



**United Nations  
Environment Programme**

**Food and Agriculture Organization  
of the United Nations**

Distr.: General  
8 November 2005

English only

**Rotterdam Convention on the Prior Informed  
Consent Procedure for Certain Hazardous  
Chemicals and Pesticides in International Trade  
Chemical Review Committee**

Second meeting

Geneva, 13–17 February 2006

Item 5 (b) of the provisional agenda\*

**Listing of chemicals in Annex III of the Rotterdam Convention:  
Review of notifications of final regulatory action to ban  
or severely restricted a chemical: Endosulfan**

## **Endosulfan**

### **Note by the Secretariat**

1. Under article 5 of the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, when the Secretariat has received at least one notification from each of two prior informed consent (PIC) regions that contain the information required in Annex I to the Convention, it shall forward the notifications and accompanying documentation to the members of the Chemical Review Committee. The Committee shall review the documentation provided in such notifications and, in accordance with the criteria set out in Annex II, recommend to the Conference of the Parties whether the chemical in question should be included in Annex III and a decision guidance document drafted.
2. The Secretariat has received five notifications from four PIC regions relating to Endosulfan which meet the information requirements of Annex I (Europe – the Netherlands and Norway; Near East – Jordan; Africa – Côte d'Ivoire; and Asia – Thailand). Summaries of those notifications were included in PIC Circular XII of December 2000, PIC Circular XIII of June 2001, PIC Circular XVIII of December 2003, PIC Circular XX of December 2004 and PIC Circular XXII of December 2005.
3. The notifications from the Netherlands, Jordan and Norway were considered by the Interim Chemical Review Committee at its fifth session. The Committee agreed that the notification from the Netherlands was complete and met all the criteria of Annex II whereas the notifications from Jordan and

---

\* UNEP/FAO/RC/CRC.2/1.

Norway had met all the criteria of Annex II with the exception of the criterion set forth in subparagraph (b) (iii) of the Annex. That information may be found in the report of the session (document UNEP/FAO/PIC/ICRC.5/15, paragraphs 38 to 42).

4. At its first meeting, the Chemical Review Committee endorsed the conclusion of the Interim Chemical Review Committee that the notification from the Netherlands had met all the criteria of Annex II whereas the notifications from Jordan and Norway had not met criterion (b) (iii). The Committee further agreed that on the basis of the information available at that time, the notification from Côte d'Ivoire met all the criteria of Annex II with the exception of criteria (b) (iii), (c) (i) and (c) (ii), but noted that although references to supporting information had been given in the notification that information had not been received by the Secretariat. That information may be found in the report of the meeting (document UNEP/FAO/RC/CRC.1/28, paragraphs 46 to 49). Since that time, the Secretariat has received additional supporting documentation from Côte d'Ivoire.

5. The secretariat is forwarding the new notification from Thailand and the notifications from the Netherlands and Côte d'Ivoire for the review of the Chemical Review Committee. Those notifications as they were received from the notifying countries are annexed to the present note.

6. The supporting documentation provided by the Netherlands, Côte d'Ivoire and Thailand, where available, may be found in documents UNEP/FAO/RC/CRC.2/15/Add.1, Add.2 and Add.3.

## **Annex**



**FORM**  
**FOR NOTIFICATION OF FINAL REGULATORY ACTION**  
**TO BAN OR SEVERELY RESTRICT A CHEMICAL**

IMPORTANT: See instructions before filling in the form

COUNTRY: THE NETHERLANDS

**PART I: PROPERTIES, IDENTIFICATION AND USES**

<b>1. IDENTITY OF CHEMICAL</b>		
<b>1.1 Common name</b>	Endosulfan	
<b>1.2 Chemical name according to an internationally recognized nomenclature (e.g. IUPAC), where such nomenclature exists</b>	6,7,8,9,10,10-Hexachloro-1,5,5a,6,9,9a-hexahydro-6,9-methano-2,4,3-benzo-dioxo-thiepin-3-oxide (CAS name)	
<b>1.3 Trade names and names of preparations</b>	Benzoepin; Insectophene; Thiosulfan; Tiovel; Tionel; Thiodan; Thionex; Thionate Malix; HOE 2671; FMC 5462; Cyclodan 'Thifor; Beosit 'Chlorthiepin Endocide; Endosulphan	
<b>1.4 Code numbers</b>		
<b>1.4.1 CAS number</b>	115-29-7	
<b>1.4.2 Harmonized System customs code</b>	2920 9090	
<b>1.4.3 Other numbers (specify the numbering system)</b>	2040794 (EINECS)	

<b>1.5 Indication regarding previous notification on this chemical, if any</b>		
<b>1.5.1</b>	<input type="checkbox"/> This is a first time notification of final regulatory action on this chemical.	
<b>1.5.2</b>	<input type="checkbox"/> This is a modification of a previous notification of final regulatory action on this chemical. The sections modified are: _____	
	<input checked="" type="checkbox"/> This notification replaces all previously submitted notifications on this chemical.	
	Date of issue of the previous notification: before 1995	

1.6 Information on hazard classification where the chemical is subject to classification requirements	
International classification systems	Hazard class
WHO	Toxicity Class II (DOSE)
EPA	Toxicity Class I (formulation) (DOSE)
EU (Annex I)	T (toxic); N (dangerous for the environment) R24/25, R36, R50/53
IARC	Not evaluated
Other classification systems	Hazard class

1.7 Use or uses of the chemical	
1.7.1	<input checked="" type="checkbox"/> <b>Pesticide</b>
	<b>Describe the uses of the chemical as a pesticide in your country:</b>
	Prior to ban: insecticide used against a variety of insects on tall and small fruit, full field vegetables, arable agriculture, mushrooms and full field ornamentals
1.7.2	<input type="checkbox"/> <b>Industrial</b>
	<b>Describe the industrial uses of the chemical in your country:</b>
	Not relevant.

1.8 Properties																											
1.8.1	<b>Description of physico-chemical properties of the chemical</b> <table> <tr> <td><b>Identity</b></td><td>Brown crystals</td></tr> <tr> <td><b>Formula</b></td><td>C<sub>9</sub>H<sub>6</sub>Cl<sub>6</sub>O<sub>3</sub>S</td></tr> <tr> <td><b>Chemical name</b></td><td>Endosulfan</td></tr> <tr> <td><b>Chemical type</b></td><td></td></tr> <tr> <td><b>CAS number</b></td><td>115-29-7</td></tr> <tr> <td><b>Molecular weight</b></td><td>406.95</td></tr> <tr> <td><b>Solubility</b></td><td>0.51 mg/l (α-endosulfan); 0.45 mg/l (β-endosulfan) at 20 °C (Howard, 1989) 0.32 mg/l (α-endosulfan); 0.33 mg/l (β-endosulfan) at 22 °C (DOSE) 1.487 mg/l at 25 °C (EPIWIN)</td></tr> <tr> <td><b>logKow</b></td><td>3.83 (α-endosulfan) (Howard, 1989; HSDB; EPIWIN) 4.74 (α-endosulfan) ; 4.79 (β-endosulfan) (DOSE)</td></tr> <tr> <td><b>Vapour pressure</b></td><td>0.133 E-2 Pa at 25 °C (Howard, 1989) 0.360 E-4 Pa at 25 °C (EPIWIN) 0.830 E-2 Pa at 20°C (HSDB)</td></tr> <tr> <td><b>Melting point</b></td><td>106 °C (Howard, 1989; HSDB) 109 °C (α-endosulfan); 213.3 °C (β-endosulfan) (DOSE)</td></tr> <tr> <td><b>Boiling point</b></td><td>401.28 °C (EPIWIN)</td></tr> <tr> <td><b>Dissociation constant</b></td><td></td></tr> <tr> <td><b>Henry's law constant</b></td><td>1.12 E-5 atm-m<sup>3</sup>/mole (Howard, 1989) 9.03 E-8 atm-m<sup>3</sup>/mole (EPIWIN)</td></tr> </table>	<b>Identity</b>	Brown crystals	<b>Formula</b>	C <sub>9</sub> H <sub>6</sub> Cl <sub>6</sub> O <sub>3</sub> S	<b>Chemical name</b>	Endosulfan	<b>Chemical type</b>		<b>CAS number</b>	115-29-7	<b>Molecular weight</b>	406.95	<b>Solubility</b>	0.51 mg/l (α-endosulfan); 0.45 mg/l (β-endosulfan) at 20 °C (Howard, 1989) 0.32 mg/l (α-endosulfan); 0.33 mg/l (β-endosulfan) at 22 °C (DOSE) 1.487 mg/l at 25 °C (EPIWIN)	<b>logKow</b>	3.83 (α-endosulfan) (Howard, 1989; HSDB; EPIWIN) 4.74 (α-endosulfan) ; 4.79 (β-endosulfan) (DOSE)	<b>Vapour pressure</b>	0.133 E-2 Pa at 25 °C (Howard, 1989) 0.360 E-4 Pa at 25 °C (EPIWIN) 0.830 E-2 Pa at 20°C (HSDB)	<b>Melting point</b>	106 °C (Howard, 1989; HSDB) 109 °C (α-endosulfan); 213.3 °C (β-endosulfan) (DOSE)	<b>Boiling point</b>	401.28 °C (EPIWIN)	<b>Dissociation constant</b>		<b>Henry's law constant</b>	1.12 E-5 atm-m <sup>3</sup> /mole (Howard, 1989) 9.03 E-8 atm-m <sup>3</sup> /mole (EPIWIN)
<b>Identity</b>	Brown crystals																										
<b>Formula</b>	C <sub>9</sub> H <sub>6</sub> Cl <sub>6</sub> O <sub>3</sub> S																										
<b>Chemical name</b>	Endosulfan																										
<b>Chemical type</b>																											
<b>CAS number</b>	115-29-7																										
<b>Molecular weight</b>	406.95																										
<b>Solubility</b>	0.51 mg/l (α-endosulfan); 0.45 mg/l (β-endosulfan) at 20 °C (Howard, 1989) 0.32 mg/l (α-endosulfan); 0.33 mg/l (β-endosulfan) at 22 °C (DOSE) 1.487 mg/l at 25 °C (EPIWIN)																										
<b>logKow</b>	3.83 (α-endosulfan) (Howard, 1989; HSDB; EPIWIN) 4.74 (α-endosulfan) ; 4.79 (β-endosulfan) (DOSE)																										
<b>Vapour pressure</b>	0.133 E-2 Pa at 25 °C (Howard, 1989) 0.360 E-4 Pa at 25 °C (EPIWIN) 0.830 E-2 Pa at 20°C (HSDB)																										
<b>Melting point</b>	106 °C (Howard, 1989; HSDB) 109 °C (α-endosulfan); 213.3 °C (β-endosulfan) (DOSE)																										
<b>Boiling point</b>	401.28 °C (EPIWIN)																										
<b>Dissociation constant</b>																											
<b>Henry's law constant</b>	1.12 E-5 atm-m <sup>3</sup> /mole (Howard, 1989) 9.03 E-8 atm-m <sup>3</sup> /mole (EPIWIN)																										

1.8.2	Description of toxicological properties of the chemical	
	1.Acute toxicity to laboratorium animals	
oral	LD50 rat: 70-100 mg/kg bw LD50 rat: 64 mg kg bw (in olive oil) LD50 rat: 40-50 mg/kg bw (in 95% alcohol) LD50 rat: 43 mg/kg bw; male (in peanut oil) LD50 rat: 18 mg/kg bw, female (in peanut oil) LD50 rat: 121 mg/kg bw; male (in cottonseed oil) LD50 rat: 355 mg/kg bw LD50 hamster: 118 mg/kg bw (in olive oil ) LD50 mouse: 7.36 mg/gk bw LD50 rabbit: 28 mg/kg bw LD50 dog: 7.67 mg/kg bw LD50 cat: 2 mg/kg bw	(DOSE)       (EHC, 1984)      (RTECS)
dermal	LD50 rat: 130 mg/kg bw, male (in xylene) LD50 rat: 74 mg/kg bw, female (in xylene) LD50 rat: 681 mg/kg bw(in cottonseed oil) LD50 rat: 34 mg/kg bw LD50 rabbit: 359 mg/kg bw (in oil) LD50 rabbit: 147 mg/kg bw (in cottonseed oil) LD50 rabbit: 360 mg/kg bw (in cottonseed oil) LD50 rabbit: 187 mg/kg bw (in chloroform) LD50 Guinea pig: 1000 mg/kg bw (in cottonseed oil)	   (EHC, 1984) (RTECS) (DOSE)     (EHC, 1984)

<b>inhalation</b>	LD50 rabbit: 90 mg/kg bw	(RTECS)
	LC50 rat: 12.6 µg/l, male (4 h exposure)	
<b>intraperitoneal</b>	LC50 rat: 34.5 µg/l, female (4 h exposure)	(DOSE)
	LC50 rat: 350 µg/l (4 h exposure)	(EHC, 1984)
	LC50 rat: 80 µg/l (4 h exposure)	(RTECS)
	LC50 cat: 0.09 µg/l (4 h exposure)	(RTECS)
	LD50 rat: 8 mg/kg bw	
	LD50 mouse: 7.5 mg/kg bw, female (in 95% alcohol)	
	LD50 mouse: 6.9 mg/kg bw, male (in 95% alcohol)	
	LD50 mouse: 13.5 mg/kg bw, female (in alcohol & peanut oil)	
	LD50 mouse: 12.6 mg/kg bw, male (in alcohol & peanut oil)	(EHC, 1984)
	LD50 hamster: 80 mg/kg bw	(RTECS)
<b>Irritation</b>	Studies in experimental animals have shown that dermal exposure is only Slightly to moderately irritating at relatively high doses (ATSDR, 1998)	
<b>2. Short-term exposure</b>	<ul style="list-style-type: none"> <li>- <u>Rats</u> treated with oral doses of endosulfan at 1.6-3.2 mg/kg bw for 12 weeks: no effects on growth rate.</li> <li>- <u>Rats</u> received diets containing endosulfan at 2 to 200 mg/kg diet for 2 weeks: induction of MFO-activity.</li> <li>- Female <u>rats</u> treated with oral doses of endosulfan at 1 to 5 mg/kg bw for 7 or 15 days: at 2.5 and 5 mg/kg bw increased liver weight and decreased pentobarbital sleeping time, induction of aminopyrine demethylase, aniline hydroxylase, and amino-transferase activity, and spontaneous lipid peroxidation.</li> <li>- Male <u>rats</u> dosed orally with endosulfan at 5 or 10 mg/kg bw for 15 days: at 10 mg/kg bw reduced body weight, 25% mortality.</li> <li>- Male <u>rats</u> dosed orally with endosulfan at 0.625 to 20 mg/kg bw for 7 weeks: at 20 mg/kg bw slight increase in blood glucose and decrease in plasma Ca.</li> <li>- Four <u>dogs</u> dosed orally with endosulfan at 2.5 mg/kg bw for 3 days: vomiting in all dogs, tremors, convulsions, rapid respiration and mydriasis, no microscopic abnormalities.</li> <li>- Canulated <u>cats</u> dosed intravenously with endosulfan at 2, 3, or 4 mg/kg bw: muscular twitching and convulsions in all groups, at 3 and 4 mg/kg bw marked rise in blood glucose after 15 and 20 min. with gradual fall up to 4 h.</li> </ul>	
<b>3. Long-term exposure</b>	<ul style="list-style-type: none"> <li>- <u>Rats</u> received endosulfan in the diets at 10 to 100 mg/kg diet for 104 weeks: reduced survival in the second year in female rats at 10 and 30 mg/kg, reduced survival and changes in weight gain and haematological parameters in females at 100 mg/kg diet. At autopsy reduced relative testis weight at 10 mg/kg diet, enlarged kidneys and renal tubular damage at 100 mg/kg diet. No increased tumour incidences.</li> <li>- <u>Dogs</u> orally treated with endosulfan at 0.075 to 0.75 mg/kg bw for 10 m: No gross or microscopic findings.</li> </ul>	
<b>4. Effects on reproduction</b>	Although the available reproductive studies indicate that endosulfan has no adverse effects on reproductive performance in animals, severe adverse effects on male reproductive organs have been seen in rats and mice. Endosulfan may potentially cause reproductive toxicity in humans (ATSDR, 1998)	

## 5. Mutagenicity

- Tests with endosulfan and *E. coli* and *S. typhimurium* : negative
  - Mitotic conversion in *Saccharomyces cerevisiae*: negative.
  - Technical grade endosulfan induced reverse mutation, cross over, and mitotic gene conversions in *Sacharomyces cerevisiae*.
  - Chromosome aberration test in bone marrow cells or spermatogonia of rats treated for 5 days with oral doses of endosulfan at 11-55 mg/kg bw: negative.
  - Micronucleus test in bone marrow cells of mice treated with endosulfan in the drinking water: increased number of micronuclei, not significant.
  - Dominant lethal test in mice: negative. (EHC, 1984)
  - *Saccharomyces cerevisiae* T2 without metabolic activation induced mitotic recombination.
  - *Salmonella typhimurium* TA97a, TA98, TA100 with metabolic activation: negative
  - *Salmonella typhimurium* TA97a in modified assay using preincubation procedure with and without metabolic activation: positiv
  - *Salmonella typhimurium* Ta98, Ta100, Ta1535, TA1537 with and without metabolic activation: negative
  - In vitro mouse lymphoma L5178Y tk+/tk-: positive
  - In vitro peripheral human lymphocytes, 5 and 100 µg/ml: negative
  - In vivo oral mice, meiotic germ cells: increased polyploidy, aneuploidy, and chromosomal aberrations.
- In vivo mice: induction of dominant lethal mutations and dose dependent increase in sperm abnormalities. No changes in sperm mobility . (DOSE)
- Genotoxic studies have provided evidence that this compound is mutagenic and clastogenic, and that it induces effects on cell cycle kinetics in two different mammalian species. However, some of these data may be suspect because some formulations of endosulfan have contained epichlorohydrin, a known genotoxic chemical, as stabilizer. It should be noted that humans may also be exposed to epichlorohydrin along with endosulfan. (ATSDR, 1998)

## 6. Teratogenicity

Based on existing data in animals, there is inconclusive evidence to characterize endosulfan as a potential developmental toxicant in humans. (ATSDR, 1998)

## 7. Carcinogenicity months:

- Rats received diets containing endosulfan at 3 to 75 mg/kg diet for 24 months:
  - at 75 mg/kg reduced body weights, enlarged kidneys in females , progressive glomerulonephrosis and renal aneurysms in males, no increased tumour incidences. NOAEL=15 mg/kg diet (=0.6 mg/kg bw) (DOSE)
- Mice received diets containing endosulfan at 2 to 18 mg/kg diet for 24 months: at 18 mg/kg diet increased mortalities, slight reduced body weight gain in males, no increased tumour incidences. NOAEL=0.84 mg/kg diet (=0.97 mg/kg bw) (DOSE)
- Rats consuming 3.8 mg/kg/day (females) or 2.9 mg/kg/d (males) for 2 years did not indicate an increased incidence of any neoplastic lesion. A similar conclusion was found in a 2 year study with mice (ATSDR, 1998).

## Effects on human health



- Symptoms of poisoning: death followed a few hours after ingestion of endosulfan, clinical symptoms included vomiting, agitation, convulsions, cyanosis, dyspnoea, foaming at the mouth, and noisy breathing. Post mortem findings included congested and oedematous lungs and cyanosis.

- Three men without protective clothing and masks filled bags with endosulfan: symptoms of toxicity occurred after 3 weeks, 1 months and 1 year and consisted of headaches, restlessness, irritability, vertigo, stupor, disorientation, and epileptic convulsive seizures. Changes in electroencephalogram. (EHC, 1984)

1.8.3	Description of ecotoxicological properties of the chemical
<b>Fish</b>	<p><i>Sarotherodon mossambicus</i>, 9-w NOEC (reproduction)=0.2 µg/l (v.d Plassche et al, 1994)</p> <p>Acute LC50-values for <i>Oncorhynchus mykiss</i>, <i>Pimephales promelas</i> and <i>Ictalurus punctatus</i> were 0.3 to 1.4 µg/l, 0.86 to 1.5 µg/l, and 1.5 µg/l respectively. For <i>Leuciscus idus melanotus</i> the 96-hours LC50 was 2 µg/l. (EHC, 1984; DOSE)</p>
<b>Mollusca</b>	<p>Marine oyster, <i>Crassostrea virginica</i>, 96-hour EC50 (growth)=65 µg/l</p> <p>Freshwater snail, <i>Aplexa hypnorum</i>, 96-hours LC50= 1890 µg/l (EHC, 1984)</p>
<b>Crustacea</b>	<p><i>Daphnia magna</i>, 64-days NOEC(mortality)=2.7 µg/l (v.d Plassche et al, 1994)</p> <p>Acute L(E)C50-values ranged from 0.2 µg/l for the marine shrimp (<i>Crangon semtemspinosa</i>) to 55 µg/l for the blue crab (<i>Callinectes sapidus</i>)</p>
<b>Annelida</b>	<p><i>Nereis nereis</i>, 12-days LC50=100 µg/l (EHC, 1984)</p>
<b>Algae</b>	<p><i>Chlorella vulgaris</i>, 14-d NOEC (growth)=700 µg/l (v.d. Plassche et al, 1994)</p>
<b>Protozoa</b>	<p><i>Paramecium aurelia</i>, 5-d NOEC (growth)=100 µg/l (v.d. Plassche et al, 1994)</p>
<b>Rotatoria</b>	<p>Acute 24-hour LC50 for freshwater rotifers: 4.15 mg/l (DOSE)</p>
<b>Aquatic insects</b>	<p>Acute 96-hours L(E)C50-values ranged from 2.3 µg/l for the stonefly <i>Pteronarcys californica</i> to 2.8 µg/l for the freshwater mite <i>Hydrachna trilobata</i> (EHC, 1984)</p>
<b>Birds</b>	<p>Acute oral LD50-values for the mallard duck (<i>Anas platyrhynchos</i>) ranged from 6.47 to 33 mg/kg bw. LC50-values for diet studies with <i>Coturnix coturnix japonica</i>, <i>Colinus virginianus</i> and <i>Phasianus colchicus</i> were 1250, 805, and 1275 mg/kg diet, respectively. (EHC,1984)</p>
<b>Bees</b>	<p>For honey bees a contact LD50 of 7.1 µg/bee and an oral LD50 of 6.9 µg/bee was found.</p>
<b>Macrophyta</b>	<p>Phytotoxic effects included:</p> <ul style="list-style-type: none"> <li>- reduction in pollen tube length and germination rate of cucumber pollen</li> <li>- necrotic spots and leaves of <i>Cucurbitae</i></li> <li>- reduced viability and delayed germination of <i>Cicer arietinum</i> seeds</li> <li>- in vitro changes in permeability of root membranes</li> </ul>

- Green gram (*Vigna radiata*), coiling of the radical, inhibition of root growth, stunting of shoots, burning of tips and margins of leaves, and plants were dwarfed and chlorotic
- germinating *Cicer arietinum* showed fall in pectin

#### References

ATSDR, 1998. Toxicological profile for endosulfan (update). Draft for public comment. ATSDR USA.

DOSE (through April 1999) The Dictionary Of Substances and their Effects. The Royal Society of Chemistry.

EPIWIN, Estimation Programs Interface for Microsoft Windows 3.1. Syracuse Research Corp. North Syracuse, New Jersey, 1997.

HSDB (through oktober 1999) Hazardous Substances Data Bank, National Library of Medicines.

Howard, P.H. (1989) Handbook of environmental fate and exposure data for organic chemicals, Lewis Publishers, Boca Raton, (volume I-IV).

RTECS, Registry of Toxic Effects of Chemical Substances, provided by NIOSH.

Van de Plassche, E.J., J.H. Canton, Y.A. Eijls, J.W. Everts, P.J.C.M. Janssen, J.E.M. van Koten-Vermeulen, M.D. Polder, R. Posthumus, and J.M. de Stoppelaar. (1994) Towards integrated environmental quality objectives for several compounds with a potential for secondary poisoning: Underlying data. National Institute of Public Health and Environmental Protection, Bilthoven, The Netherlands. Annex to Report no. 679101 012. Environmental Health Criteria 40, Endosulfan. World Health Organization, Geneva, 1984.

## PART II: FINAL REGULATORY ACTION

<b>2.</b>	<b>FINAL REGULATORY ACTION</b>			
<b>2.1</b>	The chemical is:	<input checked="" type="checkbox"/> banned	OR	<input type="checkbox"/> severely restricted
<b>2.2</b>	<b>Information specific to the final regulatory action</b>			
<b>2.2.1</b>	<b>Summary of the final regulatory action</b>			
	It is prohibited to sell, stock, store or use Endosulfan as pesticide			
<b>2.2.2</b>	<b>Reference to the regulatory document</b>			
	Decree of Ministry of Agriculture and Fisheries, Ministerial Order of 27 November 1989			
<b>2.2.3</b>	<b>Date of entry into force of the final regulatory action</b>			
	1-1-1990			

<b>2.3</b>	<b>Was the final regulatory action based on a risk or hazard evaluation?</b>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
	<b>If yes, give information on such evaluation</b>		
	See under 2.4.2.		
	<b>Reference to the relevant documentation</b>		
	Decision of De Voorzitter van het College van Beroep voor het Bedrijfsleven No. 89 2403/060/029 (in Dutch).		

<b>2.4</b>	<b>Reasons for the final regulatory action</b>	
<b>2.4.1</b>	<b>Is the reason for the final regulatory action relevant to the human health?</b>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
	<b>If yes, give summary of the known hazards and risks presented by the chemical to human health, including the health of consumers and workers</b>	
	<b>Reference to the relevant documentation</b>	
	<b>Expected effect of the final regulatory action</b>	

<b>2.4.2</b>	<b>Is the reason for the final regulatory action relevant to the environment?</b>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
	<b>If yes, give summary of the known hazards and risks to the environment</b>	
	<p>Application (good agricultural practice) of endosulfan will result in surface water concentrations that will significantly affect aquatic organisms (especially fish).</p> <p>Emission of endosulfan to surface water will be due to spraying drift during application (fruit). The surface water concentration of endosulfan during application was estimated with a dispersion model. Assuming a drift emission factor of 10% an endosulfan concentration of 0.014 mg/l was calculated. Comparing this concentration with the lowest LC50 for fish (0.00017 mg/l) results in a risk quotient of 82 which was considered unacceptable.</p> <p>Field experiments in Africa support these conclusions.</p> <p>(i) Evaluation is based on a review of scientific data in the context of the conditions prevailing in the country.</p>	
	<b>Reference to the relevant documentation</b>	
	Internal reports of National Institute of Public Health and Environment (RIVM). Bilthoven, the Netherlands. Confidential (partly).	
	<b>Expected effect of the final regulatory action</b>	
	Complete risk reduction	

<b>2.5</b>	<b>Category or categories where the final regulatory action has been taken</b>	
<b>2.5.1</b>	<b>Final regulatory action has been taken for the chemical category</b>	<input type="checkbox"/> <b>Industrial</b>
	<b>Use or uses prohibited by the final regulatory action</b>	
	Not relevant.	
	<b>Use or uses that remain allowed</b>	

<b>2.5.2</b>	<b>Final regulatory action has been taken for the chemical category</b>	<input type="checkbox"/> <b>Pesticide</b>
	<b>Formulation(s) and use or uses prohibited by the final regulatory action</b>	
	All applications.	
	<b>Formulation(s) and use or uses that remain allowed</b>	
None.		

2.5.3 Estimated quantity of the chemical produced, imported, exported and used, where available.		
	Quantity per year (MT)	Year
Produced		
Imported		
Exported		
Used		

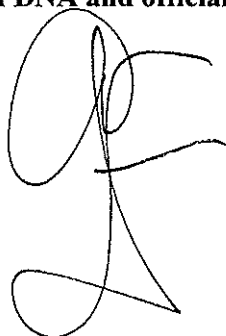
<b>2.6</b>	<b>Indication, to the extent possible, of the likely relevance of the final regulatory action to other states and regions</b>
	EU, USA, ASIA, AFRICA

<b>2.7 Other relevant information that may cover:</b>			
<b>2.7.1</b>	<table border="1"><tr><td><b>Assessment of socio-economic effects of the final regulatory action</b></td></tr><tr><td></td></tr></table>	<b>Assessment of socio-economic effects of the final regulatory action</b>	
<b>Assessment of socio-economic effects of the final regulatory action</b>			
<b>2.7.2</b>	<table border="1"><tr><td><b>Information on alternatives and their relative risks</b></td></tr><tr><td></td></tr></table>	<b>Information on alternatives and their relative risks</b>	
<b>Information on alternatives and their relative risks</b>			
<b>2.7.3</b>	<table border="1"><tr><td><b>Relevant additional information</b></td></tr><tr><td></td></tr></table>	<b>Relevant additional information</b>	
<b>Relevant additional information</b>			

**PART III : GOVERNMENT AUTHORITIES**

<b>Ministry/Department and authority responsible for issuing/enforcing the final regulatory action</b>	
<b>Institution</b>	Ministry of Housing, Spatial Planning and the Environment Ministry of Agriculture
<b>Address</b>	P.O. Box 30945 2500 GX The Hague The Netherlands
<b>Telephone</b>	+31 70 339 3939
<b>Telefax</b>	+31 70 339 1297
<b>E-mail address</b>	
<b>Designated National Authority</b>	
<b>Institution</b>	Ministry of Housing, Spatial Planning and the Environment
<b>Address</b>	P.O. Box 30945 2500 GX The Hague The Netherlands
<b>Name of person in charge</b>	drs. K.A. Gijsbertsen
<b>Position of person in charge</b>	Designated national authority
<b>Telephone</b>	+31 70 339 4744
<b>Telefax</b>	+31 70 339 1297
<b>E-mail address</b>	karel.gijsbertsen@dsvs.dgm.minvrom.nl

**Date, signature of DNA and official seal:** The Hague, 7 June 2000





## FORMULAIRE

### NOTIFICATION DE LA MESURE DE REGLEMENTATION FINALE VISANT A INTERDIRE OU A STRICTEMENT REGLEMENTER UN PRODUIT CHIMIQUE

IMPORTANT: Se reporter aux instructions avant de compléter le formulaire

PAYS: COTE D'IVOIRE

#### PREMIERE PARTIE : PROPRIETES, IDENTIFICATIONS ET EMPLOIS

<b>1. IDENTITE DU PRODUIT CHIMIQUE</b>		
<b>1.1</b>	Nom usuel	ENDOSULFAN
<b>1.2</b>	Nom chimique d'après une nomenclature internationalement reconnue (IUPAC par exemple), si une telle nomenclature existe	(1,4,5,6,7-hexachloro-8,9,10-trinobom-5-en-2,3-ylenebisméthylène) sulfite (IUPAC)
<b>1.3</b>	Appellations commerciales et noms des préparations	CALLIFAN 50EC, THIODAN 35EC, TIONEX 50EC, TIOSULFAN 35EC, THIOSULFAN 50EC
<b>1.4</b>	Numéros de code	
<b>1.4.1</b>	Numéro du CAS	115-29-7
<b>1.4.2</b>	Code dans le Système harmonisé de code douanier	
<b>1.4.3</b>	Autres numéros (préciser le système de numérotation)	

<b>1.5 Indication concernant une notification précédente relative au produit chimique, le cas échéant</b>	
<b>1.5.1</b>	<input type="checkbox"/> Il s'agit de la première notification d'une mesure de réglementation finale concernant ce produit chimique. X
<b>1.5.2</b>	<input type="checkbox"/> La présente notification consiste en une modification d'une notification précédente concernant ce produit chimique. Les sections modifiées sont les suivantes : _____ <input type="checkbox"/> La présente notification remplace toutes les notifications précédentes concernant ce produit chimique. Date de la précédente notification: _____

#### PRIERE DE RETOURNER LE FORMULAIRE COMPLETE AU :

Secrétariat de la Convention de Rotterdam  
Plant Protection Service  
Plant Production and Protection Division, FAO  
Viale delle Terme di Caracalla  
00100 Rome, Italy

OU

Secrétariat de la Convention de Rotterdam  
UNEP Chemicals

11-13, Chemin des Anémones  
CH - 1219 Châtelaine, Geneva, Switzerland

Téléphone: (+39 06) 5705 3441  
Télécopieur: (+39 06) 5705 6347  
Adresse électronique: pic@fao.org

Téléphone: (+41 22) 917 8183  
Télécopieur: (+41 22) 797 3460  
Adresse électronique: pic@unep.ch



1.6 Informations sur la catégorie de danger du produit chimique lorsqu'il fait l'objet d'une classification	
Systèmes internationaux de classification des dangers	Catégorie de danger
WHO	Classe de Toxicité II (DOSE)
EU	T (toxique), N (dangereux pour l'environnement) R24/25, R36, R50/53
Autres systèmes de classification	Catégorie de danger

1.7 Emploi ou emplois du produit chimique	
1.7.1	<p>Ø Pesticide X</p> <p>Décrire les emplois du produit chimique comme pesticide dans votre pays:</p> <p>L'Endosulfan lutte contre les chenilles, scolytes et les punaises. Il est utilisé pour le traitement du cotonnier, du coton, du cacaoyer, du cacao et du caféier. Il agit par contact, par ingestion et également par inhalation.</p>
1.7.2	<p>Ø Emplois industriels</p> <p>Décrire les emplois industriels du produit chimique dans votre pays:</p> <p>Aucun</p>

1.8 Propriétés	
1.8.1	<p>Décrire les propriétés physico-chimiques du produit chimique</p> <p>L'Endosulfan se présente comme de paillettes de couleur marron clair, dont les températures de fusion, d'ébullition et de décomposition sont respectivement 80°C (Tech), isomère <math>\alpha</math> - 109°C, isomère <math>\beta</math> - 213,3°C. Il est soluble dans l'eau.</p>
1.8.2	<p>Décrire les propriétés toxicologiques du produit chimique</p> <p>Toxicité aiguë : Chez le RAT : DL50 par voie orale: 80mg/kg, par inhalation : 8-13mg/l. Les résultants des analyses ont montré que l'Endosulfan n'irrite ni la peau ni les yeux.</p>
1.8.3	<p>Décrire les propriétés écotoxicologiques du produit chimique</p> <p>L'Endosulfan est très toxique pour les oiseaux : DL50 = 42-243mg/kg, très toxique également pour les poissons : CL50 = 0,02-6,9µg/l. Les abeilles DL50 : 2µg/abeille</p>

## DEUXIEME PARTIE : MESURE DE REGLEMENTATION FINALE

2. MESURE DE REGLEMENTATION FINALE	
2.1	<p>Le produit chimique est :            Ø interdit                            OU            Ø strictement réglementé X</p>
2.2	<p>Informations sur la mesure de réglementation finale</p>
2.2.1	<p>Résumé de la mesure de réglementation finale</p> <p>L'Endosulfan a été homologué, mais son utilisation est strictement réglementée et est sous contrôle de l'ANADER (Agence Nationale d'Appui au Développement Rural). Car ce produit est très toxique pour l'homme et l'environnement.</p>

<b>2.2.2</b>	<b>Références du document de réglementation</b> - Analyse Socio-économique de la filière des pesticides en Côte d'Ivoire - Index phytosanitaire de Côte d'Ivoire, édité en 2000 par le Ministère chargé de l'Agriculture
<b>2.2.3</b>	<b>Date de prise d'effet de la mesure de réglementation finale</b> Depuis 1998

<b>2.3</b>	<b>La mesure de réglementation finale a-t-elle été prise après une évaluation des risques ou des dangers?</b>	<input type="radio"/> Oui <input checked="" type="radio"/> Non
	<b>Dans l'affirmative, veuillez donner des précisions sur cette évaluation</b> Il faut noter qu'en Côte d'Ivoire, l'utilisation de plus en plus croissante des produits phytosanitaires par une population paysanne en majorité analphabète pose de nombreux problèmes tant au niveau de la santé humaine qu'au niveau de l'environnement. Pour minimiser les effets néfastes de l'utilisation abusive et irrationnelle des pesticides, le gouvernement ivoirien a mis en place des textes réglementaires, fondés sur le décret 89-02 du 04 janvier 1989, relatif à l'agrément, la fabrication, la vente et l'utilisation des pesticides en rapport avec les accords internationaux.	
	<b>Références de la documentation pertinente</b> - Index phytosanitaire 2000, édité par le Ministère de l'Agriculture - Analyse socio-économie de la filière des pesticides en Côte d'Ivoire (série de publication N° 06/F - Décret N° 89-02 du 04 janvier 1989.	

<b>2.4</b>	<b>Raisons ayant motivé la mesure de réglementation finale</b>	
<b>2.4.1</b>	<b>La santé des personnes est-elle la raison ayant motivé la mesure de réglementation finale?</b>	<input type="radio"/> Oui <input checked="" type="radio"/> Non
	<b>Dans l'affirmative, résumer les dangers et les risques connus présentés par le produit chimique pour la santé des personnes, notamment la santé des consommateurs et des travailleurs</b> Les utilisateurs sont exposés à des dangers. En général, les manipulateurs étant en majorité des profanes, n'observent pas de précautions d'usage. Ils détournent l'usage principal de ce produit à d'autres fins non recommandées. Toujours en zone rurale, ce produit est stocké dans l'environnement immédiat des hommes. Les travailleurs des entreprises industrielles et minières sont aussi en dangers par manque d'équipements adaptés à ce produit chimique.  En Côte d'Ivoire, des études réalisées par des étudiants ont montré la présence des résidus d'Endosulfan dans les denrées alimentaires et dans l'eau de consommation (puits). Vue la toxicité de ce produit, ces résidus constituent également un dangers pour l'homme.	
	<b>Références de la documentation pertinente</b> - Profil National pour évaluer les capacités nationales de gestion des produits chimiques. (édité par la Direction de l'Environnement avec l'assistance de l'UNITAR et le (IFCS). - Analyse socio-économie de la filière des pesticides en Côte d'Ivoire (série de publication N° 06/F	
	<b>Effets escomptés de la mesure de réglementation finale</b> Reduire complètement des risques liés à l'emploi de l'Endosulfan pour préserver la santé humaine.	

<b>2.4.2</b>	<b>La protection de l'environnement est-elle la raison ayant motivé la mesure de réglementation finale?</b>	<input type="radio"/> Oui <input checked="" type="radio"/> Non
	<b>Dans l'affirmative, résumer les dangers et risques connus pour l'environnement</b> Les résultats d'analyse du milieu aquatique en Côte d'Ivoire, ont montré la présence de l'Endosulfan. Vue la toxicité de ce produit et sa persistance, la contamination du milieu aquatique peut se traduire souvent par une accumulation biologique dans les poissons et dans d'autres organismes aquatiques. Ces résidus peuvent constituer un danger pour l'homme.  Ce résultat est la conséquence de la mauvaise gestion de ce produit (enfouissement, rejet direct dans le milieu aquatique et terrestre pour l'élimination des emballages dans la nature).	
	<b>Références de la documentation pertinente</b>	

	Profil National pour évaluer les capacités nationales de gestion des produits chimiques. (édité par la Direction de l'Environnement avec l'assistance de l'UNITAR et le (IFCS).
	<b>Effets escomptés de la mesure de réglementation finale</b>
	Reduire complètemnt les risques liés à l'Endosulfan afin de protéger la faune et la flore aquatique.

2.5 Catégorie ou catégories à laquelle/auxquelles s'applique la mesure de réglementation finale		
2.5.1	La mesure de réglementation finale s'applique a la catégorie	θ Produit à usage industriel
	Emploi ou emplois interdit(s) par la mesure de réglementation finale	
	Emploi ou emplois qui demeure(nt) autorisé(s)	

2.5.2	La mesure de réglementation finale s'applique a la catégorie	θ Pesticide X
	Préparation(s) et emploi(s) interdits par le mesure de réglementation finale	
	Toutes les formulations EC sont concernées	
	Préparation(s) et emploi(s) qui demeure(nt) autorisés	
	L'emploi des formulations CS seront autorisé.	

2.5.3 Estimation, lorsque cela est possible, des quantités du produit chimique produites, importées, exportées et employées.		
	Quantité annuelle (tonnes métriques)	Année
Produite		
Importée		
Exportée		
Employée		

2.6 Indiquer, dans la mesure du possible, l'intérêt de la mesure de réglementation finale pour d'autres Etats et régions	

2.7 Autres informations utiles dont:	
2.7.1	Evaluation des impacts socio-économiques de la mesure de réglementation finale

Les mesures de réglementation constituent pour l'essentiel la législation ivoirienne dans le domaine des produits phytosanitaires.  
 Cette législation, fondée sur le décret 89-02 du 04 janvier 1989, relatif à l'Agrément, la Fabrication, la Vente et l'Utilisation des pesticides en Côte d'Ivoire, prend en compte les recommandations de la FAO et de l'OMS en matière d'utilisation des produits phytosanitaires.  
 Ce dispositif vient d'être renforcé récemment à travers la ratification de la Convention de Rotterdam, par la Côte d'Ivoire.

Ainsi, au delà des enjeux d'ordre environnemental, liés à la prise en compte des effets consubstantiels à l'utilisation des pesticides pour la santé humaine et l'environnement, il est important d'évaluer les impacts socio-économiques desdites mesures.

Au plan économique :

- Amélioration et augmentation de la production agricole,
- Développement des circuits de commercialisation,
- Renforcement de la coopération économique et commerciale,
- Préservation des ressources naturelles
- Institution de taxes directs ou indirectes et des subventions en vue du développement du secteur d'activités.

Au plan social :

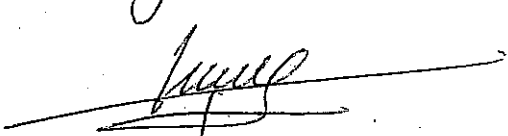
- Préservation de la santé humaine et de l'environnement
- Lutte contre la pauvreté,
- Bonne gestion de la protection végétale,
- Renforcement du niveau de formation et information des populations,
- Amélioration du cadre de vie.

2.7.2	Renseignements disponibles sur les solutions de remplacement et leurs risques
2.7.3	Informations supplémentaires pertinentes

**TROISIEME PARTIE : AUTORITES DESIGNEES PAR LE GOUVERNEMENT**

Ministère/Département et autorité responsables de la promulgation/l'application de la mesure de réglementation finale	
Institution	MINISTERE D'ETAT, MINISTERE DE L'ENVIRONNEMENT / Direction des Politiques et Stratégies de l'Environnement
Adresse	20 BP 650 Abidjan 20
Téléphone	(225) 20 21 11 83
Télécopieur	(225) 20 22 20 50 / 20 21 11 83
Adresse électronique	
Autorité nationale désignée	
Institution	MINISTERE D'ETAT, MINISTERE DE L'ENVIRONNEMENT / Direction des Politiques et Stratégies de l'Environnement
Adresse	20 BP V 650 Abidjan 20
Nom de la personne responsable	Madame VI KOUADIO Amenan
Position de la personne responsable	Assistante, gestion de projet.
Téléphone	(225) 20 21 11 83 / 05 99 84 29
Télécopieur	(225) 20 22 20 50 / 20 21 11 83
Adresse électronique	vijosee@yahoo.fr

Date, signature de l'autorité nationale désignée et cachet officiel:

23 juin 2004  




## FORM FOR NOTIFICATION OF FINAL REGULATORY ACTION TO BAN OR SEVERELY RESTRICT A CHEMICAL

IMPORTANT: See instructions before filling in the form

COUNTRY: CÔTE D'IVOIRE

### PART I: PROPERTIES, IDENTIFICATION AND USES

<b>1. IDENTITY OF CHEMICAL</b>		
<b>1.1</b>	<b>Common name</b>	ENDOSULFAN
<b>1.2</b>	<b>Chemical name according to an internationally recognized nomenclature (e.g. IUPAC), where such nomenclature exists</b>	1,4,5,6,7-hexachloro-8,9,10-trinoborn-2-en-5,6-ylenedimethyl sulphite
<b>1.3</b>	<b>Trade names and names of preparations</b>	CALLIFAN 50EC, THIODAN 35EC, TIONEX 50EC, TIOSULFAN 35EC, THIOSULFAN 50EC
<b>1.4</b>	<b>Code numbers</b>	
<b>1.4.1</b>	<b>CAS number</b>	115-29-7
<b>1.4.2</b>	<b>Harmonized System customs code</b>	
<b>1.4.3</b>	<b>Other numbers (specify the numbering system)</b>	

<b>1.5 Indication regarding previous notification on this chemical, if any</b>	
<b>1.5.1</b>	<input checked="" type="checkbox"/> This is a first time notification of final regulatory action on this chemical.
<b>1.5.2</b>	<input type="checkbox"/> This is a modification of a previous notification of final regulatory action on this chemical. The sections modified are: _____ <input type="checkbox"/> This notification replaces all previously submitted notifications on this chemical. Date of issue of the previous notification: _____

### PLEASE RETURN THE COMPLETED FORM TO:

Interim Secretariat for the Rotterdam Convention  
Plant Protection Service  
Plant Production and Protection Division, FAO  
Viale delle Terme di Caracalla  
00100 Rome, Italy  
  
Tel: (+39 06) 5705 3441  
Fax: (+39 06) 5705 6347  
E-mail: [pic@fao.org](mailto:pic@fao.org)

OR

Interim Secretariat for the Rotterdam Convention  
UNEP Chemicals  
  
11-13, Chemin des Anémones  
CH – 1219 Châtelaine, Geneva, Switzerland  
  
Tel: (+41 22) 917 8183  
Fax: (+41 22) 797 3460  
E-mail: [pic@unep.ch](mailto:pic@unep.ch)

1.6 Information on hazard classification where the chemical is subject to classification requirements	
International classification systems	Hazard class
Endosulfan ai (active ingredient) belongs to Class Ib Classification based on toxicity by mouth	Highly hazardous
Other classification systems	Hazard class

1.7 Use or uses of the chemical	
1.7.1	<input checked="" type="checkbox"/> <b>Pesticide</b>
	<b>Describe the uses of the chemical as a pesticide in your country:</b> Endosulfan controls caterpillars, bark beetles and bugs. It is used to treat cotton plants, cotton, cocoa plants, cocoa and coffee plants. It works by contact, by ingestion and by inhalation.
1.7.2	<input type="checkbox"/> <b>Industrial</b>
	<b>Describe the industrial uses of the chemical in your country:</b> None

1.8 Properties	
1.8.1	<b>Description of physico-chemical properties of the chemical</b>
	Endosulfan comes in light brown flakes form, and its melting, boiling and decomposition temperatures are respectively 80° (Tech), $\alpha$ -109°C isomer, $\beta$ -213, 3°C.isomer. It is soluble in water

1.8.2	<b>Description of toxicological properties of the chemical</b>	<p>Highly toxic: in rats:DL50 by mouth: 80mg/kg by inhalation: 8-13mg/l. Analysis showed that Endosulfan does not irritate either the skin or the eyes.</p>
1.8.3	<b>Description of ecotoxicological properties of the chemical</b>	<p>Endosulfan is highly toxic to birds: DL50=42-243mg/kg, and also highly toxic to fish: CL50=0,02-6,9µg/l. Bees DL50: 2 µg/bee</p>

## PART II: FINAL REGULATORY ACTION

2.	<b>FINAL REGULATORY ACTION</b>		
2.1	The chemical is:	<input type="checkbox"/> banned	OR <input checked="" type="checkbox"/> severely restricted
2.2	<b>Information specific to the final regulatory action</b>		
2.2.1	<b>Summary of the final regulatory action</b> <p>Endosulfan has been registered but its use is severely restricted and under the control of ANADER (National Agency of support to rural development) because it is highly toxic to humans and the environment.</p>		
2.2.2	<b>Reference to the regulatory document</b> <ul style="list-style-type: none"> <li>- Socio-economic analysis of pesticides production in the Ivory Coast (publication series N° 06/F)</li> <li>- Plant protection product index of the Ivory Coast, published in 2002 by the Ministry of Agriculture</li> </ul>		
2.2.3	<b>Date of entry into force of the final regulatory action</b> <p>Since 1998</p>		

2.3	<b>Was the final regulatory action based on a risk or hazard evaluation?</b>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
	<b>If yes, give information on such evaluation</b>	

	<p>It is to be noted that the increasing use of plant protection products in the Ivory Coast by a rural population whose majority is illiterate presents several problems both to human health and the environment. In order to minimise the adverse effects caused by an excessive and irrational use of pesticides, the Government of the Ivory Coast has implemented regulatory texts based on decree 89-02 of 4 January 1989 on the approval, production, sale and use of pesticides related to international agreements.</p>				
	<table border="1"> <tr> <td><b>Reference to the relevant documentation</b></td> <td></td> </tr> <tr> <td colspan="2"> <ul style="list-style-type: none"> <li>- plant protection products index 2000, published by the Ministry of Agriculture</li> <li>- Socio-economic analysis of pesticides production in the Ivory Coast (publication series N° 06/F)</li> <li>- Decree N° 89-02 of 4 January 1989.</li> </ul> </td> </tr> </table>	<b>Reference to the relevant documentation</b>		<ul style="list-style-type: none"> <li>- plant protection products index 2000, published by the Ministry of Agriculture</li> <li>- Socio-economic analysis of pesticides production in the Ivory Coast (publication series N° 06/F)</li> <li>- Decree N° 89-02 of 4 January 1989.</li> </ul>	
<b>Reference to the relevant documentation</b>					
<ul style="list-style-type: none"> <li>- plant protection products index 2000, published by the Ministry of Agriculture</li> <li>- Socio-economic analysis of pesticides production in the Ivory Coast (publication series N° 06/F)</li> <li>- Decree N° 89-02 of 4 January 1989.</li> </ul>					

<b>2.4</b>	<b>Reasons for the final regulatory action</b>															
<b>2.4.1</b>	<b>Is the reason for the final regulatory action relevant to the human health?</b>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No														
	<table border="1"> <tr> <td><b>If yes, give summary of the known hazards and risks presented by the chemical to human health, including the health of consumers and workers</b></td> <td></td> </tr> <tr> <td colspan="2"> <p>Users are exposed to risks. Since handlers are usually unskilled, they don't respect the necessary precautions while using the product. They use the product for purposes Other than the indicated one, which are not recommended. In rural areas, the product is stored close to the human habitat. Industrial and mine workers are also at risk lacking the appropriate equipment for that chemical</p> <p>In the Ivory Coast, studies carried out by students showed the presence of endosulfan residues in food and in the drinking water (wells). Considering the toxicity of the product, those residues also represent a risk to humans.</p> </td> </tr> <tr> <td><b>Reference to the relevant documentation</b></td> <td></td> </tr> <tr> <td colspan="2"> <ul style="list-style-type: none"> <li>- National profile in order to assess the national capacity to manage chemicals (published by the Direction of Environment with the assistance of UNITAR and IFCS).</li> <li>- Socio-economic analysis of pesticides production in the Ivory Coast (publication series N° 06/F)</li> </ul> </td> </tr> <tr> <td><b>Expected effect of the final regulatory action</b></td> <td colspan="2"></td> </tr> <tr> <td colspan="3"> <p>A total reduction of risks linked to the use of Endosulfan to preserve human health.</p> </td> </tr> </table>		<b>If yes, give summary of the known hazards and risks presented by the chemical to human health, including the health of consumers and workers</b>		<p>Users are exposed to risks. Since handlers are usually unskilled, they don't respect the necessary precautions while using the product. They use the product for purposes Other than the indicated one, which are not recommended. In rural areas, the product is stored close to the human habitat. Industrial and mine workers are also at risk lacking the appropriate equipment for that chemical</p> <p>In the Ivory Coast, studies carried out by students showed the presence of endosulfan residues in food and in the drinking water (wells). Considering the toxicity of the product, those residues also represent a risk to humans.</p>		<b>Reference to the relevant documentation</b>		<ul style="list-style-type: none"> <li>- National profile in order to assess the national capacity to manage chemicals (published by the Direction of Environment with the assistance of UNITAR and IFCS).</li> <li>- Socio-economic analysis of pesticides production in the Ivory Coast (publication series N° 06/F)</li> </ul>		<b>Expected effect of the final regulatory action</b>			<p>A total reduction of risks linked to the use of Endosulfan to preserve human health.</p>		
<b>If yes, give summary of the known hazards and risks presented by the chemical to human health, including the health of consumers and workers</b>																
<p>Users are exposed to risks. Since handlers are usually unskilled, they don't respect the necessary precautions while using the product. They use the product for purposes Other than the indicated one, which are not recommended. In rural areas, the product is stored close to the human habitat. Industrial and mine workers are also at risk lacking the appropriate equipment for that chemical</p> <p>In the Ivory Coast, studies carried out by students showed the presence of endosulfan residues in food and in the drinking water (wells). Considering the toxicity of the product, those residues also represent a risk to humans.</p>																
<b>Reference to the relevant documentation</b>																
<ul style="list-style-type: none"> <li>- National profile in order to assess the national capacity to manage chemicals (published by the Direction of Environment with the assistance of UNITAR and IFCS).</li> <li>- Socio-economic analysis of pesticides production in the Ivory Coast (publication series N° 06/F)</li> </ul>																
<b>Expected effect of the final regulatory action</b>																
<p>A total reduction of risks linked to the use of Endosulfan to preserve human health.</p>																

<b>2.4.2</b>	<b>Is the reason for the final regulatory action relevant to the environment?</b>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No						
	<table border="1"> <tr> <td><b>If yes, give summary of the known hazards and risks to the environment</b></td> <td></td> </tr> <tr> <td colspan="2"> <p>Analysis of the aquatic environment in the Ivory Coast showed the presence of Endosulfan. Considering the toxicity of the product, the contamination of the aquatic environment often leads to a biological bioaccumulation in fish and other aquatic organisms. These residues can be a risk to humans.</p> <p>This situation results from the wrong management of these products (burying, direct discharge in the aquatic and terrestrial environment due to the disposal of its packaging)</p> </td> </tr> <tr> <td><b>Reference to the relevant documentation</b></td> <td></td> </tr> </table>		<b>If yes, give summary of the known hazards and risks to the environment</b>		<p>Analysis of the aquatic environment in the Ivory Coast showed the presence of Endosulfan. Considering the toxicity of the product, the contamination of the aquatic environment often leads to a biological bioaccumulation in fish and other aquatic organisms. These residues can be a risk to humans.</p> <p>This situation results from the wrong management of these products (burying, direct discharge in the aquatic and terrestrial environment due to the disposal of its packaging)</p>		<b>Reference to the relevant documentation</b>	
<b>If yes, give summary of the known hazards and risks to the environment</b>								
<p>Analysis of the aquatic environment in the Ivory Coast showed the presence of Endosulfan. Considering the toxicity of the product, the contamination of the aquatic environment often leads to a biological bioaccumulation in fish and other aquatic organisms. These residues can be a risk to humans.</p> <p>This situation results from the wrong management of these products (burying, direct discharge in the aquatic and terrestrial environment due to the disposal of its packaging)</p>								
<b>Reference to the relevant documentation</b>								



	- National profile in order to assess the national capacity to manage chemicals (published by the Direction of Environment with the assistance of UNITAR and IFCS).
--	---

	<b>Expected effect of the final regulatory action</b>  A total reduction of risks linked to the use of Endosulfan to preserve the wildlife and the aquatic flora
--	--

<b>2.5</b>	<b>Category or categories where the final regulatory action has been taken</b>	
<b>2.5.1</b>	<b>Final regulatory action has been taken for the chemical category</b>	<input type="checkbox"/> <b>Industrial</b>
	<b>Use or uses prohibited by the final regulatory action</b>	
	<b>Use or uses that remain allowed</b>	

<b>2.5.2</b>	<b>Final regulatory action has been taken for the chemical category</b>	<input checked="" type="checkbox"/> <b>Pesticide</b>
	<b>Formulation(s) and use or uses prohibited by the final regulatory action</b>	
	All EC formulations are concerned	
	<b>Formulation(s) and use or uses that remain allowed</b>	
	The use of CS formulations is authorised	

<b>2.5.3</b>	<b>Estimated quantity of the chemical produced, imported, exported and used, where available.</b>	
	<b>Quantity per year (MT)</b>	<b>Year</b>
<b>Produced</b>		
<b>Imported</b>		
<b>Exported</b>		
<b>Used</b>		

<b>2.6</b>	<b>Indication, to the extent possible, of the likely relevance of the final regulatory action to other states and regions</b>
------------	---

--	--

<b>2.7 Other relevant information that may cover:</b>			
<b>2.7.1</b>	<table border="1"> <tr> <td><b>Assessment of socio-economic effects of the final regulatory action</b></td> <td></td> </tr> </table> <p>The regulatory act basically comprises the legislation of the Ivory Coast in the field of plant protection products.</p> <p>This legislation, based on decree 89-02 of 4 January 1989 on the approval, the production, the sale and use of pesticides in the Ivory Coast takes into account the FAO and WHO recommendations on the use of plant protection products.</p> <p>This measure has recently been reinforced by the Ivory Coast ratification of the Rotterdam Convention. Besides the environmental concerns linked to the effects that the use of pesticides can have on human health and the environment, it is also important to assess the socio-economic impact of these measures.</p> <p><u>On the economic level:</u></p> <ul style="list-style-type: none"> <li>- to improve and increase the agricultural production</li> <li>- to develop the marketing network</li> <li>- to improve the economic and trade co-operation</li> <li>- to preserve natural resources</li> <li>- to introduce direct or indirect taxes and subventions in view of the development of this sector.</li> </ul> <p><u>On the social level:</u></p> <ul style="list-style-type: none"> <li>- to preserve human health and the environment</li> <li>- to fight against poverty</li> <li>- to insure a good management of plant protection</li> <li>- to improve the level of training and information of the population</li> <li>- to improve the standard of living</li> </ul>	<b>Assessment of socio-economic effects of the final regulatory action</b>	
<b>Assessment of socio-economic effects of the final regulatory action</b>			

<b>2.7.2</b>	<b>Information on alternatives and their relative risks</b>	
<b>2.7.3</b>	<b>Relevant additional information</b>	

### PART III : GOVERNMENT AUTHORITIES

Ministry/Department and authority responsible for issuing/enforcing the final regulatory action	
<b>Institution</b>	Ministry of State, Ministry of the Environment / Direction of environment policies and strategies
<b>Address</b>	20 BP 650 Abidjan 20
<b>Telephone</b>	(225) 20 21 11 83
<b>Telefax</b>	(225) 20 22 20 50 / 20 21 11 83
<b>E-mail address</b>	
<b>Designated National Authority</b>	

<b>Institution</b>	Ministry of State, Ministry of the Environment / Direction of environment policies and strategies
<b>Address</b>	20 BP V 650 Abidjan 20
<b>Name of person in charge</b>	Ms. VI KOUADIO Amenan
<b>Position of person in charge</b>	Assistant, project management
<b>Telephone</b>	(225) 20 21 11 83/ 05 99 84 29
<b>Telefax</b>	(225) 20 22 20 50 / 20 21 11 83
<b>E-mail address</b>	vijosee@yahoo.fr

**Date, signature of DNA and official seal:** \_\_\_\_\_



**FORM**  
**FOR NOTIFICATION OF FINAL REGULATORY ACTION**  
**TO BAN OR SEVERELY RESTRICT A CHEMICAL**

IMPORTANT: See instructions before filling in the form

COUNTRY: Thailand

**PART I: PROPERTIES, IDENTIFICATION AND USES**

<b>1. IDENTITY OF CHEMICAL</b>		
1.1	Common name	endosulfan
1.2	Chemical name according to an internationally recognized nomenclature (e.g. IUPAC), where such nomenclature exists	(1,4,5,6,7,7-hexachloro-8,9,10-trinorborn-5-en-2,3-ylene=bismethylene) sulfite
1.3	Trade names and names of Preparations	Thiodan
1.4	Code numbers	OMS 204 (α); OMS 205(β); OMS 570; ENT 23979
1.4.1	CAS number	[115-29-7]
1.4.2	Harmonized System customs code	
1.4.3	Other numbers (specify the numbering system)	EEC no. 204-079-4
1.5	Indication regarding previous notification on this chemical, if any	
1.5.1	<input checked="" type="checkbox"/> This is a first time notification of final regulatory action on this chemical	
1.5.2	<input type="checkbox"/> This is a modification of a previous notification of final regulatory action on this chemical. The sections modified are: <input type="checkbox"/> This notification replaces all previously submitted notifications on this chemical.	
	Date of issue of the previous notification: _____	

**PLEASE RETURN THE COMPLETED FORM TO:**

Interim Secretariat for the Rotterdam Convention  
Plant Protection Service  
Plant Production and Protection Division, FAO  
Viale delle Terme di Caracalla  
00100 Rome, Italy  
Tel: (+39 06) 5705 3441  
Fax: (+39 06) 5705 6347  
E-mail: pic@fao.org

OR

Interim Secretariat for the Rotterdam Convention  
UNEP Chemicals

11 - 13, Chemin des Anémones  
CH - 1219 Châtelaine, Geneva, Switzerland  
Tel: (+4122) 917 8183  
Fax: (+4122) 797 3460  
E-mail: pic@unep.ch

1.6 Information on hazard classification where the chemical is subject to classification requirements	
international classification systems	Hazard class
WHO (Technical Product)	II
Other classification systems	Hazard class
EPA (formulation)	I
EC hazard	T; R 24/25 Xi; R36 N; R50; R 53

1.7 Use or uses of the chemical	
1.7.1	<input checked="" type="checkbox"/> Pesticide Describe the uses of the chemical as a pesticide in your country:  Used for controlling <ul style="list-style-type: none"> <li>- aphids and leafhoppers in cotton</li> <li>- webworm and hawk moth worm in sesame</li> <li>- berryborer in coffee</li> </ul>
1.7.2	<input type="checkbox"/> Industrial Describe the industrial uses of the chemical in your country:  

1.8 Properties	
1.8.1	Description of physico-chemical properties of the chemical  Molecular weight = 406.9, molecular formula = $C_9H_6Cl_6O_3S$ . Form : colourless crystal (tech. Cream to brown, mostly beige). Melting point $\geq 80^\circ C$ ; (tech.); $\alpha$ -109.2 $^\circ C$ ; $\beta$ -213.3 $^\circ C$ . Vapour pressure = 0.83 mPa (20 $^\circ C$ ) for 2:1 mixture of $\alpha$ - and $\beta$ - isomers. $K_{ow}$ logP for $\alpha$ - = 4.74; $\beta$ - = 4.79 (both at pH 5). Henry for $\alpha$ - = 1.48; $\beta$ - = 0.07 (both Pa m <sup>3</sup> mol <sup>-1</sup> , 22 $^\circ C$ , calc.) Specific gravity /density c. 1.8 (20 $^\circ C$ ) (tech.). Solubility in water alpha-endosulfan = 0.32, beta-endosulfan = 0.33 (both in mg/l, 22 $^\circ C$ ). In ethyl acetate, dichloromethane, toluene 200, ethanol c. 65, hexane c. 24 (all in g/l, at 20 $^\circ C$ ). Stability: stable to sunlight. Slowly hydrolysed in aqueous acids and alkalis, with the formation of the diol and sulfur dioxide.

1.8.2	<b>Description of toxicological properties of the chemical</b> <p>Acute oral LD<sub>50</sub> for rats 70 mg(in aqueous suspension)/kg, 110 mg tech.(in oil)/kg, 76 mg alpha-isomer/kg, 240 g beta-isomer/kg; for dogs 77 mg tech./kg. Skin and eye: Accute percutaneous LD<sub>50</sub> for rabbits 359 mg(in oil)/kg; for male rats &gt; 4000, female rats 500 mg/kg. Inhalation LC<sub>50</sub> (4h) for male rats 0.0345, female rats 0.0126 mg/l . NOEL (2 years) for rats = 15 ppm diet; (1 year) for dogs 10 ppm diet. ADI (JMPR) 0.006mg/kg body weight.[1998].</p>
1.8.3	<b>Description of ecotoxicological properties of the chemical</b> <p>Birds: Acute oral LD<sub>50</sub> for mallard ducks = 205-245, ring-necked pheasants 620-1000 mg /kg. Fish: Highly toxic (LC<sub>50</sub> (96 hours) for golden orfe = 0.002 mg/l water) but , in practical use, should be harmless to wildlife. Daphnia LC<sub>50</sub> (48 hours) 75-750 µg/l. Algae EC<sub>50</sub> for green algae &gt;0.56 mg/l. Bees: Not toxic to bees under field conditions at an application rate of 1.6 l/ha ( 560 g endosulfan/ha). Worms: NOEC = 0.1 mg/kg dry weight.</p>

**PART II: FINAL REGULATORY ACTION**

2.	<b>FINAL REGULATORY ACTION</b>
2.1	The chemical is: <input type="checkbox"/> banned OR <input checked="" type="checkbox"/> severely restricted
2.2	<b>Information specific to the final regulatory action</b>
2.2.1	<b>Summary of the final regulatory action</b> <p>Endosulfan in formulations other than Capsule Suspension (CS) has been prohibited for import, production, having in possession and use as agricultural pesticide.</p>
2.2.2	<b>Reference to the regulatory document</b> <p>Notification of Ministry of Industry dated 30 September 2004, published in the Royal Gazette volume no 121, special section 118 Ng. dated 18 October 2004.</p>
2.2.3	<b>Date of entry into force of the final regulatory action</b> <p>19 October 2004.</p>

2.3	Was the final regulatory action based on a risk or hazard evaluation?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
	If yes, give information on such evaluation	
	Reference to the relevant documentation	
	<p>Endosulfan as EC formulation is very highly hazardous to aquatic life.</p> <p>The Pesticide Manual. 13 th Edition.</p>	

2.4	Reasons for the final- regulatory action		
2.4.1	Is the reason for the final regulatory action relevant to the human health?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	If yes, give summary of the known hazards and risks presented by the chemical to human health, including the health of consumers and workers		
	Reference to the relevant documentation		
	Expected effect of the final regulatory action		

2.4.2	Is the reason for the final regulatory action relevant to the environment?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
	If yes, give summary of the known hazards and risks to the environment  <p>Endosulfan as EC and GR formulations are very highly toxic to fish and other aquatic lives. They had been registered for use in field crops but they were misused to kill Golden Apple Snail in the paddy field.</p>	
	Reference to the relevant documentation  <p>The Pesticide Manual. 13 th Edition.</p>	
	Expected effect of the final regulatory action  <p>Reduce misuse of endosulfan. (In the past, farmers used for controlling Golden Apple Snail in paddy field. It did not kill only snail but also killed other aquatic organisms).</p>	

2.5	Category or categories where the final regulatory action has been taken	
2.5.1	Final regulatory action has been taken for the chemical category	<input type="checkbox"/> Industrial
	Use or uses prohibited by the final regulatory action  	
	Use or uses that remain allowed  	



2.5.2	Final regulatory action has been taken for the chemical category	<input checked="" type="checkbox"/> Pesticide
	Formulation(s) and use or uses prohibited by the final regulatory action	
	Other formulations were prohibited except capsule suspension (CS) formulation.	
	Formulation(s) and use or uses that remain allowed	
	CS formulation is registered for use in cotton only.	

2.5.3 Estimated quantity of the chemical produced, imported, exported and used, where available.		
	Quantity per year (MT)	Year
Produced		
Imported	1,678.1	2003
Exported		
Used		

2.6	Indication, to the extent possible, of the likely relevance of the final regulatory action to other states and regions

2.7	Other relevant information that may cover:
2.7.1	Assessment of socio-economic effects of the final regulatory action

2.7.2	Information on alternatives and their relative risks
	Endosulfan CS formulation has been proved to be safe for aquatic organisms including golden apple snail. So it cannot be used to control snail.
2.7.3	Relevant additional information

**PART III : GOVERNMENT AUTHORITIES**

Ministry/Department and authority responsible for issuing/enforcing the final regulatory action	
Institution	Department of Agriculture
Address	50 Phaholyothin Rd., Ladyao, Chatuchak, Bangkok 10900 Thailand
Telephone	66-2-5790586
Telefax	66-2-5615024
E-mail address	
Designated National Authority	
Institution	Department of Agriculture
Address	50 Phaholyothin Rd., Ladyao, Chatuchak, Bangkok 10900 Thailand
Name of person in charge	Mr. Chakarn Saengruksawong
Position of person in charge	Director-General
Telephone	66-2-5790586
Telefax	66-2-5615024
E-mail address	chakarn@doa.go.th

Date, signature of DNA and official seal:

17-01-05

