideline 301C
- -Cultivation period: 28 days
- -Concentration of test chemical: 100 mg/L
- -Concentration of activated sludge: 30 mg/L
- -Test temperature: 25 ℃
- -Control chemical: Aniline



ANNEX 2

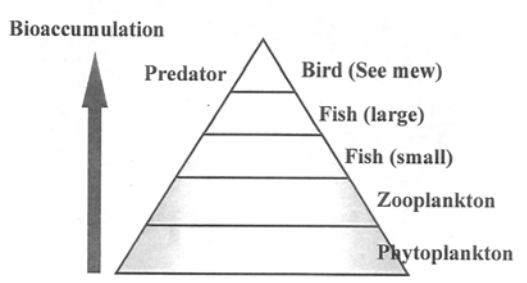
April 2005

OECD GUIDELINE FOR TESTING OF CHEMICALS

PROPOSAL FOR REVISED INTRODUCTION TO THE OECD GUIDELINES FOR TESTING OF CHEMICALS, SECTION 3

PART 1: PRINCIPLES AND STRATEGIES RELATED TO THE TESTING OF DEGRADATION OF ORGANIC CHEMICALS

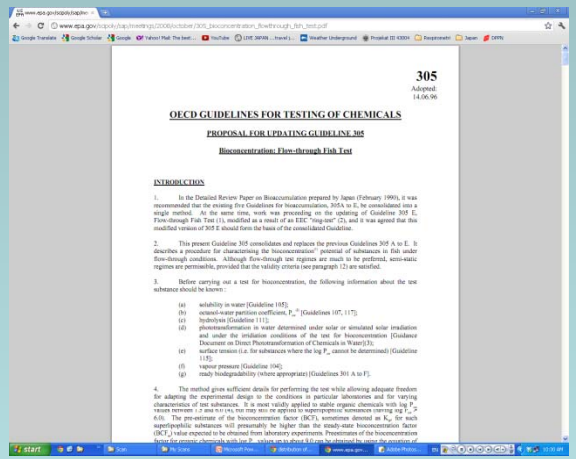
BIOAKUMULACIJA



Bio-concentration factor (BCF)

$$= \frac{\text{Concentration of test chemical in fish}}{\text{Concentration of test chemical in water}}$$

$$= \frac{C_f}{C_w}$$



305

Adopted:
14.06.96

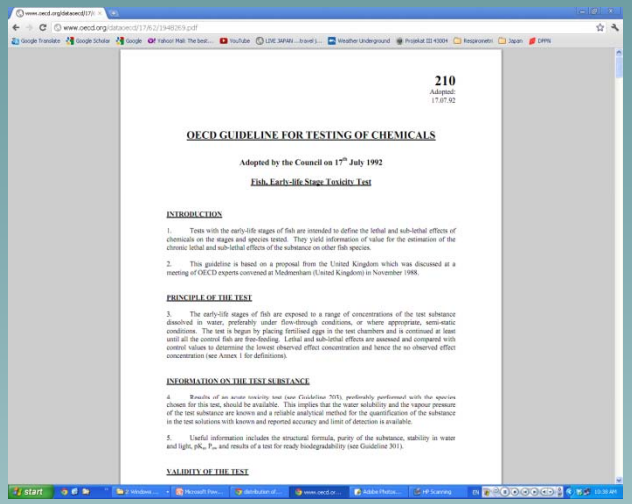
OECD GUIDELINES FOR TESTING OF CHEMICALS

PROPOSAL FOR UPDATING GUIDELINE 305

Bioconcentration: Flow-through Fish Test

INTRODUCTION

EKOTOKSIČNOST



210
Adopted:
17.07.92

OECD GUIDELINE FOR TESTING OF CHEMICALS

Adopted by the Council on 17th July 1992

Fish, Early-life Stage Toxicity Test

INTRODUCTION

1. Tests with the early-life stages of fish are intended to define the lethal and sub-lethal effects of chemicals on the stages and species tested. They yield information of value for the estimation of the chronic lethal and sub-lethal effects of the substance on other fish species.

2. This guideline is based on a proposal from the United Kingdom which was discussed at a meeting of OECD experts convened at Medmenham (United Kingdom) in November 1988.

PRINCIPLE OF THE TEST

3. The early-life stages of fish are exposed to a range of concentrations of the test substance dissolved in water, preferably under flow-through conditions, or where appropriate, semi-static conditions. The test is begun by placing fertilised eggs in the test chambers and is continued at least until all the control fish are free-feeding. Lethal and sub-lethal effects are assessed and compared with control values to determine the lowest observed effect concentration and hence the no observed effect concentration (see Annex 1 for definitions).

INFORMATION ON THE TEST SUBSTANCE

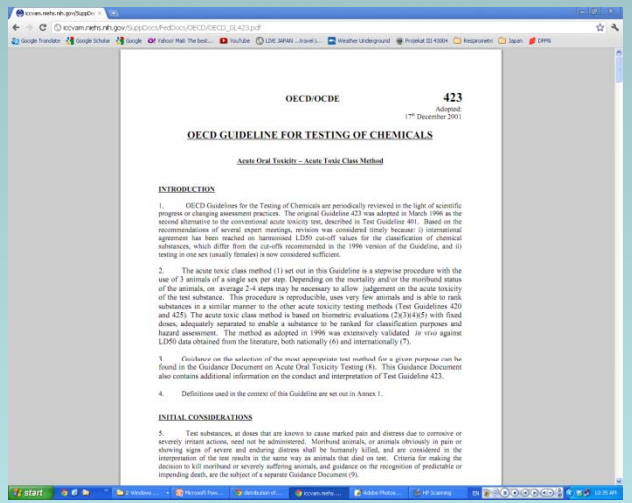
4. Results of an acute toxicity test (see Guideline 203), preferably performed with the species chosen for this test, should be available. This implies that the water solubility and the vapour pressure of the test substance are known and a reliable analytical method for the quantification of the substance in the test solutions with known and reported accuracy and limit of detection is available.

5. Useful information includes the structural formula, purity of the substance, stability in water and light, pK_a, P_{ow} and results of a test for ready biodegradability (see Guideline 301).

VALIDITY OF THE TEST

TOKSIČNOST

National Institute of Agro-Envi. Science (Tsukuba)



OECD/OCDE 423
Adopted:
17th December 2001

OECD GUIDELINE FOR TESTING OF CHEMICALS

Acute Oral Toxicity – Acute Toxic Class Method

INTRODUCTION

1. OECD Guidelines for the Testing of Chemicals are periodically reviewed in the light of scientific progress or changing assessment practices. The original Guideline 423 was adopted in March 1996 as the second alternative to the conventional acute toxicity test, described in Test Guideline 401. Based on the recommendations of several expert meetings, revision was considered timely because: i) international agreement has been reached on harmonised LD50 cut-off values for the classification of chemical substances, which differ from the cut-offs recommended in the 1996 version of the Guideline, and ii) testing in one sex (usually females) is now considered sufficient.

2. The acute toxic class method (1) set out in this Guideline is a stepwise procedure with the use of 3 animals of a single sex per step. Depending on the mortality and/or the moribund status of the animals, on average 2-4 steps may be necessary to allow judgement on the acute toxicity of the test substance. This procedure is reproducible, uses very few animals and is able to rank substances in a similar manner to the other acute toxicity testing methods (Test Guidelines 420 and 425). The acute toxic class method is based on biometric evaluations (2)(3)(4)(5) with fixed doses, adequately separated to enable a substance to be ranked for classification purposes and hazard assessment. The method as adopted in 1996 was extensively validated *in vivo* against LD50 data obtained from the literature, both nationally (6) and internationally (7).

3. Guidance on the selection of the most appropriate test method for a given purpose can be found in the Guidance Document on Acute Oral Toxicity Testing (8). This Guidance Document also contains additional information on the conduct and interpretation of Test Guideline 423.

4. Definitions used in the context of this Guideline are set out in Annex 1.

INITIAL CONSIDERATIONS

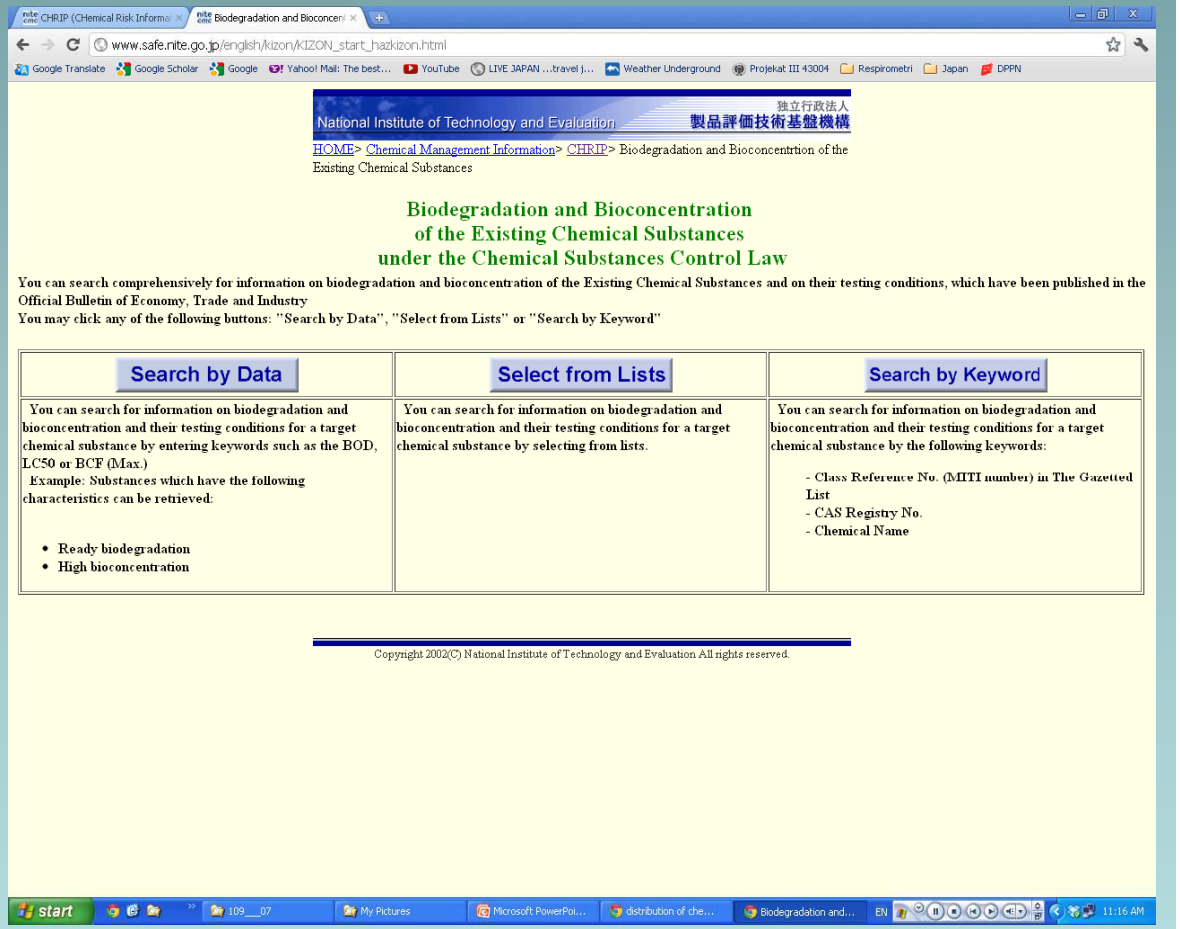
5. Test substances, at doses that are known to cause marked pain and distress due to corrosive or severely irritant actions, need not be administered. Moribund animals, or animals obviously in pain or showing signs of severe and enduring distress shall be humanely killed, and are considered in the interpretation of the test results in the same way as animals that died on test. Criteria for making the decision to kill moribund or severely suffering animals, and guidance on the recognition of predictable or impending death, are the subject of a separate Guidance Document (9).

JAPANSKE BAZE PODATAKA

Više od 2000 testova biodegradacije i bioakumulacije.

Rezultati su dostupni na Internet stranici “National Institute for Technology and Evaluation”.

http://www.safe.nite.go.jp/english/db.html



RIZIK OD POJEDINIH AKTIVNOSTI U JAPANU I HOLANDIJI

Activity	Death number	Annual mortality rate	Risk over the life
Traffic accident	10,649	8.5×10^{-7}	6.0×10^{-3}
Traffic accident (foot passenger	2,886	2.3×10^{-5}	1.6×10^{-3}
Water accident	1,360	1.5×10^{-5}	7.0×10^{-4}
Fire accident	1,041	8.4×10^{-6}	5.9×10^{-4}
Natural calamity	59	4.8×10^{-7}	3.4×10^{-5}
Ground discharge		3.2×10^{-8}	2.2×10^{-6}

Annual mortality rate associated with certain occurrences and activities in the Netherlands

Activity	Annual mortality rate	-
Drowning as a result of dike collapse	1×10^{-7}	1 in 10,000,000
Bee sting	2×10^{-7}	1 in 5,000,000
Walking	1.85×10^{-5}	1 in 54,000
Driving a car	1.75×10^{-4}	1 in 5,700
Riding a motorbike	2×10^{-4}	1 in 5,000
Smoking cigarettes (1 packet a day)	5×10^{-3}	1 in 200

Risk Assessment of chemicals: An introduction, C.J. van Leeuwen, T.G. Vermeire, springer, 2000 44

Pitanje: Koji nivo rizika je prihvatljiv za hemikalije?

10^{-5} $\quad \frac{1}{100\,000}$

10^{-6} $\quad \frac{1}{1\,000\,000}$

KORISNE INFORMACIJE ZA PROCENU RIZIKA UPOTREBE POZNATIH SUPSTANCI SU VEĆ DOSTUPNE!!!

Hemijske, fizičko hemijske, toksikološke, ekotoksikološke osobine supstanci!

Medjunarodni zakoni i propisi, rečnici, dokumenti o upravljanju, neophodna testiranja...

Internet i kompjuterski modeling za procenu rizika!

Ekstrapolacija sa jednog seta dogadjaja na drugi!

A must have list of database and computational tools for risk assessment (free)

Physical chemical properties		
The OSIRIS Property Explorer	http://www.chemexper.com/tools/propertyExplorer/main.html	
ChemAxon	http://www.chemaxon.com/	

PBT – Persistence, Bioaccumulation, Toxicity

Level One: PBT assessment tool		
EPA EPIWin	http://www.epa.gov/oppt/exposure/pubs/episuitedl.htm	
EPA PBT profiler	http://www.pbtprofiler.net/	

A must have list of database and computational tools for risk assessment (free)

Environmental and metabolism degradation database and prediction tools		
UM biodegradation database	http://umbbd.msi.umn.edu/	
MITI biodegradation database	http://www.safe.nite.go.jp/english/kizon/KIZON_start_hazkizon.html	
METIS (Metabolic Information Input System)	http://ecb.jrc.ec.europa.eu/qsar/qsar-tools/index.php?c=METIS	
CRAFT - Chemical Reactivity and Fate Tool	http://www.molecular-networks.com/products/craft	

Ecotoxicity database and predictive systems		
EPA ECOSAR	http://www.epa.gov/oppt/newchems/tools/21ecosar.htm	
EPA ecotox on-line database	http://cfpub.epa.gov/ecotox/	

A must have list of database and computational tools for risk assessment (free)

Exposures estimation		
Chemical Screening Tool for Exposures & Environmental Releases (ChemSTEER)	http://www.epa.gov/oppt/exposure/pubs/chemsteer.htm	
Exposure and Fate Assessment Screen (E-FAST V2.0)	http://www.epa.gov/oppt/exposure/pubs/efast.htm	
Level I, II, III Fugacity Models	http://www.trentu.ca/academic/aminss/envmodel/models/L1L2L3.html	

Toxicity prediction		
Lazar Toxicity Predictions	http://lazar.in-silico.de/	
The OSIRIS Property Explorer	http://www.chemexper.com/tools/propertyExplorer/main.html	
Ambit/Tox Tree	http://ambit.acad.bg	

REČNICI, UPUTSTVA, PRAVILNICI, ZAKONI, REGULATIVE...

- Glossary of terms relating to pesticides
  http://www.iupac.org/publications/pac/2006/pdf/7811x2075.pdf
- Risk assessment for occupational exposure to chemicals. A review of current methodology
  http://www.iupac.org/publications/pac/2001/pdf/7306x0993.pdf
- Modeling lifetime and degradability of organic compounds in air, soil, and water systems
  http://www.iupac.org/publications/pac/2001/pdf/7308x1331.pdf

- Glossary of terms used in toxicology
  http://www.iupac.org/publications/pac/2007/pdf/7907x1153.pdf
- Explanatory dictionary of key terms in toxicology
  http://www.iupac.org/publications/pac/2007/pdf/7909x1583.pdf
- Glossary of terms used in toxicokinetics
  http://www.iupac.org/publications/pac/2004/pdf/7605x1033.pdf

https://secure.pesticides.gov.uk/MRLs/

http://www.epa.gov/OCEPAterms/

http://cfpub.epa.gov/ncea/

http://www.epa.gov/risk/basicinformation.htm#risk

2. AKCIONI PLAN

PROCENA LABORATORIJSKIH KAPACITETA ZA FIZIČKO HEMIJSKU I EKOTOKSIKOLOŠKU ANALIZU HEMIKALIJA U REPUBLICI SRBIJI

OPŠTI CILJ

Postići visoke laboratorijske kapacitete za ekotoksikološka, toksikološka i fizičko-hemijska istraživanja i analize pojedinačnih supstanci i za procenu ekotoksikološkog uticaja oslobodjenih štetnih supstanci u životnu sredinu i osnivanje Referentne, nacionalne laboratorije za ekotoksikologiju.

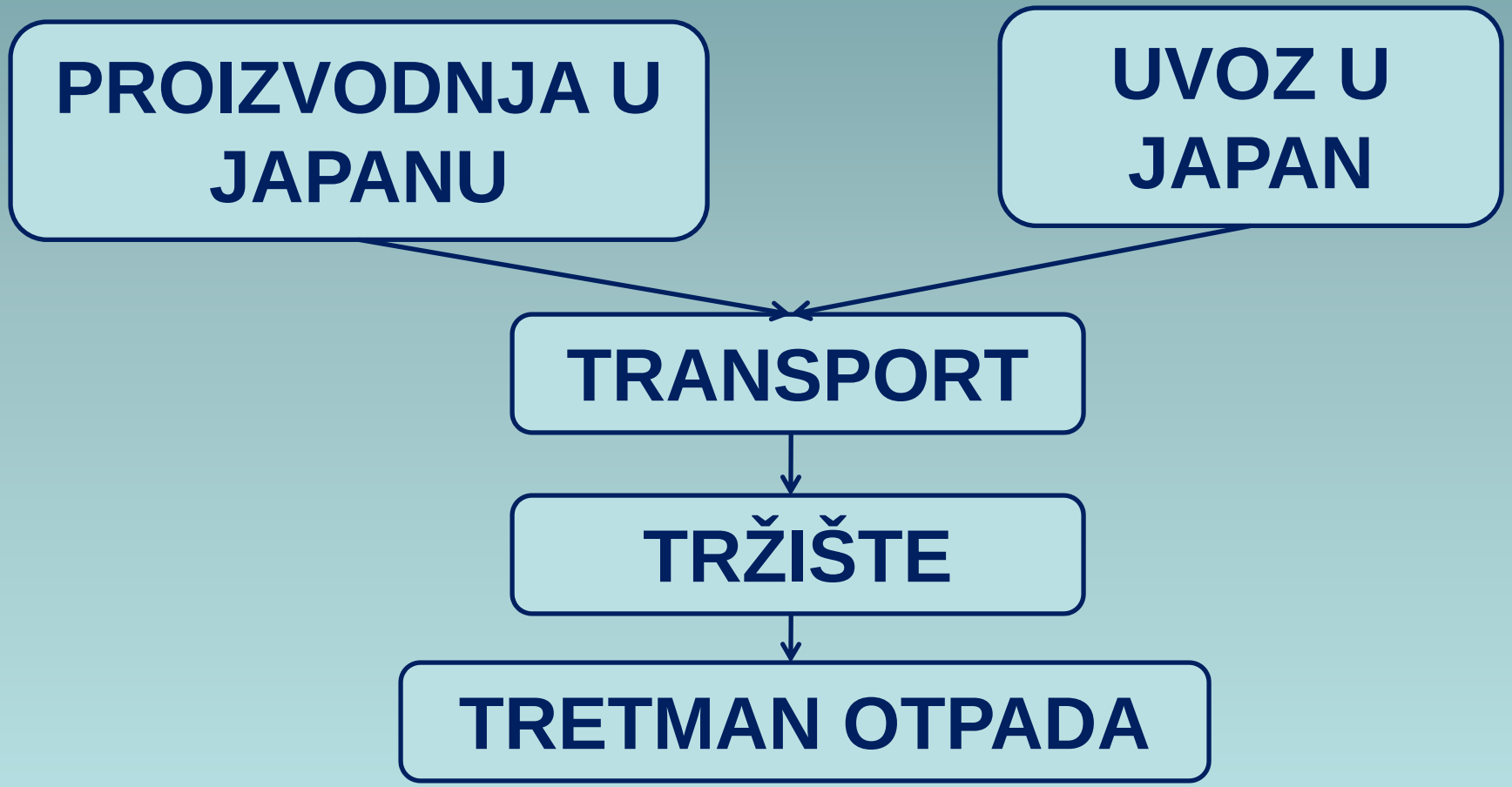
SVRHA PROJEKTA

Sakupljanje informacija koliko državnih i privatnih laboratorija može da realizuje ekotoksikološke i fizičko-hemijske analize i podela informacija sa Ministarstvom za životnu sredinu, rudarstvo i prostorno planiranje, Agencijom za hemikalije Republike Srbije i javnošću.

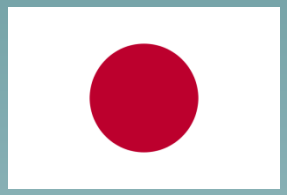
REALIZACIJA

Analiza postojećih informacija i dostupnih podataka u Ministarstvima Republike Srbije, priprema upitnika prema "COMMISSION REGULATION (EC) NO 440/2008 OF 30 MAY 2008“, distribucija laboratorijama, realizacija ispitivanja, obrada i prezentovanje podataka.

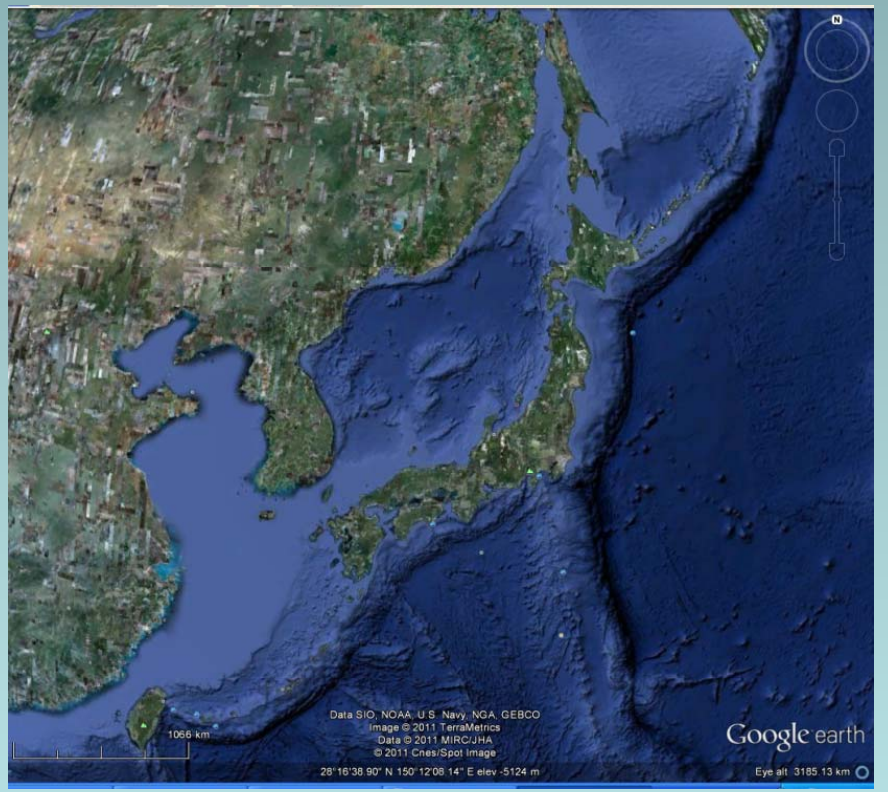
3. PUTOVANJE PROIZVODA - OČIMA HEMIČARA (zašto je Japan – “Japan”)



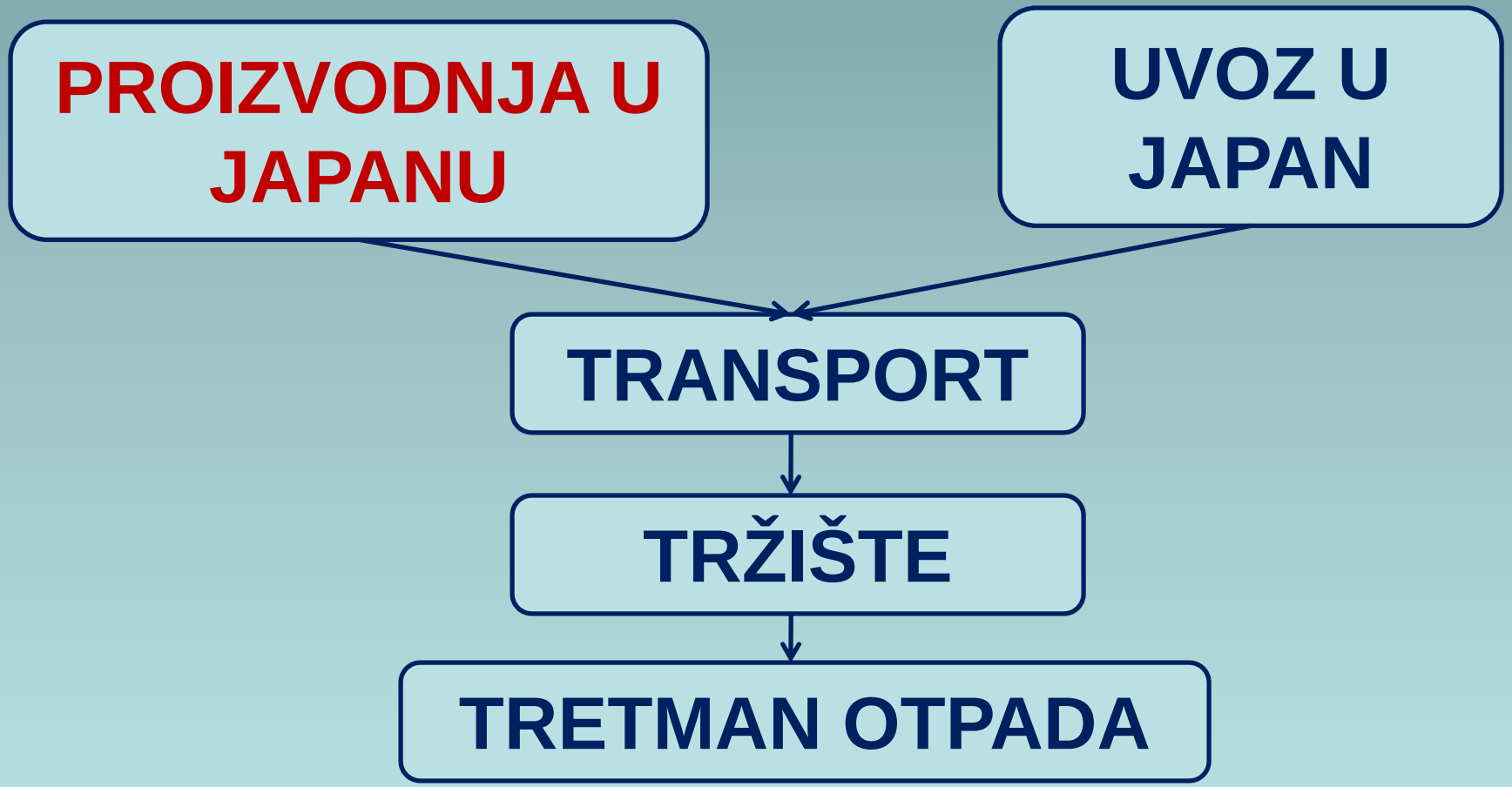
JAPAN U BROJEVIMA



- 6800 ostrva
- 4 ostrva čine 97% površine
  - Hokkaido
  - Honshu
  - Kzushu
  - Shikoku
- 73% planine
- 12% poljoprivredno zemljište
- Površina 377,944 km^2
- Stanovnika 127,960,000
- 1500 merljivih zemljotresa godišnje
- Aktivni vulkani, planina Fuji
- **>60% hrane se uvozi**



3. PUTOVANJE PROIZVODA - OČIMA HEMIČARA (zašto je Japan – “Japan”)



3. PUTOVANJE PROIZVODA - OČIMA HEMIČARA (zašto je Japan – “Japan”)

PROIZVODNJA U JAPANU






HPTCAFF

Hyogo Prefectural Technology Center for Agriculture, Forestry and Fisheries (Kasai)

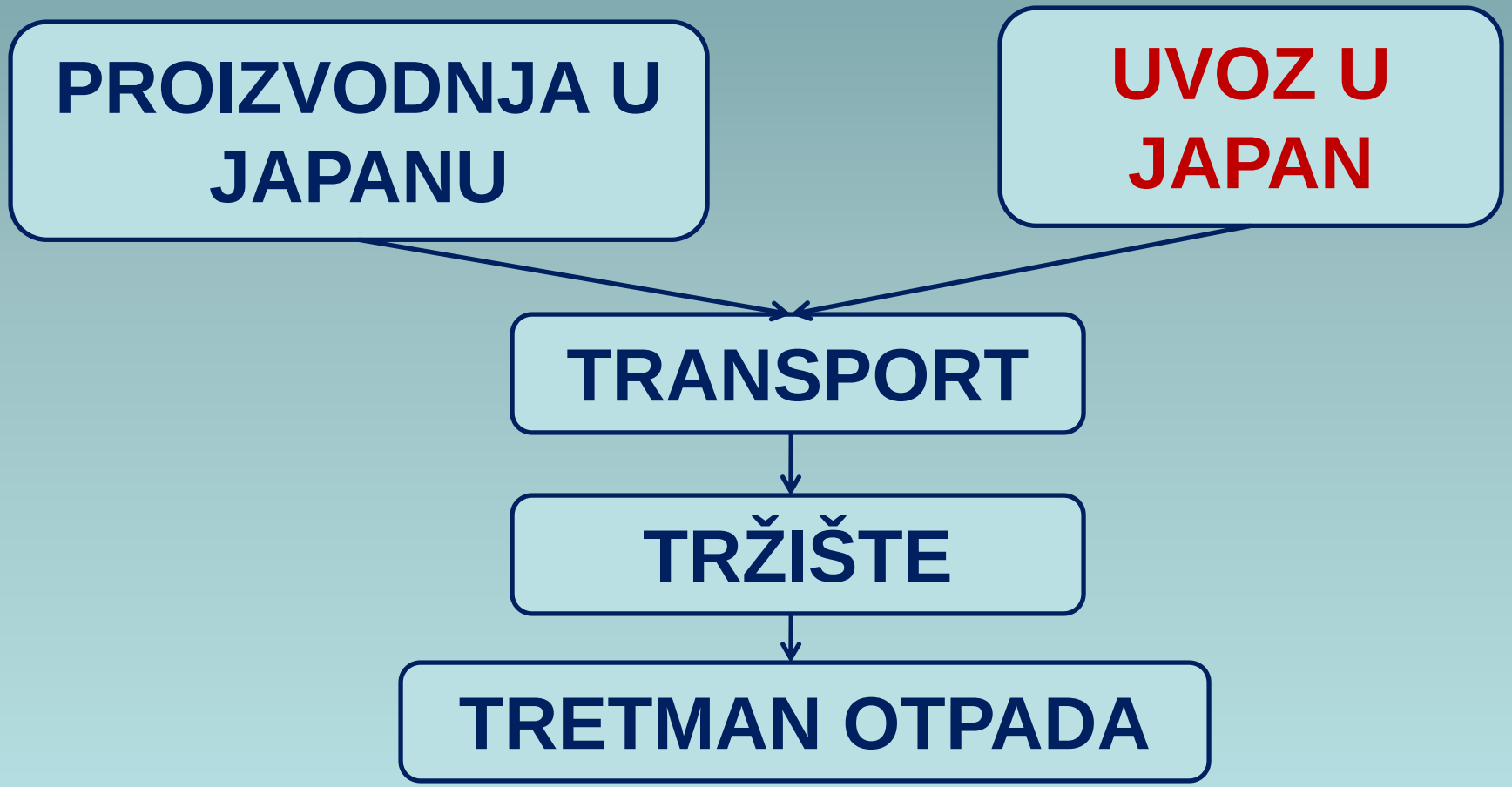
ANALITIKA

Pesticidi, teški metali, hranljive supstance, mikroorganizmi u zemljištu i vodi.

R&D

Primena novih pesticida, razvoj novih sojeva biljaka (manji prostor – veći prinos).

3. PUTOVANJE PROIZVODA - OČIMA HEMIČARA (zašto je Japan – “Japan”)



3. PUTOVANJE PROIZVODA - OČIMA HEMIČARA (zašto je Japan – “Japan”)

UVOZ U JAPAN

KQS

Kobe Quarantine Station, Center for Inspection of Imported Foods and Infectious Diseases, (Kobe);

15 karantinskih stanica kontroliše kvalitet uvezene hrane i predmeta opšte upotrebe:
pesticidi, antibiotici, aditivi, POPs, mikrobiološka analiza.

3. PUTOVANJE PROIZVODA - OČIMA HEMIČARA (zašto je Japan – “Japan”)





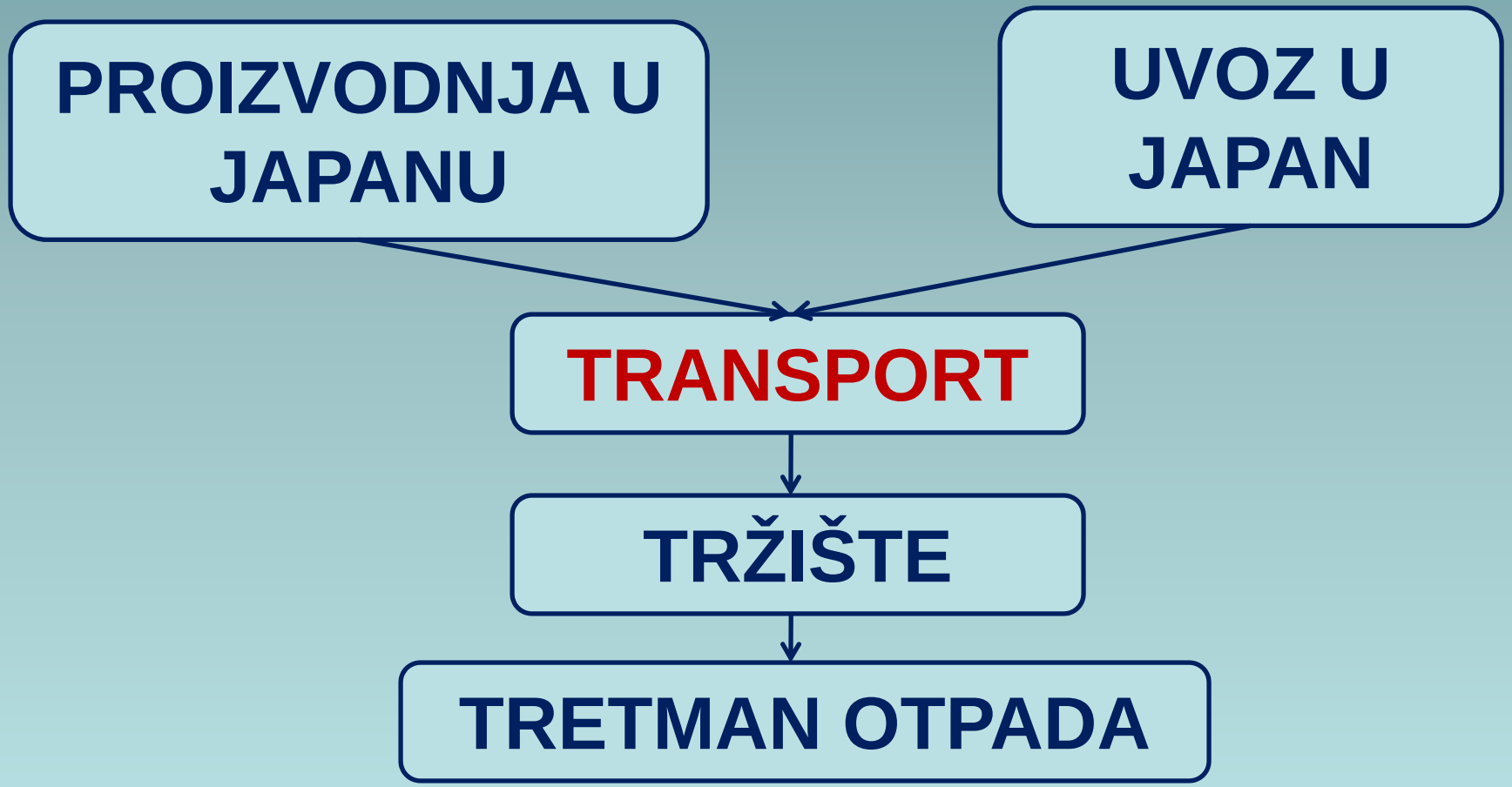

UVOZ U JAPAN

KQS

Kobe Quarantine Station, Center for Inspection of Imported Foods and Infectious Diseases, (Kobe);

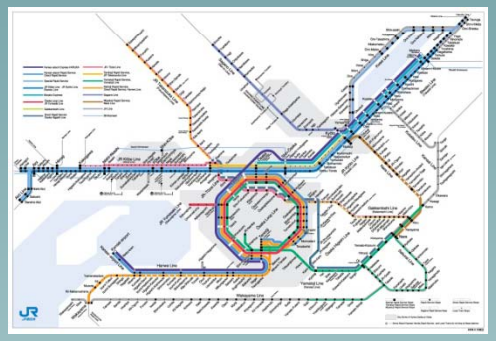
15 karantinskih stanica kontroliše kvalitet uvezene hrane i predmeta opšte upotrebe – 530 pesticida i 152 antibiotika (2010)

3. PUTOVANJE PROIZVODA - OČIMA HEMIČARA (zašto je Japan – “Japan”)

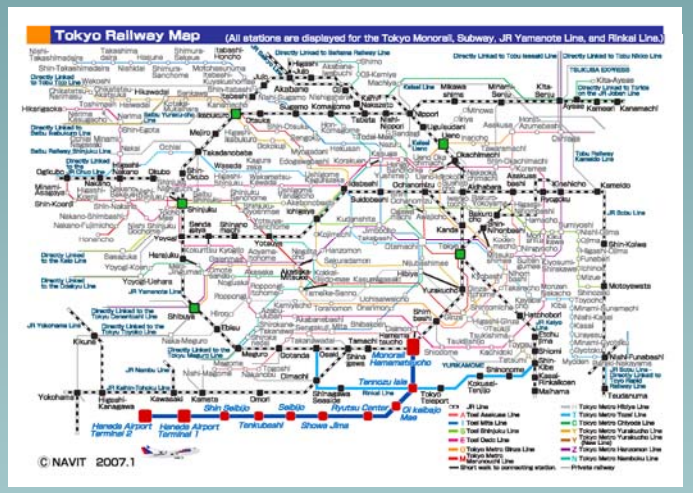


TRANSPORT

Bullet Train
Shinkansen vozovi



Kansai area train map

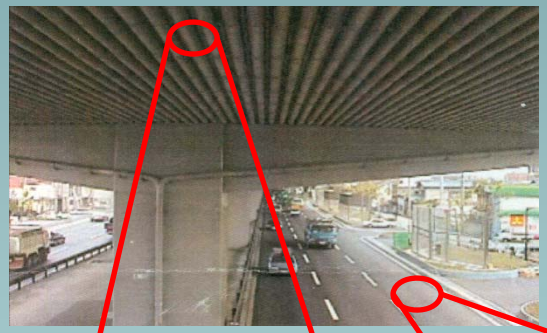


Tokyo area train map

Osaka-Kobe
National route 43 & Hanshin Expressway

TRANSPORT

Kontrola zagadjenja bukom na Nacionalnom putu 43 i & Hanshin Expressway (Osaka-Kobe autoput)



Zeleni pojas 3-5 dB, zvučne barijere 3-6 dB, vodopropusna podloga 3-5 dB, “buffer” zgrade 10-15 dB, adsorberi ispod autoputa 1-5 dB, nove zvučni adsorberi 3-6 dB.

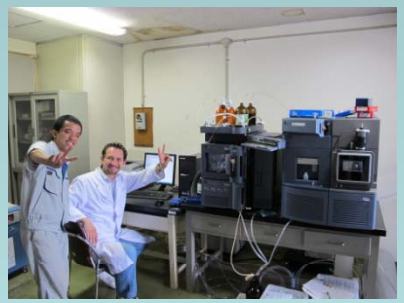
TRANSPORT

Kontrola zagadjenja vazduha u urbanim sredinama pored puteva

Hyogo Prefectural Institute of Environmental Science (Kobe)

SO_2, NO_x, O_x, SPM, HC, CO, WS, WD
Kansai oblast: 59 stanica u prirodi i 32 pored puteva

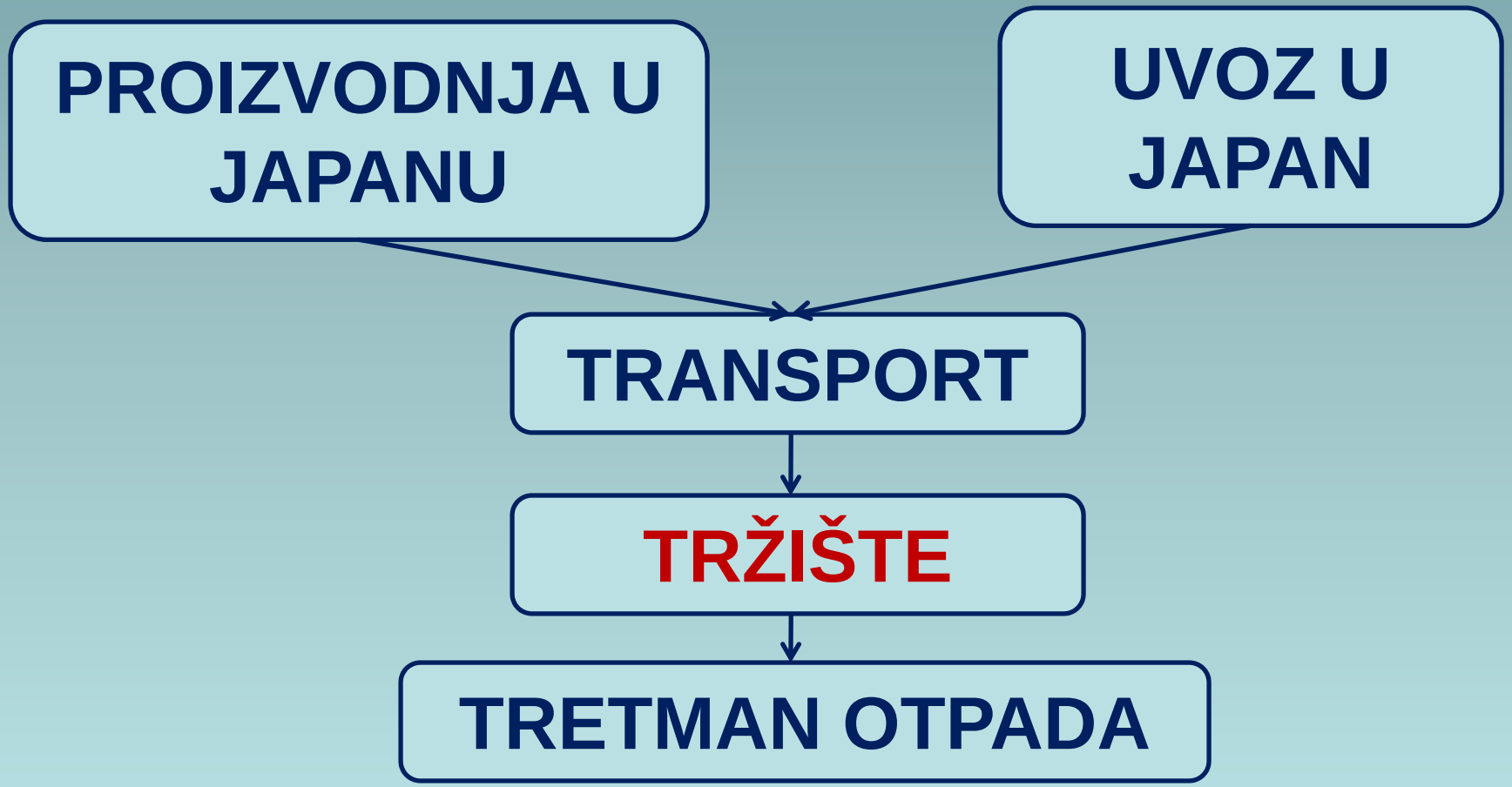
Liquid Chromatography/Ion Trap/Time of Flight (LC-IT-TOF) – (LC - MS^n)



LC MS-MS

HR GC-MS

3. PUTOVANJE PROIZVODA - OČIMA HEMIČARA (zašto je Japan – “Japan”)



TRŽIŠTE (hrana)



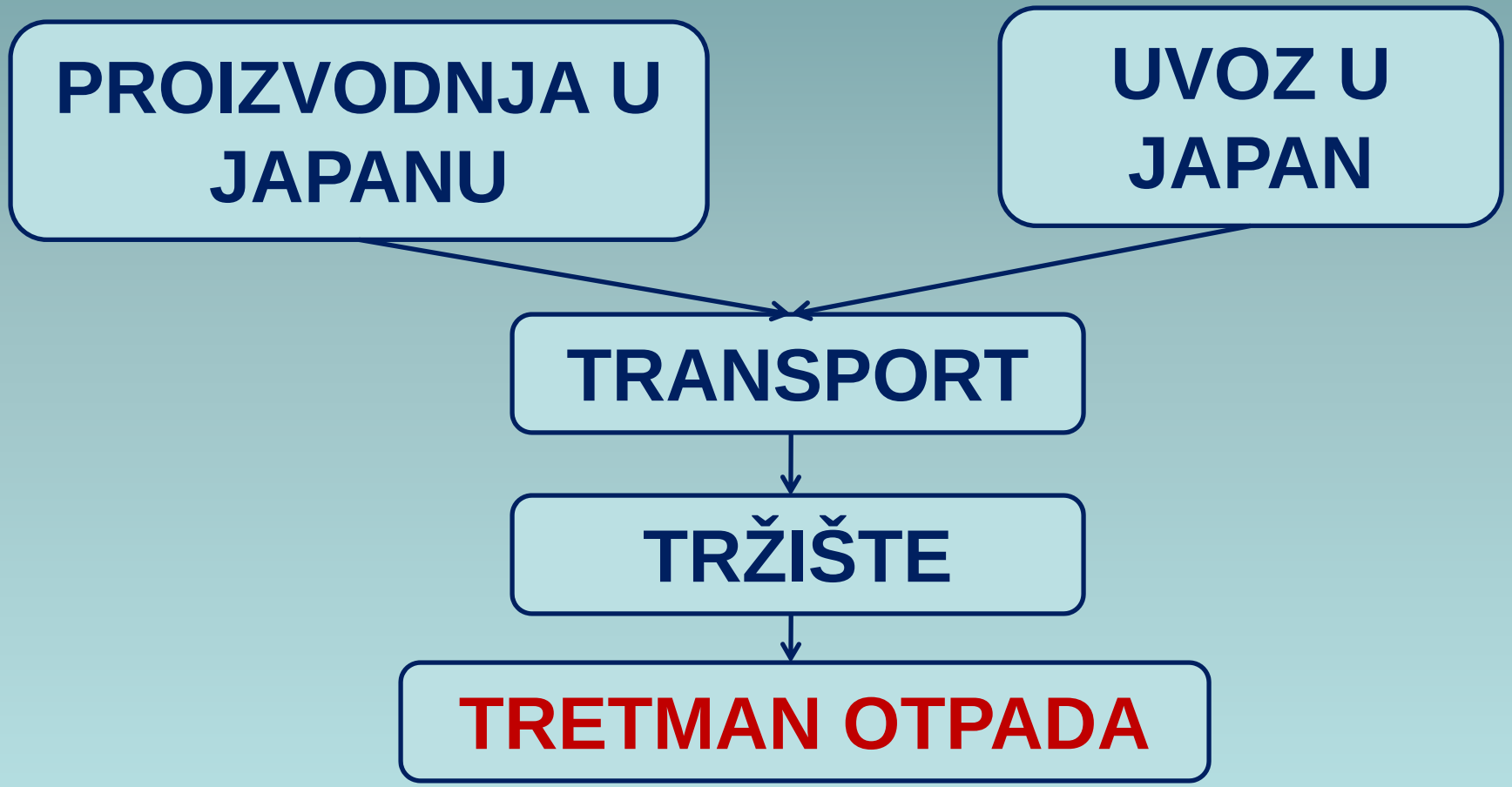








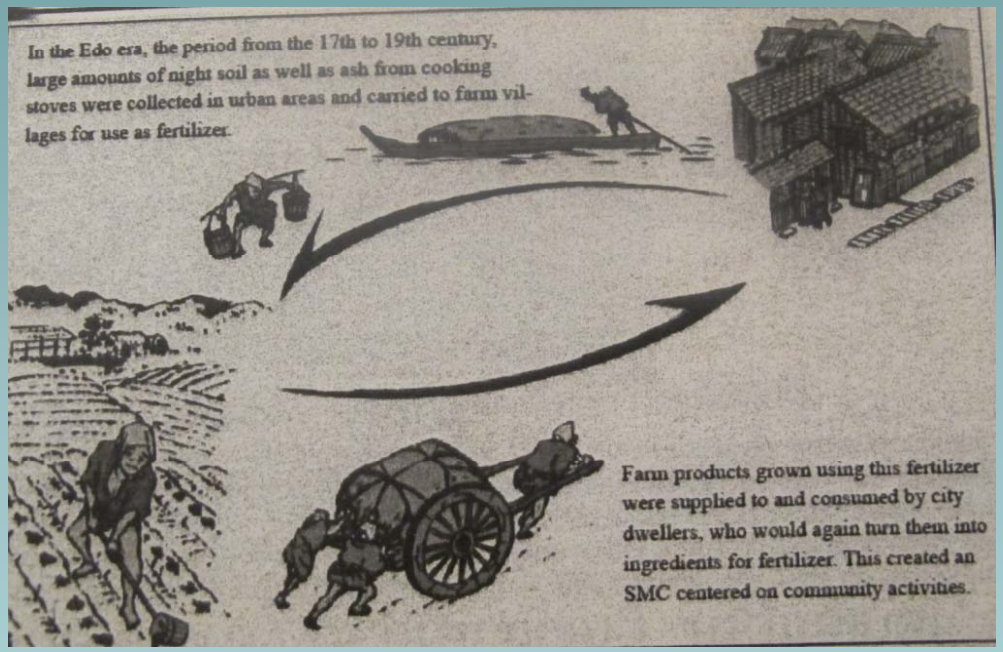

3. PUTOVANJE PROIZVODA - OČIMA HEMIČARA (zašto je Japan – “Japan”)



OTPAD U JAPANU

Komunalni otpad 50 miliona tona/godišnje
Industrijski otpad 400 miliona tona/godišnje

- 30% kuhinjski otpad
- 15% otpad od pakovanja
- 20% papirni otpad
- 20% gradjevinski otpad
- 15% poljoprivredni otpad



MOTTAINAI koncept- sramota je da nešto završi na otpadu ukoliko sav njegov potencijal nije iskorišćen. Vekovni izraz poštovanja prema životnoj sredini i prirodi!

OTPAD U JAPANU

Klasifikacija otpada

- Spaljivo
- Nespaljivo

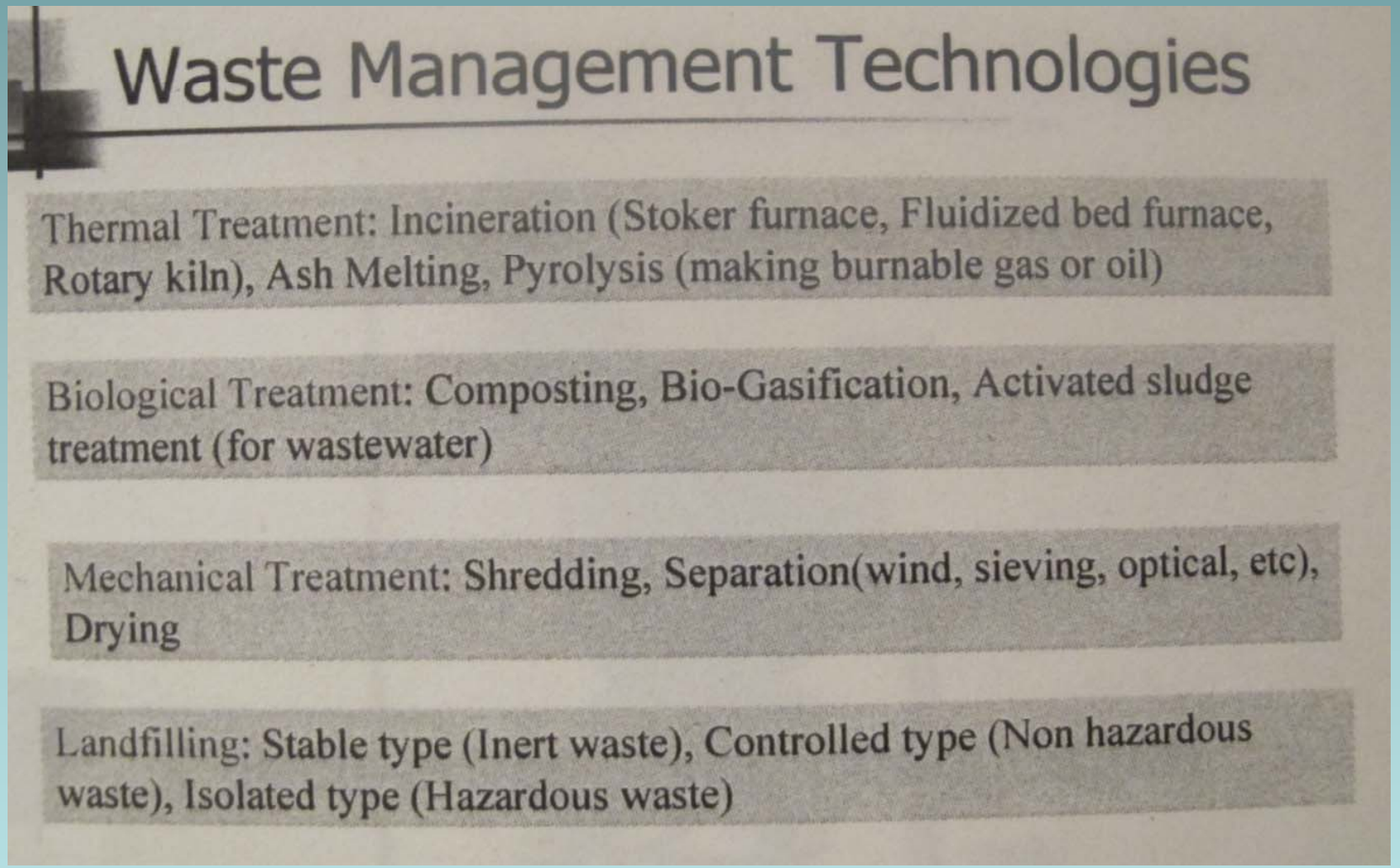
Kyoto University 4

Tsukuba 8

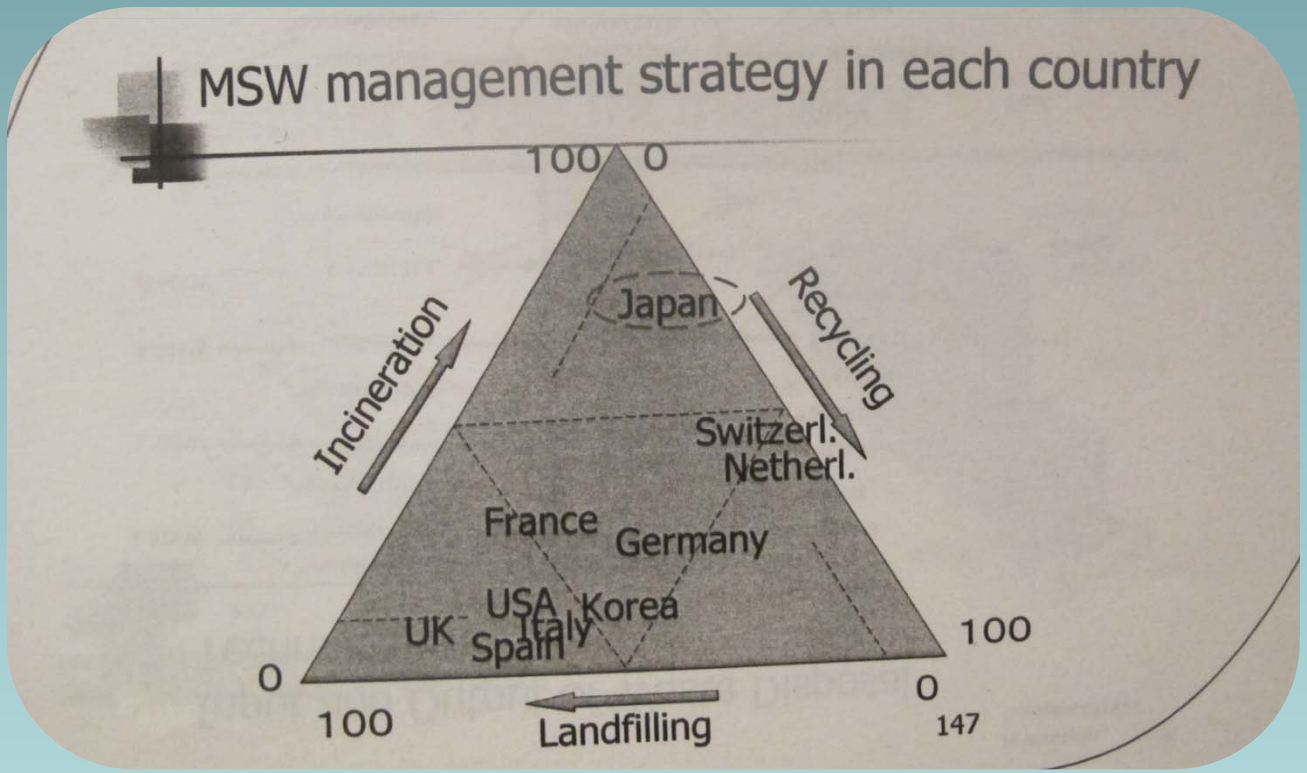
Minamata 24!!!

MOTTAINAI koncept- sramota je da nešto završi na otpadu ukoliko sav njegov potencijal nije iskorišćen. Vekovni izraz poštovanja prema životnoj sredini i prirodi!

TRETMAN OTPADA U JAPANU



U Japanu se otpad dominantno spaljuje i reciklira!!!



U Japanu se otpad dominantno spaljuje i reciklira!!!

The Flow of Waste Treatment

1. Discharge
   - Reduction (Change of Life style, Group Resources Collection, Expanded Producer Responsibility, Cooperation between citizen, municipality and business, etc.)
   - Legislative System and Policies (Promoting measures in the following order of priority: (1)Reduce, (2)Reuse, (3)Material Recycling, (4)Thermal Recycling, (5)Proper disposal)
2. Collection & Transportation
   - Source-Separation, Collection Spots, Transport Vehicles
3. Intermediate Treatment
   - Incineration, Shredding, Separation, Resources Recovery, Composting, etc.
4. Final Disposal
   - Phoenix-plan Final Disposal Site (Integrated Administration)
   - Municipal Final Disposal Site

3

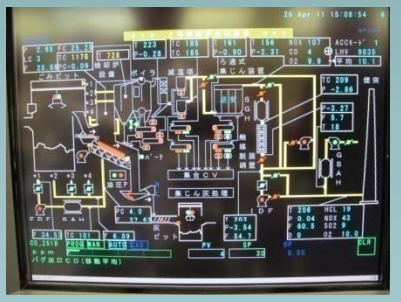
POSTROJENJE ZA TRETMAN KOMUNALNOG OTPADA (Nishinomiya)

Communal Waste Treatment Plant (Nishinomiya)





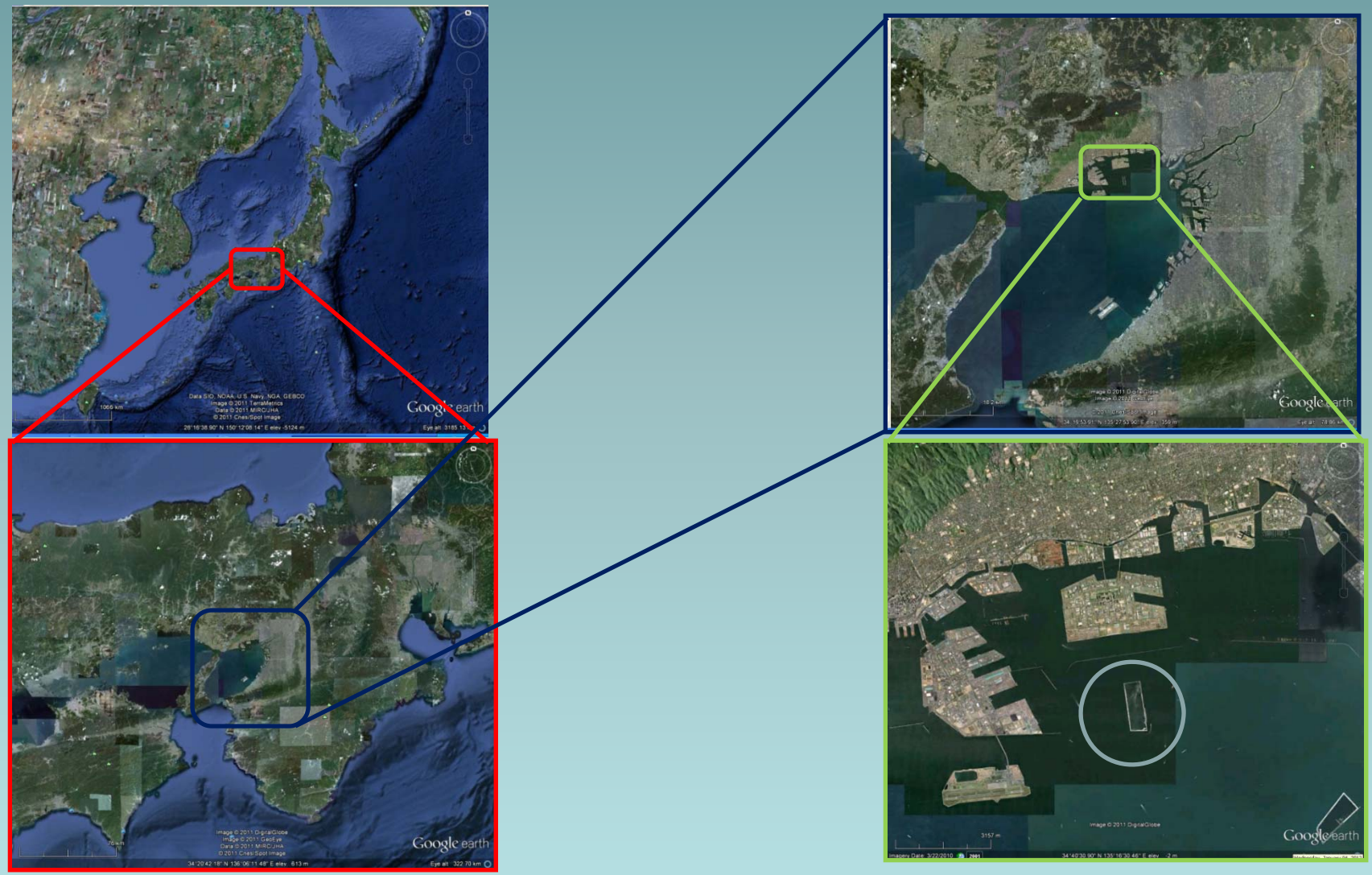





Pepeo ~ 10%; 900°C; 3000 t/dan; 300 kamiona!!!

THE OSAKA BAY PHOENIX PROJECT



Kobe Airport

Kansai International Airport

Rokko Island

Port Island


Phoenix-Plan Disposal Site (Izumi-Otsu Offshore Site)
泉大津沖埋立処分場航空写真
13 June 2008
平成20年6月13日撮影


Phoenix-Plan Disposal Site (Amagasaki Offshore Site)
尼崎沖埋立処分場航空写真
Amagasaki Yard & Pier for Shipment
尼崎基地
管理型区画
Controlled Landfill Area
Inert Waste Landfill Area
安定型区画
13 June 2008
平成20年6月13日撮影

KOBE OFFSHORE RECLAMATION DISPOSAL SITE








Projekat pokrenut 1983. godine.
Komunalni, industrijski i gradjevinski otpad.
Do 2009. odloženo 86 miliona tona otpada!
Zatvaranje mesta odlaganja 2021. godine.
168 opština i 6 prefektura.
4 lokacije: Amagasaki, Izumiotsu, Kobe, Osaka
Izazovi: eutrofikacija i narušavanje prirodnih staništa

4. O Japanu – *Ichi go, Ichi e*

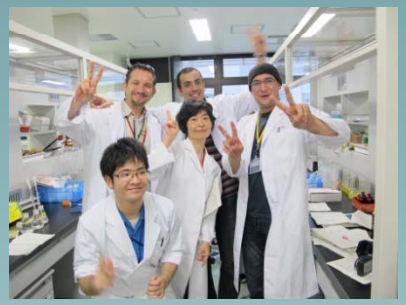
4. O Japanu – *Ichi go, Ichi e*

Zemlja volontera

4. O Japanu – *Ichi go, Ichi e*

Zemlja osmeha








4. O Japanu – *Ichi go, Ichi e*

Zemlja Festivala

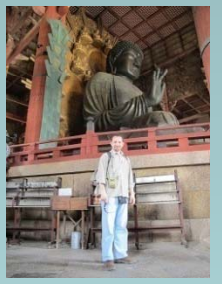
4. O Japanu – *Ichi go, Ichi e*

Zemlja tradicije











4. O Japanu – *Ichi go, Ichi e*

Zemlja detalja



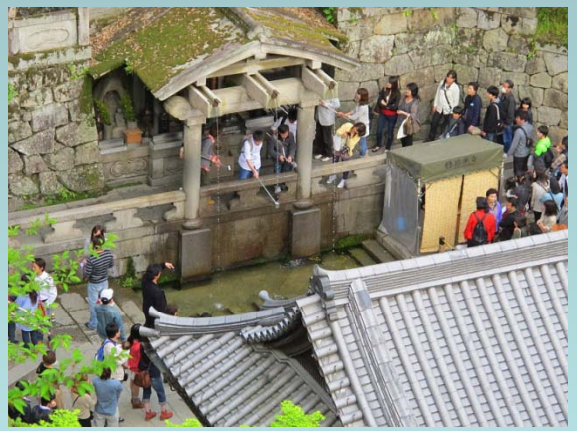







4. O Japanu – *Ichi go, Ichi e*

Zemlja tehnologije



4. O Japanu – *Ichi go, Ichi e*

Zemlja, lepote življenja, upornosti, žrtvovanja, istrajnosti!

HVALA VAM NA PAŽNJI!