

# MALAYSIA

# Plant Red List

Guide for Contributors



# **MALAYSIA**

## **Plant Red List**

*Produced with the financial support of*

**MINISTRY OF SCIENCE, TECHNOLOGY AND INNOVATION  
GOVERNMENT OF MALAYSIA**

# **MALAYSIA Plant Red List**

Guide for Contributors

Prepared by  
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Forest Research Institute Malaysia  
2006

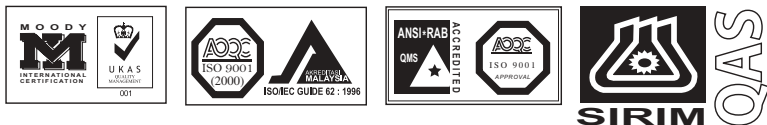
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## Foreword

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The initiation of the Malaysian Plant Red List project is timely. The forests of Malaysia have been systematically managed since early 1900s. Forest management measures were practised to ensure sustainable production of timber and non-timber resources, in addition to, enhancing ecological balance, safeguarding water supplies and environmental quality. The Sustainable Forest Management approach, practiced since early 1990s, has an important component of conservation of biological diversity. Malaysia has documented much of her plant wealth; however, the application of a holistic approach to plant conservation in the context of Sustainable Forest Management is still in its infancy. This is primarily because few plant species has been assessed for its threat status, the assessment being based on global guidelines, and the management of the biological resources is sectoral-based. Previously, prior to the formation of the Ministry of Natural Resources and Environment (NRE), these resources were managed and coordinated by many Ministries. When NRE was established in 2004, many of the existing sectoral-based institutional framework were integrated and this included programmes relating to the conservation of natural resources. NRE is now keenly interested in documenting Malaysia's biodiversity, particularly for poorly known biological groups.

In view of Malaysia's vast biological diversity, it is a heavy task to document and conserve all species. This threat assessment project is the first step towards identifying priorities for conservation. Each species is assessed for its threats and given a threat category—the basis for the category is based on past collections and published inventory data. Species bearing the more critical category can then be given attention by the relevant authorities and policy makers.

The Malaysia Plant Red List Project is a collaborative project jointly undertaken by the Forest Research Institute Malaysia

(FRIM), Forest Research Centre, Sarawak, Forest Research Centre, Sabah, research institutions and universities, under the auspices of NRE and funded by the Malaysian Government.

I am confident that the Plant Red List generated from the project will be meaningful and useful to resource managers and Malaysia, particularly with regards to effective conservation management and sustainable use of the country's natural resources.

A handwritten signature in black ink, appearing to read 'Razak', with a long horizontal stroke extending from the end of the signature.

**Dato' Dr. Hj. Abdul Razak Mohd. Ali**  
*Director General*  
*Forest Research Institute Malaysia*



## Acknowledgements

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FRIM gratefully acknowledges the valuable input provided by the participants of the “Seminar on the Status of Biological Diversity in Malaysia & the Workshop on Threat Assessment of Plant Species in Malaysia”. Agencies represented in the seminar and workshop were Forest Department Peninsular Malaysia and State Forest Departments, Forest Research Centre, Sabah, Forest Research Centre, Sarawak, Department of Agriculture, Fisheries Department, Department of Wildlife and National Parks, Department of Veterinary Sciences, Malaysian Rubber Board, Malaysian Agricultural Research and Development Institute, Malaysian Timber Industry Board, Malaysian Centre for Remote Sensing, Sabah Parks, University Malaya, Universiti Putra Malaysia, Universiti Kebangsaan Malaysia, Universiti Malaysia Sarawak, Universiti Malaysia Sabah, University College of Science and Technology Malaysia, Malaysian Zoological Society, Putrajaya Botanical Garden, the private sector, governmental and non-governmental organisations. FRIM also gratefully acknowledge the Royal Botanic Gardens Sydney, Royal Botanic Gardens Kew and Singapore Botanical Gardens for their contribution. Special thanks are due to Charlotte Lusty (INIBAP-IPGRI) for her deliberations. We are indebted to the Flora and Fauna International for the generous financial support provided.

The hosting of this workshop was made possible through the support provided by the Ministry of Natural Resources and Environment (NRE) and the financial support from the Malaysian Government, through its National Council for Scientific Research and Development (MPKSN).

# Introduction

The Malaysia Plant Red List Project is a collaborative project jointly undertaken by the Forest Research Institute Malaysia (FRIM), Forest Research Centre, Sarawak, Forest Research Centre, Sabah, research institutions and universities. The project is under the auspices of the Ministry of Natural Resources and Environment (NRE) and is funded by the Malaysian Government through the National Council for Scientific Research and Development (MPKSN), beginning in the Ninth Malaysia Plan.

The project is aimed at producing an assessment of the conservation status and threats for indigenous plant species in Malaysia. This assessment is expected to highlight species that are rare, threatened and endangered and to develop recommendations and strategies towards improving their conservation through enhancing the current network of in situ protected areas as well as a national network for ex situ conservation. The ultimate aim of the Red List is to convey the urgency and scale of conservation problems to the public and policy makers, and to motivate the relevant authorities to try to reduce species extinctions. Information about species and ecosystems is essential in moving towards a more sustainable use of our natural resources.

The Taxon Data Information Sheet (TDIS) contains a minimal but fundamental set of information that provides rationale to support the Red List category given to the taxon concerned. The Red List category here refers to the IUCN Red List Categories and Criteria version 3.1 (2001). TDIS had been modified from the IUCN Red List Assessment Questionnaire to suit the requirements for the Malaysian plant species. This version was approved at the “Seminar on the Status of Biological Diversity in Malaysia & the Workshop on Threat Assessment of Plant Species in Malaysia” held at the Forest Research Institute Malaysia on 28-30 June 2005.

The TDIS comprises the following:

- . • Scientific name including authority details;
- . • Taxonomy details;
- . • Common names in other languages;
- . • Habitat preferences;
- . • Geographical range;
- . • General distribution pattern;
- . • Population decline;
- . • Threats;
- . • Red List Category and Criteria;
- . • A rationale for the listing (including any numerical data used or inferences made, that relates to the threshold in the criteria);
- . • Current conservation measures;
- . • Utilisation;
- . • Literature used in the assessment;
- . • Details of Assessor(s);
- . • Date of assessment;
- . • Review process (names of evaluators)

TDIS and the guide to filling up the information sheet are available in electronic and hard copy forms. The electronic copy is available from <http://www.frim.gov.my/tfbc/>. Several supporting documents are required to assist the assessor(s) in the assessment and these are (1) IUCN Red List Categories and Criteria version

3.1 (2001); (2) IUCN Guidelines for Using the IUCN Red List Categories and Criteria and IUCN (2005); and (3) Guidelines for Application of IUCN Red List Criteria at Regional Levels: Version 3.0 (2003). These documents are available from the IUCN website (<http://www.iucn.org>).

The primary focus of the Malaysia Plant Red List Project is at the infra-specific level; therefore TDIS includes species, subspecies and varieties. As mentioned above, only indigenous species will be assessed, introduced ones are ignored.

# **Guide in Filling up the Taxon Data Information Sheet**

Please fill out the Data Information Sheet carefully using one sheet per taxon. Where necessary, please provide scoring based on your knowledge of the taxon and answer questions only with respect to the geographical area of your field knowledge. For taxon that is not restricted to Malaysia, you may want to include information that applies within its geographical distribution.

The taxon data information sheet may be filled in digitally or through hard copy. If you fill up the sheet digitally, double click on the accompanied check box and follow the instructions to check the box. If you choose to fill up the hard copy, tick on the box provided. Whether you choose to fill up the digital or hard copy, please do not create new codes – if you think the present codes do not accurately reflect the character, please specify under “Others” or use the “General Information” box provided at the end of the Part. The layout of the sheet has been protected and does not allow for any changes.

We urge you to submit the taxon information sheet in digital format. However, if this is going to be a problem, you can submit the sheets in hard copy. Kindly alert the Secretariat when you are ready to submit the sheets in so that we can take the necessary actions should the copies not arrive as expected.

It is acceptable to use either actual, approximation or inferred values. For taxon that you are familiar with, please avoid selecting the option “Unknown”. If you do so frequently, there will be little basis to support your proposed placement of the taxon under that Red List Category (item 29). However for many taxon, inferred or approximate values may not even be available and in such cases, “Unknown” may be selected.

Please note that if a higher level in the hierarchy is scored, this does not automatically imply that all the levels nested below that level are also scored. For example, under threats to the habitat (human induced) (18), scoring agriculture (18.1.2.) means that all the types under it, i.e., 18.1.2.1 to 18.1.2.3 are scored. This will not be the intention in most cases. Assessors are therefore encouraged, wherever possible, to select the appropriate type from the lowest level in the hierarchy.

## **Part I. Taxon Attributes**

Please use validly published scientific name. These can be obtained through taxonomic bibliographies or the International Plant Names Index (<http://www.ipni.org/index.html>). For common/ vernacular names, please use names that are published.

The habitat preference categories are based on the climatic and edaphic types described by Whitmore T.C. 1984. *Tropical Rain Forests of the Far East*. ELBS/Oxford University Press. 352 pp.; Symington C.F. 2004. *Foresters' Manual of the Dipterocarps*. Malayan Forest Records No. 16. Revised by P.S. Ashton & S. Appanah, edited by H.S. Barlow. Second edition. Forest Research Institute Malaysia and Malaysian Nature Society. 519 pp.; Wyatt-Smith J. 1995. *Manual of Malayan Silviculture for Inland Forest*. 2nd edition. Malayan Forest Records No. 23. Forest Research Institute Malaysia; and Soepadmo E. & Wong K.M. 1995. *Tree Flora of Sabah & Sarawak*, Vol. 1. Forest Research Institute Malaysia, Forestry Departments Sabah & Sarawak. The aquatic habitats (inland, marine and artificial) are based primarily on the classification system of wetland types used by the Ramsar Convention (see [http://www.ramsar.org/key\\_ris\\_types.htm](http://www.ramsar.org/key_ris_types.htm)). The categories are numbered to indicate their level in the hierarchy, e.g., 5.1. Climatic climax formation and 5.1.1. Lowland dipterocarp forest (Malayan, Burmese).

## **Part II. Geographical Range & Demographic Details of Population(s)**

The Secretariat will provide a taxon geographic distribution map for Malaysia. This map is a point distribution map based on herbarium specimens or direct field records. Please review these point locations carefully and make changes where necessary based on the most current information. Assessors are requested to update the information from other herbaria in Malaysia, the region and globally. Following this, please draw a polygon/shape surrounding the locations in Peninsular Malaysia using a thick black line. Depending on the distribution of the taxon, the polygon/ shape may be one continuous or many separate smaller polygons/ shapes. If the species is also present in Sabah and Sarawak, draw a polygon/shape for Sabah and Sarawak. Again, depending on the distribution of the taxon, the polygon may be one continuous or many separate, smaller polygons/shapes. If the extent of occurrence of the taxon follows a coastline, extend the polygon/ shape boundary outwards so that the coastline is included. The boundary of the polygon/shape will be cut to the coastline when the data is processed at a later date.

The eventual polygon(s)/shape(s) will be the extent of occurrence for the taxon. IUCN Red List Categories and Criteria ver 3.1 (2001) defines extent of occurrence as “the area contained within the shortest continuous imaginary boundary which can be drawn to encompass all the known, inferred or projected sites of present occurrence of a taxon, excluding cases of vagrancy. Extent of occurrence may exclude discontinuities or disjunctions within the overall distributions of taxa (e.g., large areas of obviously unsuitable habitat)”.

Every taxon map is accompanied by a scale and legend. In order to understand all the symbols given on the maps, please refer to the legend. Please do not attempt to change the scale and legend of the map as every taxon will use the same scale and legend. If however you should wish to do so, kindly discuss the matter with the Secretariat.

The assessor may request additional maps such as national forest inventory map and resource data, raster topographic data from the Secretariat and they will be provided in ArcView format. Please note that these maps are strictly to be used for the purpose of this project only and that the sources for the spatial information will be credited accordingly.

The number/approximation of locations of the taxon includes historic and current locations. Historic locations include locations that were previously forested but had since undergone a non-forest land-use change.

### **Part III. Red List Category & Criteria Assessment**

To begin Part III, you need to be familiar with the IUCN Red List Categories and Criteria version 3.1 (2001). This document together with the Guidelines for using the IUCN Red List Categories and Criteria and Guidelines for Application of IUCN Red List Criteria at Regional Levels: Version 3.0, prepared by the Standards and Petitions Sub-committee of the IUCN SSC Red List Programme, are available from the IUCN website (<http://www.iucn.org>).

For Part IIIa: Population Decline, assessors are strongly encouraged to read the relevant sections in the Guidelines for Using the IUCN Red List Categories and Criteria (April 2005). Empirical data is not needed in order to make a selection. For example, if the habitat of the taxon in question is decreasing, then it is reasonable to infer that the population of the taxon is also decreasing. If the range of the taxon is expanding, then it is reasonable to assume that the taxon is increasing. If the taxon is common and highly adaptable to environmental changes, it is reasonable to assume that it is stable. You are also asked to list any population studies/inventory done on the taxon. This information will be used in the evaluation of the assessment.

For Part IIIb: Threats, it is acceptable to select threats that can be reasonably inferred, even if they cannot be conclusively demonstrated. You should tick the threats that are being faced by the taxon, even if the taxon eventually does not qualify for one of the more threatened Red List Category. These threats could be in the past and/or present and/or future, using a time frame of ten years or three generations, whichever is longer (not exceeding 100 years in the future). Selecting a threat implies that the threat is still on-going. Selection of a higher-level threat, e.g., 18.1. Agroforestry, does not imply that all the threats below this e.g., 18.1.1 Forest Plantations to 18.1.5. Unknown, are indicated. It simply indicates that some unspecified form of agro-forestry is leading to habitat loss or habitat degradation for the taxon concerned. Selection of any threat category lower down the hierarchy automatically implies that the higher level is indicated. For

example, selecting 18.1.2.1 Shifting, indicates that shifting cultivation is an agricultural activity (18.1.2) that causes human-induced habitat loss (18). Multiple additions under 'Others' are allowed, although extensive use of this is not encouraged. If no threats to the taxon are known, you should tick item 27. If you believe that all the threat options provided here are not applicable to the taxon, kindly indicate others in item 28.

Item 20 (Natural disasters) may be directed to the habitat and/or taxon level. Selecting an option under this item indicates that the threat is being faced either at the habitat or taxon level or both.

Under Red List Category (29), if the taxon qualifies as Critically Endangered, Endangered or Vulnerable, then the criteria that qualify it for inclusion in that category must be given. The process for doing this is described in IUCN Red List Categories and Criteria version 3.1. If the taxon is listed in any other Red List Categories (i.e., Extinct, Extinct in the Wild, Near Threatened, Least Concern or Data Deficient), then no Red List criteria should be given.

## Part IV. Current Conservation Measures for the Taxon

In this part, general conservation, as well as taxon-specific, measures are included. General conservation measures have a broader focus on the ecosystems/habitats in which the taxon occurs and any measures related to that ecosystems/habitats are likely to benefit the taxon. Taxon-specific measures may include listing in the Convention on the International Trade in Endangered Species of Wild Fauna and Flora (CITES), national legislation, restoration/rehabilitation programmes or other forms of taxon specific measures.

In using this hierarchical classification of conservation actions, assessors are asked to indicate the conservation actions or measures that are in place and/or that are needed for that taxon. The selection should be for actions which are most needed and which could realistically be achieved in approximately the next five years. Selection of any action lower down the hierarchy automatically implies that the higher levels are indicated, i.e., it is not necessary to indicate all the levels, just the lowest. For example, selecting action 36.1.1. Integrity of established protected areas indicates that integrity is required in the protected areas

(36.1) and is one of the in situ/habitat conservation-based actions(36) required for the taxon concerned. Multiple conservation actions can be selected as required. Multiple additions under 'Others' are allowed, although extensive use of this is not encouraged. If no conservation actions or measures are in place, this should be recorded in item 31.

The definition of a protected area adopted by IUCN is “an area of land and/sea especially dedicated to the protection and maintenance of biological diversity and of natural and associated cultural resources, and managed through legal or other effective means”. Malaysia has a large network of protected areas and it includes national parks, state parks, virgin jungle reserves, wildlife sanctuaries and reserves and protected forest areas in Permanent Reserved Forests. Table 1 provides the IUCN equivalent for protected areas in Malaysia.

Table 1: IUCN Management Category equivalent for protected areas in Malaysia

Malaysia	IUCN Management Category equivalent
National and State Parks	II or III
Virgin Jungle Reserves	I
Wildlife Reserves/Sanctuaries	IV
Permanent Reserved Forests	VI

Greater details of the IUCN Management Category may be obtained from <http://www.unep-wcmc.org/>.

## **Part V. Utilisation**

If you are unable to fill up certain sections of this part, you might be able to source the information from relevant agencies. Should you do so, please include their names as contributors (47). You may also wish to leave certain items blank for the Secretariat to fill up.

### **Literature Used in the Documentation**

Please cite full details of the most important and relevant references used in the assessment. It is not necessary to produce an exhaustive bibliography. Only the references that provided key information are necessary. To assist assessors, a list of key references is provided and these can be check-boxed. For references that do not appear here, please follow the format for citation.

### **Details of the Assessor(s)**

Please ensure that your full name is written on the sheet so that you may be credited for the information. All future enquiries will be directed to the assessor, therefore, it is important to include your most current email address and if you should change your affiliation, please notify the Secretariat. If you have had help from others, please list their full names, title, job designation, mailing address, telephone, fax and e-mail details in (47). Your name will be listed along with others who had contributed to the entire body of information.

Finally, if you have any questions regarding the assessment, please contact:

The Secretariat Malaysia Plant Red List Project c/o Tropical Forest Biodiversity Centre Forest Research Institute Malaysia (FRIM) 52109 Kepong Selangor Darul Ehsan (Dr. Saw Leng Guan (sawlg@frim.gov.my; tel: 03-6279 7218; fax: 03-6273 1041) or Dr. Lillian Chua (lilian@frim.gov.my; tel: 03-6279 7223; fax: 03-6280 4625))

# MALAYSIA

## PLANT RED LIST

### Taxon Data Information Sheet

(Please complete one sheet per taxon)

#### Part I. Taxon attributes

1. Scientific name (include authority details)
2. Family
3. Synonyms
4. Common/Vernacular names (specify language)
5. Habitat Preferences
  - 5.1 The climatic climax formation (Please select the likely formation(s) where the taxon is found. You may tick more than one)
 

5.1.1 Lowland dipterocarp forest (Malayan, Burmese)	<input type="checkbox"/>	
5.1.2 Lowland mixed dipterocarp forest	<input type="checkbox"/>	
5.1.3 Lowland evergreen forest	<input type="checkbox"/>	
5.1.4 Hill dipterocarp forest (inland, coastal)	<input type="checkbox"/>	
5.1.5 Hill mixed dipterocarp forest	<input type="checkbox"/>	
5.1.6 Upper hill dipterocarp forest (approximately 762–1219 m (2500–4000 ft) above sea level in inland ranges; 609–914 m (2000–3000 ft) in isolated mountains and coastal ranges)	<input type="checkbox"/>	
5.1.7 Montane oak forest	<input type="checkbox"/>	
5.1.8 Montane ericaceous forest	<input type="checkbox"/>	
5.1.9 Subalpine forest	<input type="checkbox"/>	
5.1.10 Seasonally dry tropical rain forest or semi-evergreen forest	<input type="checkbox"/>	
  - 5.2 The edaphic climax formation (Please select the likely formation(s) where the taxon is found. You may tick more than one)
 

5.2.1 Mangrove forest	<input type="checkbox"/>	
5.2.2 Brackish water vegetation	<input type="checkbox"/>	
5.2.3 Peat swamp forest	<input type="checkbox"/>	
5.2.4 Freshwater swamp forest	<input type="checkbox"/>	
5.2.5 Other swamp vegetation (e.g., inland forest on flat land subjected to periodic inundation, excluding peat swamp, freshwater swamp)	<input type="checkbox"/>	
5.2.6 Coastal vegetation	<input type="checkbox"/>	
5.2.7 Riparian vegetation	<input type="checkbox"/>	
5.2.8 Permanent freshwater lake	<input type="checkbox"/>	
5.2.9 Limestone vegetation	<input type="checkbox"/>	
5.2.10 Quartz vegetation	<input type="checkbox"/>	
5.2.11 Heath forest/vegetation	<input type="checkbox"/>	
5.2.12 Ultramafic/ultrabasic vegetation	<input type="checkbox"/>	
5.2.13 Others (please specify)	<input type="checkbox"/>	
  - 5.3. Man-influenced/Artificial (terrestrial) (Please tick the most appropriate)
 

5.3.1 Agricultural land	<input type="checkbox"/>	
5.3.2 Plantations (e.g., rubber, oil palm, cocoa etc.)	<input type="checkbox"/>	
5.3.3 Urban areas/Wayside vegetation	<input type="checkbox"/>	

- 5.3.4 Regenerated logged-over forest ☐
- 5.3.5 Secondary forest comprising mainly early pioneer species ☐
- 5.3.6 Grassland ☐
- 5.3.7 Bamboo thickets ☐
- 5.3.8 Ex-mining land (e.g., tin) ☐
- 5.3.9 Others (please specify) ☐
- 5.4. Man-influenced /Artificial (aquatic) (Please tick the most appropriate)
- 5.4.1 Ponds, reservoirs and other man-made water bodies ☐
- 5.4.2 Irrigated land (including irrigation channels) ☐
- 5.4.3 Canals and other drainage channels, ditches ☐
- 5.4.4 Others (please specify) ☐
6. General information (If you have information on the aspects of occupied niches, soil type, geology, moisture regime etc. or other comments, please place details here)
7. If you have information on other aspects of the taxon's biology (taxonomy, ecology, reproductive biology etc), please place details here.

---

## Part II. Geographical Range & Demographic Details of Population(s)

8. Is the taxon endemic to Malaysia? If yes,
- 8.1 Endemic to Sabah ☐
- 8.2 Endemic to Sarawak ☐
- 8.3 Endemic to Sabah & Sarawak ☐
- 8.4 Endemic to Peninsular Malaysia (political boundary) ☐
9. Is the taxon endemic to a phytogeographical region? If yes,
- 9.1 Malaya (Peninsular Malaysia, Singapore and Peninsular Thailand) ☐
- 9.2 Borneo (Sabah, Sarawak, Brunei and Kalimantan) ☐
10. General distribution pattern of the taxon in Malaysia (A distribution map showing the Extent of Occurrence based on historic and current locations **MUST** be attached. Please fill details of the point localities in the box below)
- 10.1 Found in less than 5 localities ☐
- 10.2 Confined to one district in Peninsular Malaysia ☐
- 10.3 Confined to one state in Peninsular Malaysia or within a division in Sarawak or within a district in Sabah ☐
- 10.4 Confined to two states in Peninsular Malaysia or two divisions in Sarawak or two districts in Sabah ☐
- 10.5 Widespread ☐
11. Extent of occurrence in and around the area of study/sightings/collection (actual, approximation or inferred)
- 11.1 Less than 100 km<sup>2</sup> ☐
- 11.2 Between 100 and 5,000 km<sup>2</sup> ☐
- 11.3 Between 5,001 and 20,000 km<sup>2</sup> ☐
- 11.4 Greater than 20,001 km<sup>2</sup> ☐
- 11.5 Unknown ☐
-



## Part III. Red List Category & Criteria Assessment

### Part III(a). Population Decline

12. Status of habitat where the taxon occurs (i.e., changes to the taxon's natural distribution range/localities)

12.1 Has the habitat decreased

12.1.1 Yes

☐

12.1.2 No

☐

12.2 If decreasing, what has been the approximate percentage decrease in habitat over the last 10 years or three generations, whichever is the longer.

12.2.1 Less than 30%

☐

12.2.2 Less than 50%

☐

12.2.3 Less than 80%

☐

12.2.4 More than 80%

☐

12.2.5 Decreased to an unknown percentage

☐

12.3 If stable or unknown in the past, do you predict an approximate percentage decline in habitat over the next 10 years or three generations, whichever is the longer?

12.3.1 Less than 30%

☐

12.3.2 Less than 50%

☐

12.3.3 Less than 80%

☐

12.3.4 More than 80%

☐

12.3.5 Unknown

☐

12.4 Is there a change in the condition/quality of the habitat where the taxon occurs?

12.4.1 Stable

☐

12.4.2 Noticeable degradation

☐

12.4.3 Unknown

☐

13. Approximate number of mature individuals

13.1 Less than 50

☐

13.2 Between 51 and 250

☐

13.3 Between 251 and 1000

☐

13.4 Between 1001 and 2500

☐

13.5 Greater than 2500

☐

13.6 Unknown

☐

14. Status of population of the taxon

14.1 Has the population declined in number?

14.1.1 Yes

☐

14.1.2 No

☐

14.2 If declining, what is the percentage of population decline inferred or suspected over the last 10 years or three generations, whichever is the longer?

14.2.1 Less than 30%

☐

14.2.2 Less than 50%

☐

14.2.3 Less than 80%

☐

14.2.4 More than 80%

☐

14.2.5 Declined to an unknown percentage

☐

14.3 If stable or unknown in the past, do you predict a future decline in the population over the next 10 years or three generation, whichever is the longer?

14.3.1 Less than 30%

☐

14.3.2 Less than 50%

☐

14.3.3 Less than 80%

☐

- 14.3.4 More than 80% ☐
- 14.3.5 Unknown ☐
15. Data quality. Are all the above estimates based on (Please tick three most appropriate)
- 15.1 Inventory ☐
- 15.2 Literature ☐
- 15.3 Herbarium records ☐
- 15.4 Census/Monitoring ☐
- 15.5 Anecdotal information ☐
- 15.6 Indirect information (e.g., from trade, forest cover etc) ☐
- 15.7 Other information (please specify) ☐
16. Have any population studies/inventory been done on this taxon? (Please list the most relevant. If the study is approved, and fully or partially funded by the Malaysian Government, or approved under bilateral or multilateral agreements, specify in the following order: project title; starting and ending year of project; agencies; names of collaborators)
17. Does this species require detailed population-based ecological studies? If yes, please explain briefly.

### Part III(b). Threats

18. Threats to the habitat (human induced) (Please select three most important)
- 18.1 Agro-forestry
- 18.1.1 Forest plantations
- 18.1.1.1 Small-scale, less than 50 ha ☐
- 18.1.1.2 Large-scale, more than 50 ha ☐
- 18.1.2 Agriculture
- 18.1.2.1 Shifting ☐
- 18.1.2.2 Small-holders ☐
- 18.1.2.3 Agro-industry/large-scale plantations ☐
- 18.1.3 Aquaculture ☐
- 18.1.4 Unknown ☐
- 18.1.5 Others (please specify) ☐
- 18.2 Extraction
- 18.2.1 Mining ☐
- 18.2.2 Forestry
- 18.2.2.1 Subsistence ☐
- 18.2.2.2 Selective logging ☐
- 18.2.3 Non-timber forest products ☐
- 18.2.4 Unknown ☐
- 18.2.5 Others (please specify) ☐
- 18.3 Infrastructure development
- 18.3.1 Industry ☐
- 18.3.2 Human settlement ☐
- 18.3.3 Tourism/recreation ☐
- 18.3.4 Transport – land/air ☐
- 18.3.5 Transport – water ☐
- 18.3.6 Dams ☐
- 18.3.7 Telecommunication/power lines ☐
- 18.3.8 Unknown ☐
- 18.3.9 Others (please specify) ☐

- 18.4 Land management in non-agricultural areas
- 18.4.1 Abandonment ☐
- 18.4.2 Change in management regime ☐
- 18.4.3 Unknown ☐
- 18.4.4 Others (please specify) ☐
- 18.5 Unknown ☐
- 18.6 Others (please specify) ☐
19. Taxon harvested for (Please list the three most appropriate)
- 19.1 Food
- 19.1.1 Subsistence use/local trade ☐
- 19.1.2 Sub-national/national trade ☐
- 19.1.3 Regional/international trade ☐
- 19.2 Medicine
- 19.2.1 Subsistence use/local trade ☐
- 19.2.2 Sub-national/national trade ☐
- 19.2.3 Regional/international trade ☐
- 19.3 Timber and non-timber forest products
- 19.3.1 Subsistence use/local trade ☐
- 19.3.2 Sub-national/national trade ☐
- 19.3.3 Regional/international trade ☐
- 19.4 Cultural/scientific/leisure activities ☐
- 19.5 Fuel ☐
- 19.6 Unknown ☐
- 19.7 Others (please specify) ☐
20. Natural disasters
- 20.1 Floods ☐
- 20.2 Fire ☐
- 20.3 Drought ☐
- 20.4 Landslides ☐
- 20.5 Unknown ☐
- 20.6 Others (please specify) ☐
21. Changes in native species dynamics
- 21.1 Competitors ☐
- 21.2 Pathogens ☐
- 21.3 Hybridisation ☐
- 21.4 Host plants ☐
- 21.5 Unknown ☐
- 21.6 Others (please specify) ☐
22. Intrinsic factors
- 22.1 Restricted range ☐
- 22.2 Low densities ☐
- 22.3 Limited dispersal ☐
- 22.4 Poor recruitment, reproduction, regeneration ☐
- 22.5 High juvenile mortality ☐
- 22.6 Inbreeding ☐
- 22.7 Skewed sex ratio ☐
- 22.8 Slow growth rates ☐
- 22.9 Population fluctuations ☐
- 22.10 Low densities of pollinators ☐

- 22.11 Unknown ☐
- 22.12 Others (please specify)
23. Pollution (affecting habitat and/or species) (Please select the most appropriate)
- 23.1 Atmospheric Pollution
- 23.1.1 Acid precipitation ☐
- 23.1.2 Haze ☐
- 23.1.3 Unknown ☐
- 23.1.4 Others (please specify)
- 23.2 Land pollution
- 23.2.1 Agriculture ☐
- 23.2.2 Domestic ☐
- 23.2.3 Commercial/industrial ☐
- 23.2.4 Other non-agriculture ☐
- 23.2.5 Unknown ☐
- 23.2.6 Others (please specify)
- 23.3 Water pollution
- 23.3.1 Agriculture ☐
- 23.3.2 Domestic ☐
- 23.3.3 Commercial/industrial ☐
- 23.3.4 Oil slicks ☐
- 23.3.5 Sediment ☐
- 23.3.6 Sewage ☐
- 23.3.7 Solid waste ☐
- 23.3.8 Unknown ☐
- 23.3.9 Other (please specify)
- 23.4 Unknown ☐
- 23.5 Others (please specify)
24. Other human disturbances
- 24.1 Research ☐
- 24.2 War/civil unrest ☐
- 24.3 Unknown ☐
- 24.4 Others (please specify)
25. Invasive alien species (directly affecting the species)
- 25.1 Competitors ☐
- 25.2 Pathogens ☐
- 25.3 Hybridization ☐
- 25.4 Unknown ☐
- 25.5 Others (please specify)
26. Persecution
- 26.1 Pest control ☐
- 26.2 Unknown ☐
- 26.3 Others (please specify)
27. Unknown ☐
28. Others (please specify)

29. Red List Category (use the IUCN Version 3.1 (2001) and tick only one. If either CR, EN or VU is selected, then all criteria, sub-criteria and sub-subcriteria met for that category must be listed in the space provided (e.g., A2c+3c;B1ab (ii); D)

- ☐ Extinct (EX)
- ☐ Extinct in the Wild (EW)
- ☐ Critically Endangered (CR)      Criteria
- ☐ Endangered (EN)                      Criteria
- ☐ Vulnerable (VU)                      Criteria
- ☐ Near Threatened (NT)
- ☐ Least Concern (LC)
- ☐ Data Deficient (DD)
- ☐ Not Evaluated (NE)

30. Rationale for the Red List Assessment (including whatever population or range information used, inferences, assumptions etc. In cases, where more than one threat category may apply, describe why you have chosen the category marked above and what conditions or information would change the assessment. For NT, specify what criteria were nearly met and for DD specify what little information is known. Use additional sheets if necessary)

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## Part IV. Current Conservation Measures for the Taxon

31. Are there any conservation measures in place?

- 31.1 Yes ☐
- 31.2 No ☐

32. Are conservation measures needed?

- 32.1 Yes ☐
- 32.2 No ☐

33. Policy-based measures (please select the most appropriate and elaborate in the box below if measures are in place)

- |                              | In place                 | Needed                   |
|------------------------------|--------------------------|--------------------------|
| 33.1 Management plan         | <input type="checkbox"/> | <input type="checkbox"/> |
| 33.2 Legislation             | <input type="checkbox"/> | <input type="checkbox"/> |
| 33.3 Community management    | <input type="checkbox"/> | <input type="checkbox"/> |
| 33.4 Others (please specify) |                          |                          |

Please provide details of the measures/legislation that are already in place.

34. Communication and Education

- |                                 | In place                 | Needed                   |
|---------------------------------|--------------------------|--------------------------|
| 34.1 Formal education           | <input type="checkbox"/> | <input type="checkbox"/> |
| 34.2 Awareness                  | <input type="checkbox"/> | <input type="checkbox"/> |
| 34.3 Capacity building/training | <input type="checkbox"/> | <input type="checkbox"/> |
| 34.4 Others (please specify)    |                          |                          |

35. Research (Please list three most important)

- |               | In place                 | Needed                   |
|---------------|--------------------------|--------------------------|
| 35.1 Taxonomy | <input type="checkbox"/> | <input type="checkbox"/> |

- |       |   |                          |                          |
|-------|---|--------------------------|--------------------------|
| 35.2  | Population range, size and viability                    | <input type="checkbox"/> | <input type="checkbox"/> |
| 35.3  | Biology, ecology and genetics                           | <input type="checkbox"/> | <input type="checkbox"/> |
| 35.4  | Habitat status  | <input type="checkbox"/> | <input type="checkbox"/> |
| 35.5  | Threats   | <input type="checkbox"/> | <input type="checkbox"/> |
| 35.6  | Uses and harvest levels                                 | <input type="checkbox"/> | <input type="checkbox"/> |
| 35.7  | Cultural relevance                                      | <input type="checkbox"/> | <input type="checkbox"/> |
| 35.8  | <i>In situ</i> and <i>ex situ</i> conservation measures | <input type="checkbox"/> | <input type="checkbox"/> |
| 35.9  | Long term monitoring                                    | <input type="checkbox"/> | <input type="checkbox"/> |
| 35.10 | Others (please specify)                                 |                          |                          |

36. *In situ*/habitat conservation (Please list three most important)

- |  | In place                 | Needed                   |
|--|--------------------------|--------------------------|
| 36.1 Protected areas                                   |                          |                          |
| 36.1.1 Integrity of established protected areas        | <input type="checkbox"/> | <input type="checkbox"/> |
| 36.1.2 Identification of new sites for protected areas | <input type="checkbox"/> | <input type="checkbox"/> |
| 36.1.3 Management Plan                                 | <input type="checkbox"/> | <input type="checkbox"/> |
| 36.2 Community-based initiatives                       | <input type="checkbox"/> | <input type="checkbox"/> |
| 36.3 Rehabilitation                                    | <input type="checkbox"/> | <input type="checkbox"/> |
| 36.4 Restoration                                       | <input type="checkbox"/> | <input type="checkbox"/> |
| 36.5 Corridors   | <input type="checkbox"/> | <input type="checkbox"/> |
| 36.6 Others (please specify)                           |                          |                          |

37. Species-based conservation

- |   | In place                 | Needed                   |
|---|--------------------------|--------------------------|
| 37.1 Sustainable use                        |                          |                          |
| 37.1.1 Harvesting Plan                      | <input type="checkbox"/> | <input type="checkbox"/> |
| 37.1.2 Trade Management                     | <input type="checkbox"/> | <input type="checkbox"/> |
| 37.1.3 Timber Certification                 | <input type="checkbox"/> | <input type="checkbox"/> |
| 37.2 <i>Ex situ</i> conservation            |                          |                          |
| 37.2.1 Field germplasm, seed genebanks etc. | <input type="checkbox"/> | <input type="checkbox"/> |
| 37.2.2 Artificial propagation               | <input type="checkbox"/> | <input type="checkbox"/> |
| 37.3 Re-introduction                        | <input type="checkbox"/> | <input type="checkbox"/> |
| 37.4 Recovery management                    | <input type="checkbox"/> | <input type="checkbox"/> |
| 37.5 Disease, pathogen, pest management     | <input type="checkbox"/> | <input type="checkbox"/> |
| 37.6 Others (please specify)                |                          |                          |

38. Enforcement

- |                                  | In place                 | Needed                   |
|----------------------------------|--------------------------|--------------------------|
| 38.1 Government enforcement      | <input type="checkbox"/> | <input type="checkbox"/> |
| 38.2 Community-based enforcement | <input type="checkbox"/> | <input type="checkbox"/> |

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## Part V. Utilisation

39. Taxon is used locally, nationally or globally (if no, do not fill up the remaining questions in this part)

- |      |     |                          |
|------|-----|--------------------------|
| 39.1 | Yes | <input type="checkbox"/> |
| 39.2 | No  | <input type="checkbox"/> |

40. Purpose/type of use (Please list the three most appropriate and alongside the code, select the appropriate level of use, i.e., S=Subsistence; N=National, I=International)

**S      N      I**

- |       |   |                          |                          |                          |
|-------|---|--------------------------|--------------------------|--------------------------|
| 40.1  | Food for human                                  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 40.2  | Food for animals                                | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 40.3  | Medicine for human and veterinary               | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 40.4  | Poisons   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 40.5  | Manufacturing chemicals                         | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 40.6  | Other chemicals                                 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 40.7  | Fuel  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 40.8  | Fibre   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 40.9  | Construction/structural materials,<br>furniture | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 40.10 | Wearing apparel, accessories                    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 40.11 | Other household goods                           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 40.12 | Handicrafts, decorations, curios etc.           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 40.13 | Horticulture                                    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 40.14 | Research  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 40.15 | Specimen collecting                             | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 40.16 | Unknown   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 40.17 | Others (Please specify)                         |                          |                          |                          |

41. Primary forms removed from the wild (Please estimate the percentage of the total harvest/off take contributed)

- |      | 0-50%                     | 50-100%                  |
|------|---------------------------|--------------------------|
| 41.1 | Whole plant               | <input type="checkbox"/> |
| 41.2 | Parts–non-fatal removal   | <input type="checkbox"/> |
| 41.3 | Parts–fatal parts removal | <input type="checkbox"/> |
| 41.4 | Unknown                   | <input type="checkbox"/> |
| 41.5 | Others (please specify)   |                          |

42. Source of specimen in commercial trade (The percentage of the harvest/offtake for commercial trade (i.e., not for subsistence use) that is taken from a particular production system)

- |      | 0-50%                   | 50-100%                  |
|------|-------------------------|--------------------------|
| 42.1 | Wild                    | <input type="checkbox"/> |
| 42.2 | Artificial propagation  | <input type="checkbox"/> |
| 42.3 | Unknown                 | <input type="checkbox"/> |
| 42.4 | Others (please specify) |                          |

43. CITES status

- |      |  |                          |
|------|--|--------------------------|
| 43.1 | Taxon not listed in the CITES Appendices | <input type="checkbox"/> |
| 43.2 | Taxon listed in Appendix I               | <input type="checkbox"/> |
| 43.3 | Taxon listed in Appendix II              | <input type="checkbox"/> |
| 43.4 | Taxon listed in Appendix III             | <input type="checkbox"/> |

44. If you have other comments, please place details here.

45. Literature used in the assessment (please follow the following format for citations that do not appear in the drop-down box: Adema, F., Leenhouts, P.W. & Welzen, P.C. van. 1994. Sapindaceae. *Flora Malesiana, Ser. I*, 11: 419–768; Anonymous, 1992. *Third National Forest Inventory*. Forestry Department Peninsular Malaysia, Kuala Lumpur. 121 pp.; Ng, F.S.P. 1991. *Manual of Forest Fruits, Seeds and Seedlings*. Volume One. Malayan Forest Records No. 34. Forest Research Institute Malaysia, Kepong. 400 pp.; Raemaekers, J.J., Aldrich-Blake, F.P.G. & Payne, J.B. 1980. The forest. Pp. 29–61 in Chivers, D.J. (ed.). *Malayan Forest Primates. Ten Years' Study in Tropical Rain Forest*. Plenum Press, New York.)

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46. Details of Assessor

Full Name & Title :  
 Job Designation :  
 Mailing address :  
 Telephone :  
 Fax :  
 E-mail :

47. Other contributors to be credited for this taxon

Full Name & Title :  
 Job Designation :  
 Mailing address :  
 Telephone :  
 Fax :  
 E-mail :

Full Name and Title:  
 Job Designation :  
 Mailing address :  
 Telephone :  
 Fax :  
 E-mail :



48. Date of Assessment: day:            month:            year:
49. Name(s) of Evaluator(s) — to be filled in by the Secretariat of the Threat Assessment Project ONLY

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