

### Legend

SIMBOLO	
	Basin Limit
	Lakes
	River Order - Strahler
	1
	2
	3
	4
	5
	6
	Cp Puna grass
	Cu Cultivated areas of the coastal region
	Dc Coastal desert
	Mh Wet scrub
	Ms Dry scrub
	Msh Humid Scrubland / Sub wet scrub
	Pj Grassland

PROJECT OF THE PROTECTION OF FLOOD PLAIN AND VULNERABLE RURAL POPULATION AGAINST FLOODS

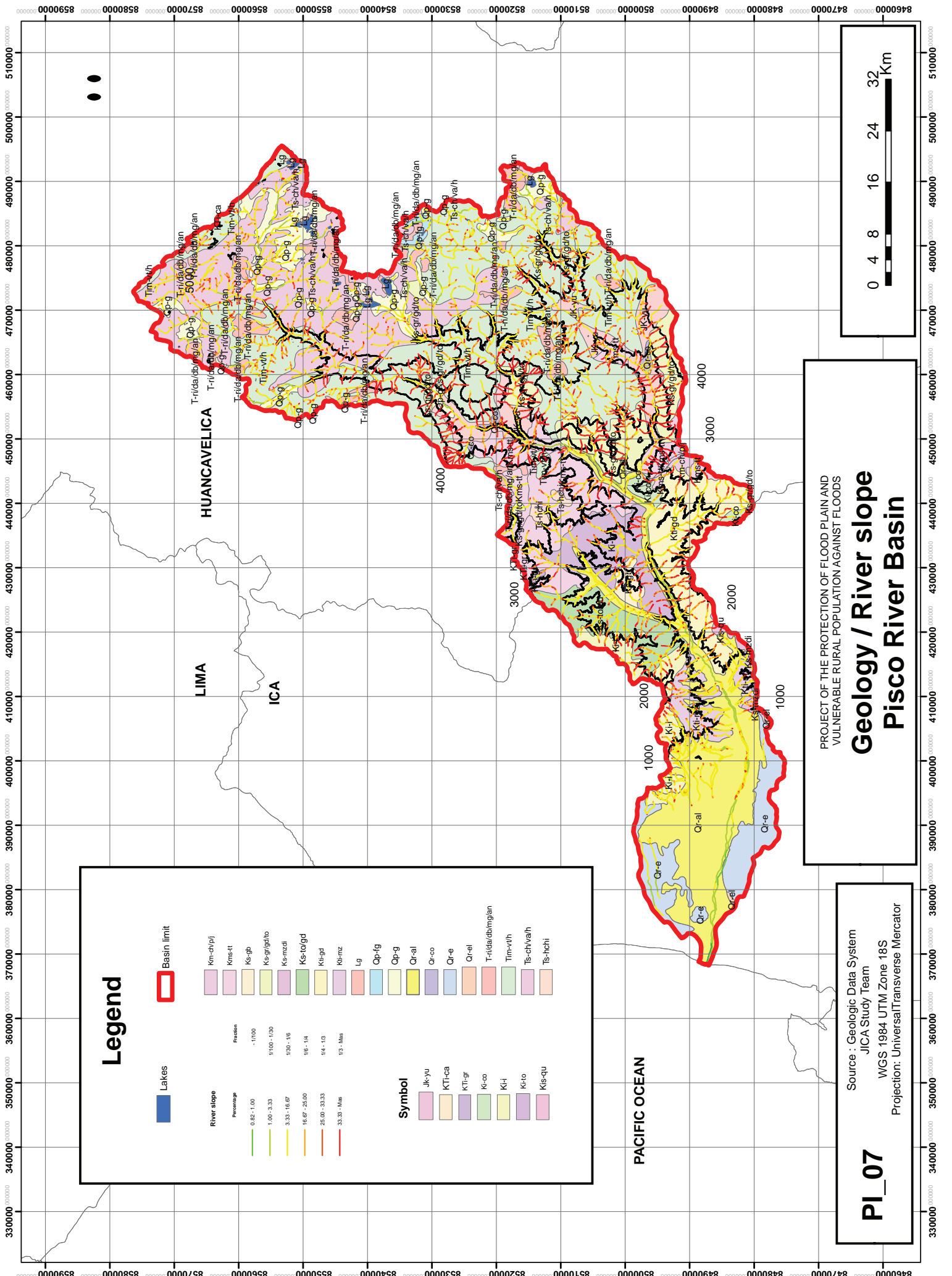
## Forestry - 1995

# Pisco River Basin

**PI\_06**

Source : Dirección General Forestal - 1995  
 WGS 1984 UTM Zone 18S  
 Projection: UniversalTransverse Mercator

Scale : 1 : 500,000



# Legend

	Lakes		Basin limit
<b>River slope</b>			
<b>Percentage</b>			
	0.02 - 1.00		- 1/100
	1.00 - 3.33		1/100 - 1/30
	3.33 - 16.67		1/30 - 1/6
	16.67 - 25.00		1/6 - 1/4
	25.00 - 33.33		1/4 - 1/3
	33.33 - Mas		1/3 - Mas
<b>Symbol</b>			
	Ik-ju		Qp-fg
	KT-ca		Qp-g
	KT-gr		Qr-al
	Ki-co		Qr-co
	Ki-i		Qr-e
	Ki-to		Qr-el
	Ki-s-qu		T-rida/db/mg/an
			Tim-vh
			Ts-ch/va/h
			Ts-hch/i

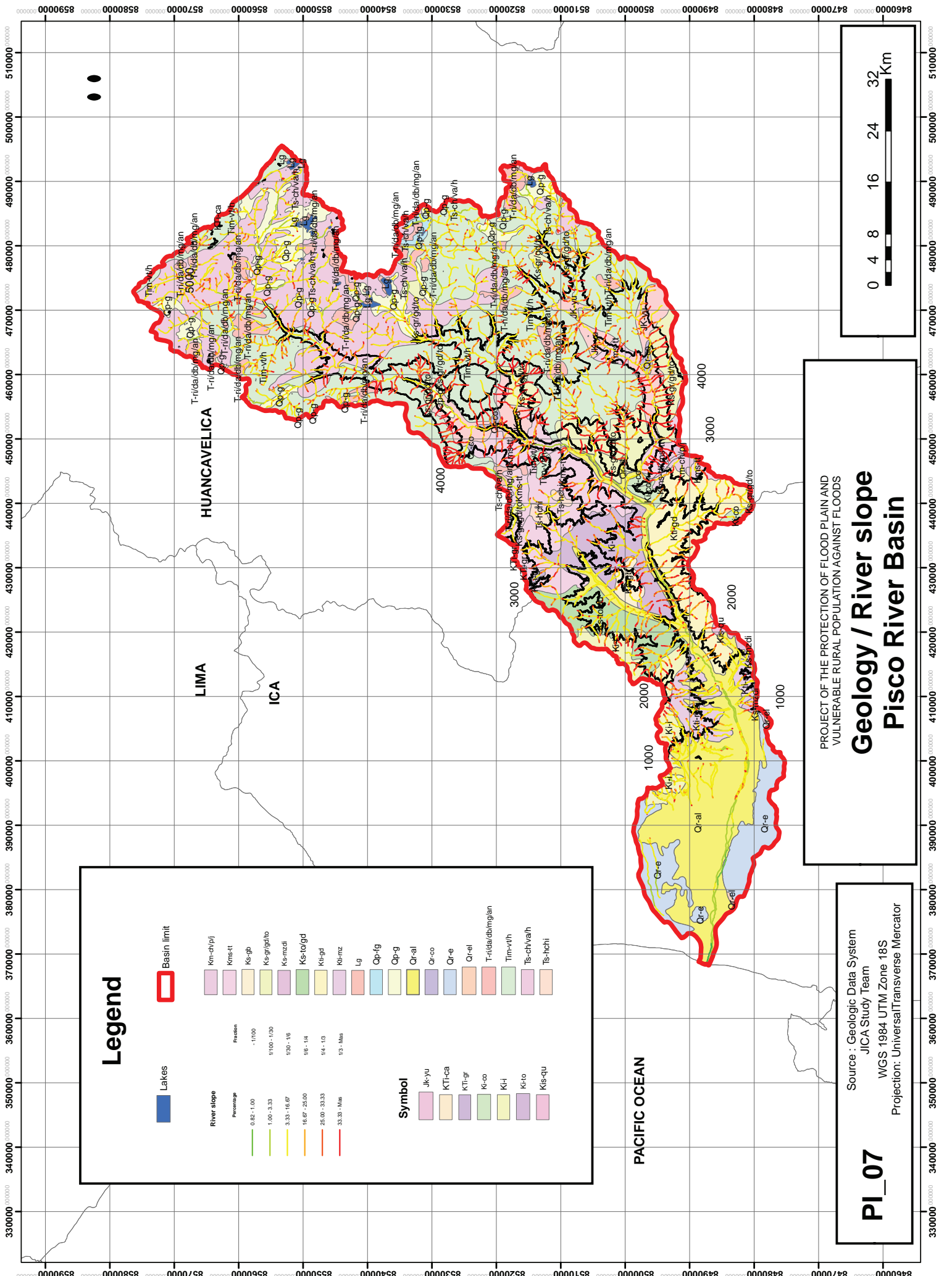
**PI\_07**

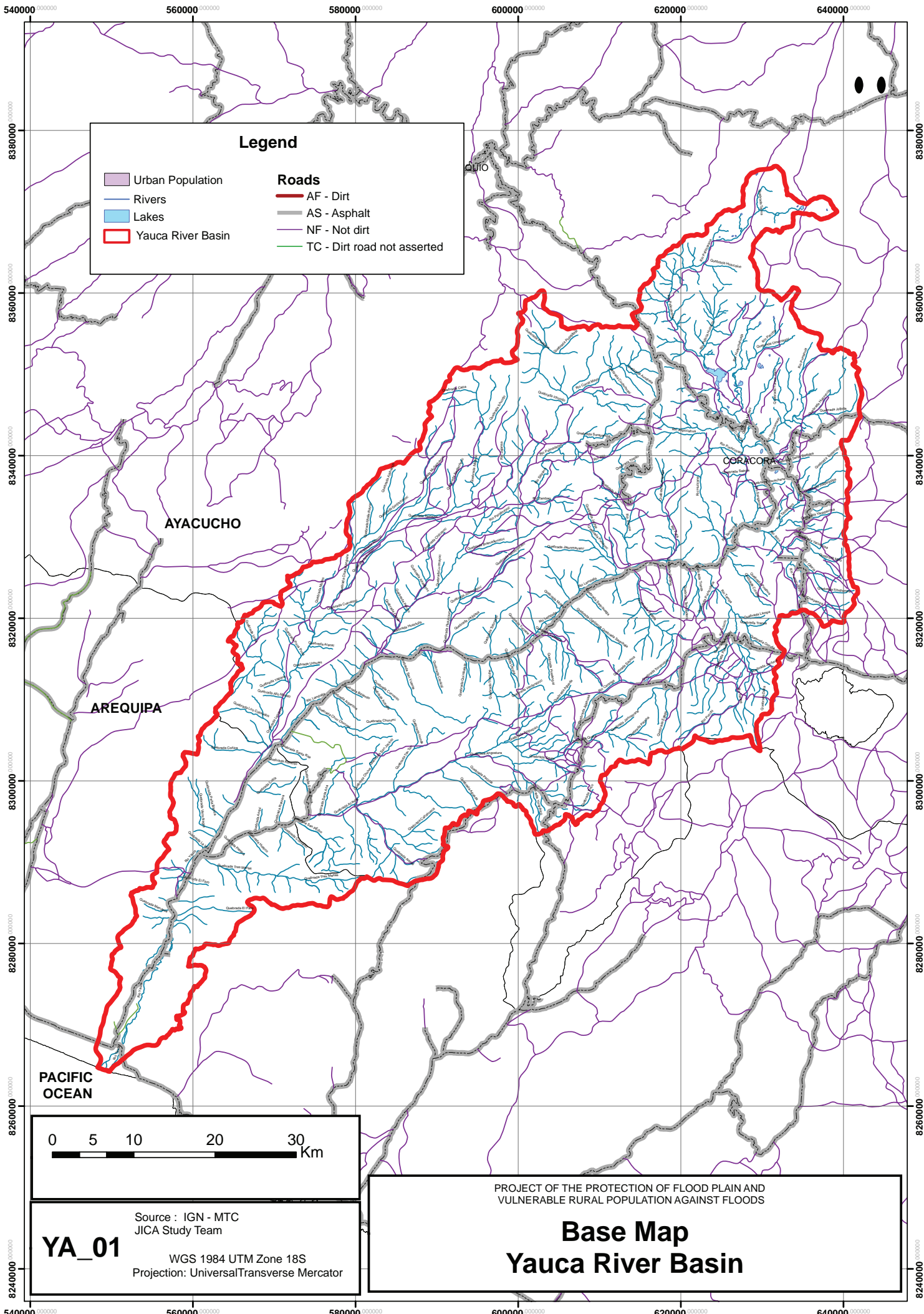
Source : Geologic Data System  
 JICA Study Team  
 WGS 1984 UTM Zone 18S  
 Projection: Universal Transverse Mercator

PROJECT OF THE PROTECTION OF FLOOD PLAIN AND VULNERABLE RURAL POPULATION AGAINST FLOODS

## Geology / River slope

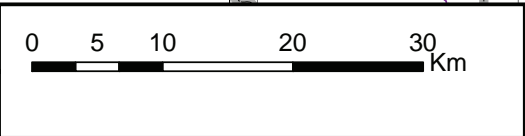
### Pisco River Basin





**Legend**

<span style="display: inline-block; width: 15px; height: 10px; background-color: #c0c0c0; border: 1px solid black;"></span> Urban Population	<b>Roads</b>
<span style="display: inline-block; width: 15px; border-bottom: 1px solid blue;"></span> Rivers	<span style="display: inline-block; width: 15px; border-bottom: 1px solid red;"></span> AF - Dirt
<span style="display: inline-block; width: 15px; height: 10px; background-color: #add8e6; border: 1px solid black;"></span> Lakes	<span style="display: inline-block; width: 15px; border-bottom: 1px solid gray;"></span> AS - Asphalt
<span style="display: inline-block; width: 15px; border: 2px solid red;"></span> Yauca River Basin	<span style="display: inline-block; width: 15px; border-bottom: 1px solid purple;"></span> NF - Not dirt
	<span style="display: inline-block; width: 15px; border-bottom: 1px solid green;"></span> TC - Dirt road not asserted



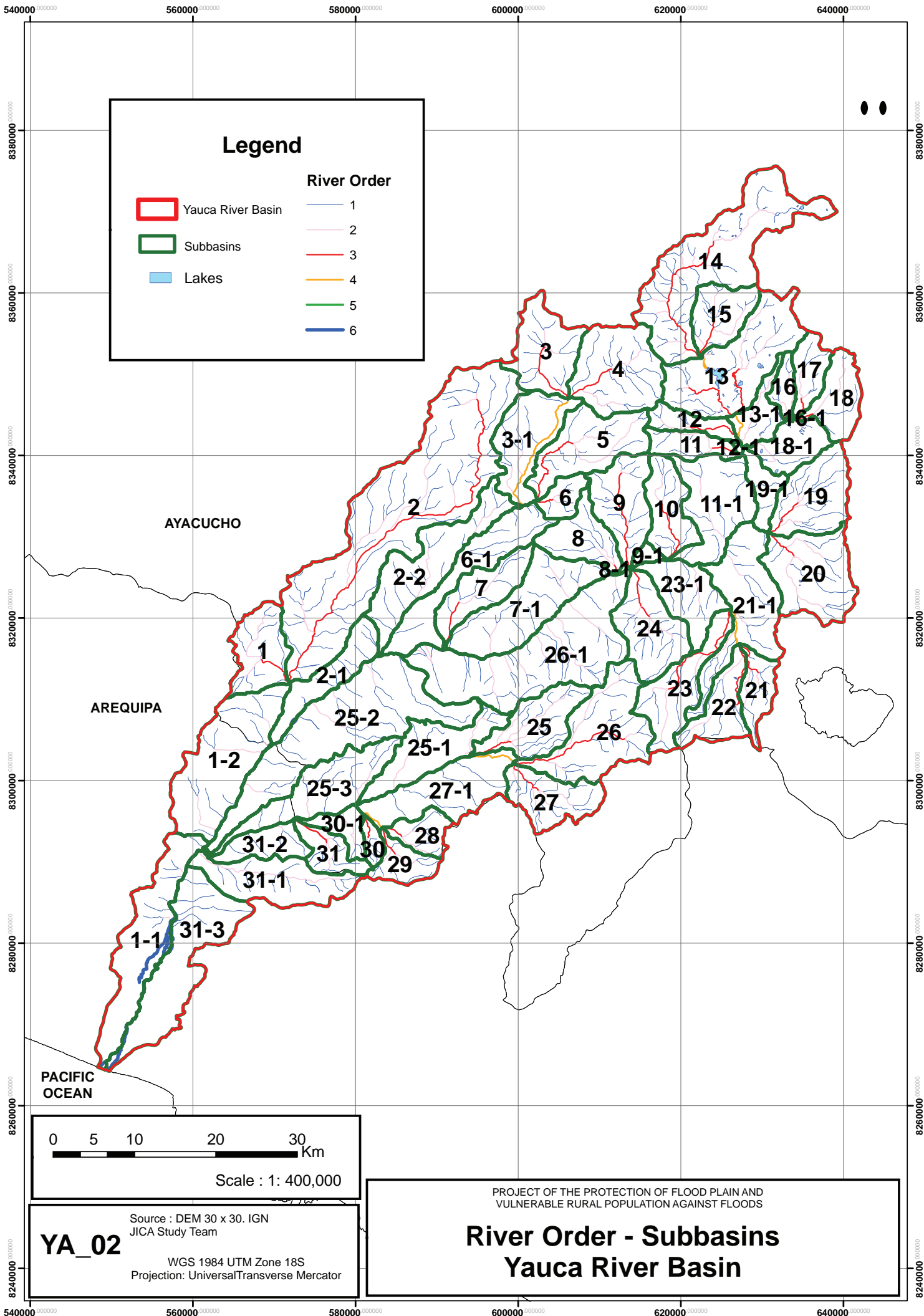
**YA\_01**

Source : IGN - MTC  
 JICA Study Team

WGS 1984 UTM Zone 18S  
 Projection: UniversalTransverse Mercator

PROJECT OF THE PROTECTION OF FLOOD PLAIN AND  
 VULNERABLE RURAL POPULATION AGAINST FLOODS

**Base Map**  
**Yauca River Basin**



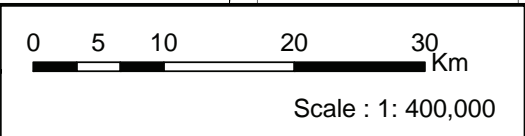
### Legend

<ul style="list-style-type: none"> <li><span style="border: 2px solid red; display: inline-block; width: 20px; height: 10px; margin-right: 5px;"></span> Yauca River Basin</li> <li><span style="border: 2px solid green; display: inline-block; width: 20px; height: 10px; margin-right: 5px;"></span> Subbasins</li> <li><span style="background-color: lightblue; display: inline-block; width: 20px; height: 10px; margin-right: 5px;"></span> Lakes</li> </ul>	<h4 style="margin: 0;">River Order</h4> <ul style="list-style-type: none"> <li><span style="border-bottom: 1px solid blue; width: 20px; display: inline-block; margin-right: 5px;"></span> 1</li> <li><span style="border-bottom: 1px solid pink; width: 20px; display: inline-block; margin-right: 5px;"></span> 2</li> <li><span style="border-bottom: 1px solid red; width: 20px; display: inline-block; margin-right: 5px;"></span> 3</li> <li><span style="border-bottom: 1px solid yellow; width: 20px; display: inline-block; margin-right: 5px;"></span> 4</li> <li><span style="border-bottom: 1px solid green; width: 20px; display: inline-block; margin-right: 5px;"></span> 5</li> <li><span style="border-bottom: 1px solid darkblue; width: 20px; display: inline-block; margin-right: 5px;"></span> 6</li> </ul>
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AYACUCHO

AREQUIPA

PACIFIC OCEAN



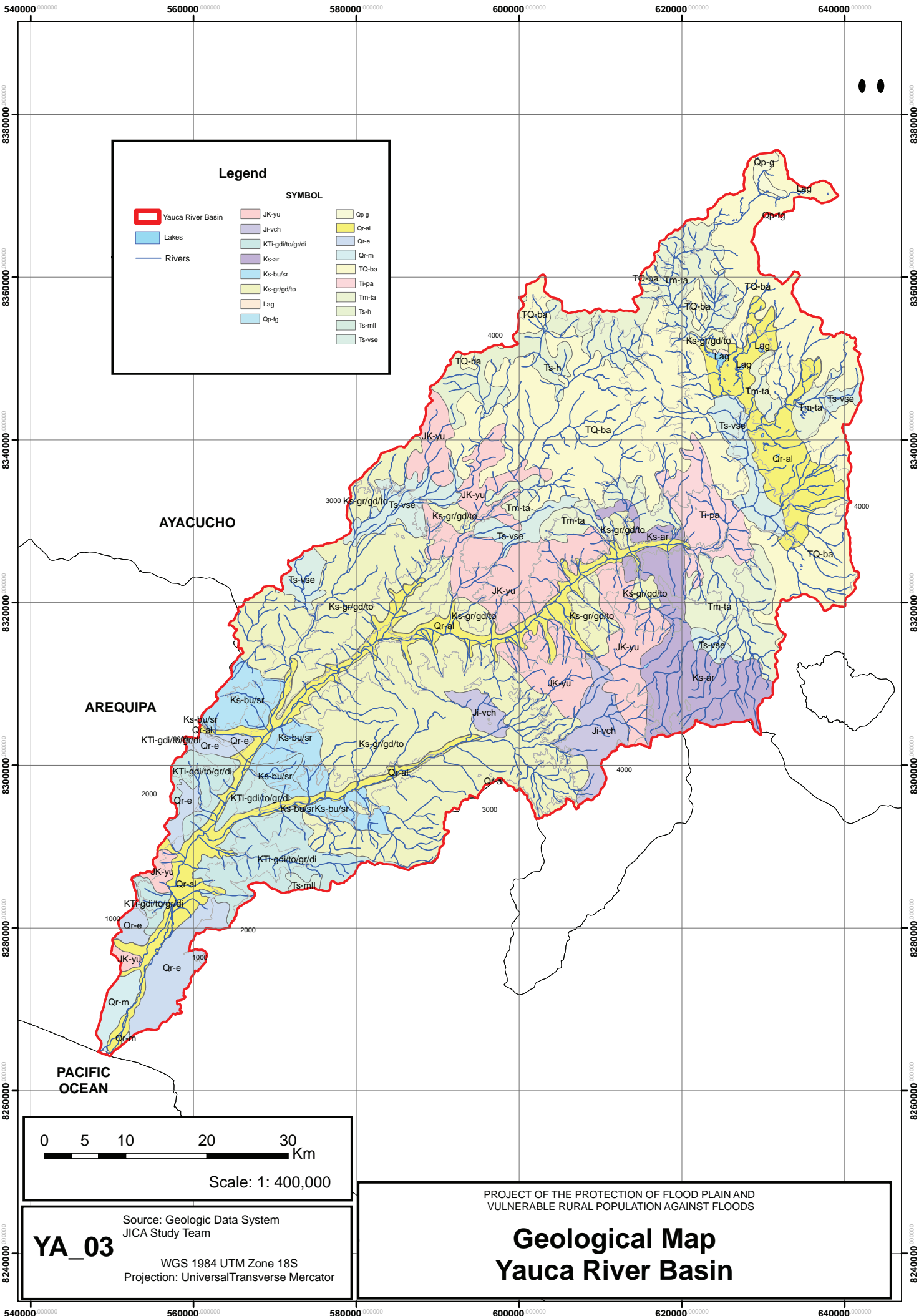
Source : DEM 30 x 30. IGN  
 JICA Study Team

**YA\_02**

WGS 1984 UTM Zone 18S  
 Projection: UniversalTransverse Mercator

PROJECT OF THE PROTECTION OF FLOOD PLAIN AND  
 VULNERABLE RURAL POPULATION AGAINST FLOODS

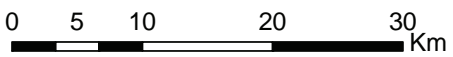
## River Order - Subbasins Yauca River Basin



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AREQUIPA

PACIFIC OCEAN



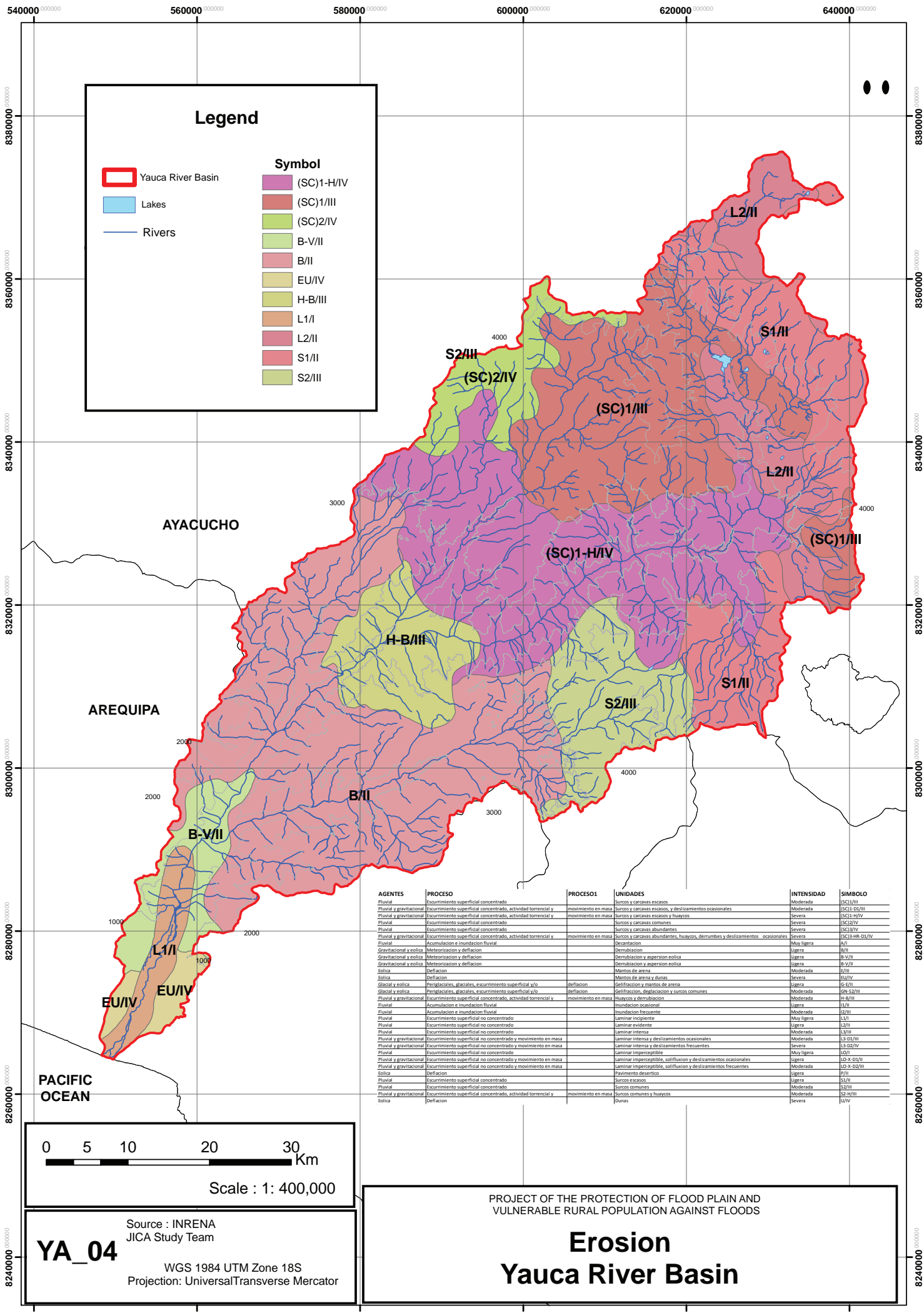
Scale: 1: 400,000

**YA\_03**

Source: Geologic Data System  
 JICA Study Team  
 WGS 1984 UTM Zone 18S  
 Projection: Universal Transverse Mercator

PROJECT OF THE PROTECTION OF FLOOD PLAIN AND  
 VULNERABLE RURAL POPULATION AGAINST FLOODS

# Geological Map Yauca River Basin



**Legend**

Yauca River Basin  
 Lakes  
 Rivers

**Symbol**

- (SC)1-H/IV
- (SC)1/III
- (SC)2/IV
- B-V/II
- B/II
- EU/IV
- H-B/III
- L1/I
- L2/II
- S1/II
- S2/III

AGENTES	PROCESO	PROCESO1	UNIDADES	INTENSIDAD	SÍMBOLO
Pluvial	Escurrimiento superficial concentrado		Suros y cárcavas escasos	Moderada	(SC)1/III
Pluvial y gravitacional	Escurrimiento superficial concentrado, actividad torrencial y movimiento en masa	movimiento en masa	Suros y cárcavas escasos, y deslizamientos ocasionales	Moderada	(SC)1-H/IV
Pluvial	Escurrimiento superficial concentrado		Suros y cárcavas abundantes	Severa	(SC)2/IV
Pluvial y gravitacional	Escurrimiento superficial concentrado, actividad torrencial y movimiento en masa	movimiento en masa	Suros y cárcavas abundantes, huaycos, derrumbes y deslizamientos ocasionales	Severa	(SC)3-HB-D1/IV
Fluvial	Acumulación e inundación fluvial		Deflatación	Muy ligera	L1/I
Gravitacional y eólica	Meteorización y deflación		Deflatación y aspersión eólica	Ligera	B-V/II
Gravitacional y eólica	Meteorización y deflación		Deflatación y aspersión eólica	Ligera	B-V/II
Eólica	Deflación		Mantos de arena y dunas	Moderada	L1/I
Glacial y eólica	Periglaciales, glaciales, escurrimiento superficial y/o deflación	deflación	Gelifracción y mantos de arena	Severa	L2/II
Pluvial y gravitacional	Escurrimiento superficial concentrado, actividad torrencial y movimiento en masa	movimiento en masa	Huaycos y derrumbidos	Moderada	H-B/III
Fluvial	Acumulación e inundación fluvial		Inundación ocasional	Ligera	L2/II
Pluvial	Escurrimiento superficial no concentrado		Inundación frecuente	Moderada	L2/II
Pluvial	Escurrimiento superficial no concentrado		Laminar intensa	Muy ligera	L2/II
Pluvial	Escurrimiento superficial no concentrado		Laminar evidente	Ligera	L2/II
Pluvial y gravitacional	Escurrimiento superficial no concentrado y movimiento en masa		Laminar intensa y deslizamientos ocasionales	Moderada	L3-S2/III
Pluvial	Escurrimiento superficial no concentrado		Laminar intensa y deslizamientos frecuentes	Severa	L3-S2/IV
Pluvial	Escurrimiento superficial no concentrado		Laminar imperceptible	Muy ligera	L2/II
Pluvial y gravitacional	Escurrimiento superficial no concentrado y movimiento en masa		Laminar imperceptible, soliflución y deslizamientos ocasionales	Ligera	L2-X-D3/II
Pluvial y gravitacional	Escurrimiento superficial no concentrado y movimiento en masa		Laminar imperceptible, soliflución y deslizamientos frecuentes	Moderada	L2-X-D3/III
Eólica	Deflación		Pavimento desértico	Ligera	P/II
Pluvial	Escurrimiento superficial concentrado		Suros escasos	Ligera	S2/III
Pluvial	Escurrimiento superficial concentrado		Suros comunes	Moderada	S2/III
Pluvial y gravitacional	Escurrimiento superficial concentrado, actividad torrencial y movimiento en masa	movimiento en masa	Suros comunes y huaycos	Moderada	S2-H/III
Eólica	Deflación		Dunas	Severa	L/IV

0 5 10 20 30 Km

Scale : 1: 400,000

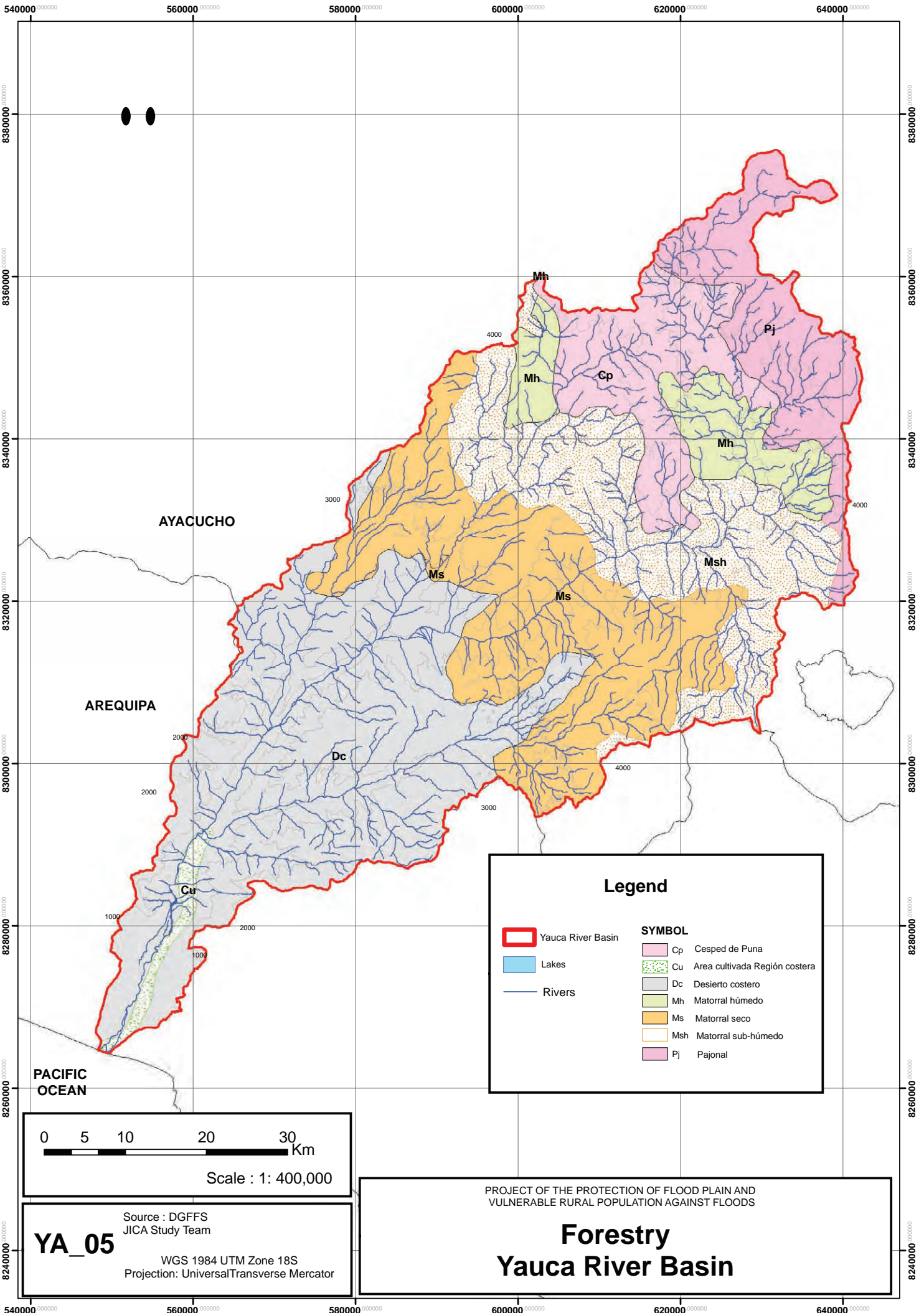
Source : INRENA  
JICA Study Team

**YA\_04**

WGS 1984 UTM Zone 18S  
Projection: Universal Transverse Mercator

PROJECT OF THE PROTECTION OF FLOOD PLAIN AND VULNERABLE RURAL POPULATION AGAINST FLOODS

**Erosion**  
**Yauca River Basin**













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AREQUIPA

PACIFIC OCEAN

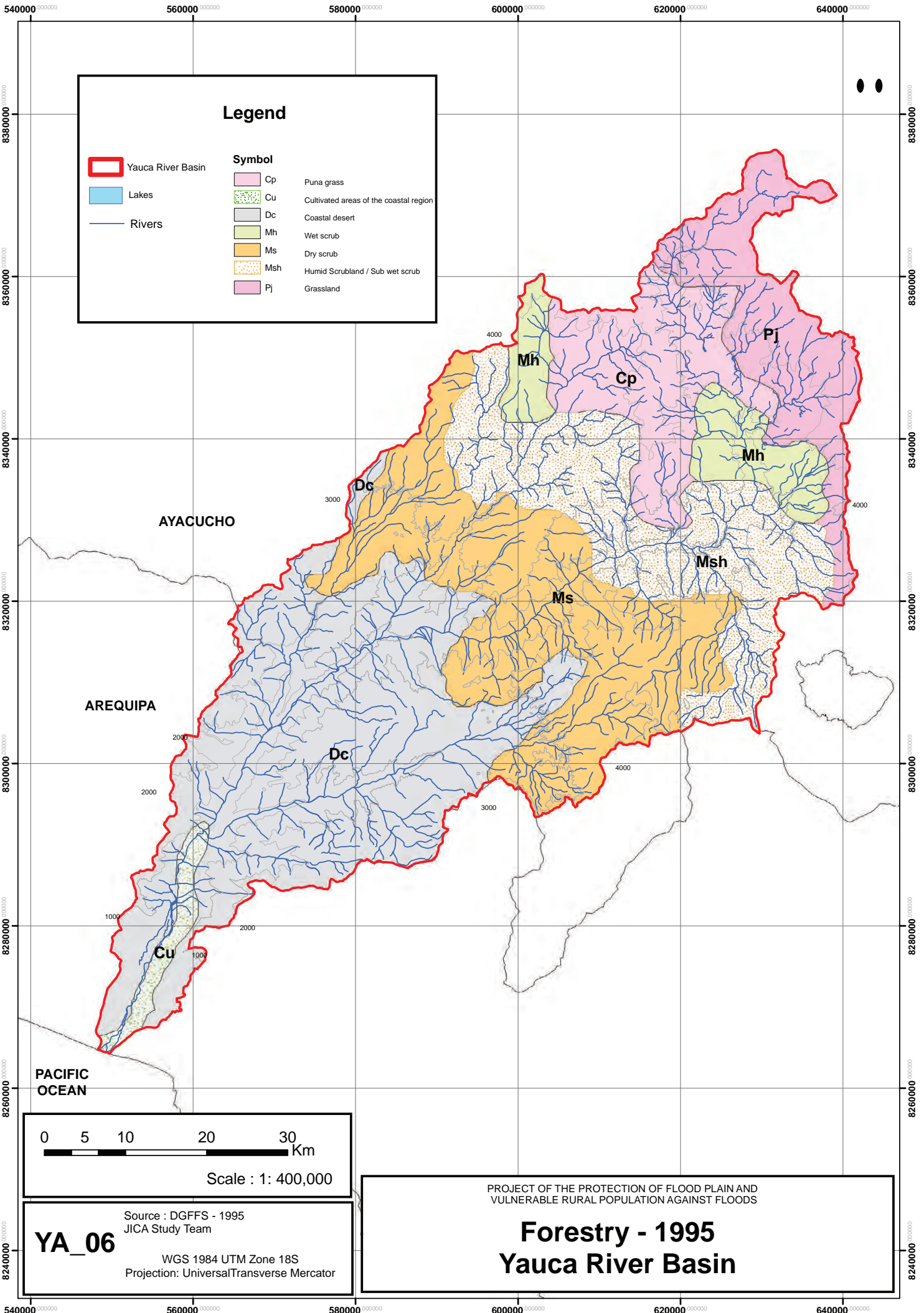
**Legend**

	Yauca River Basin		Cp Césped de Puna
	Lakes		Cu Area cultivada Región costera
	Rivers		Dc Desierto costero
			Mh Matorral húmedo
			Ms Matorral seco
			Msh Matorral sub-húmedo
			Pj Pajonal











0 5 10 20 30 Km  
Scale : 1: 400,000

Source : DGFFS  
JICA Study Team  
**YA\_05**  
WGS 1984 UTM Zone 18S  
Projection: Universal Transverse Mercator

PROJECT OF THE PROTECTION OF FLOOD PLAIN AND VULNERABLE RURAL POPULATION AGAINST FLOODS  
**Forestry**  
**Yauca River Basin**



**Legend**

	Yauca River Basin	<b>Symbol</b>		Cp	Puna grass
	Lakes		Cu	Cultivated areas of the coastal region	
	Rivers		Dc	Coastal desert	
			Mh	Wet scrub	
			Ms	Dry scrub	
			Msh	Humid Scrubland / Sub wet scrub	
			Pj	Grassland	

AYACUCHO

AREQUIPA

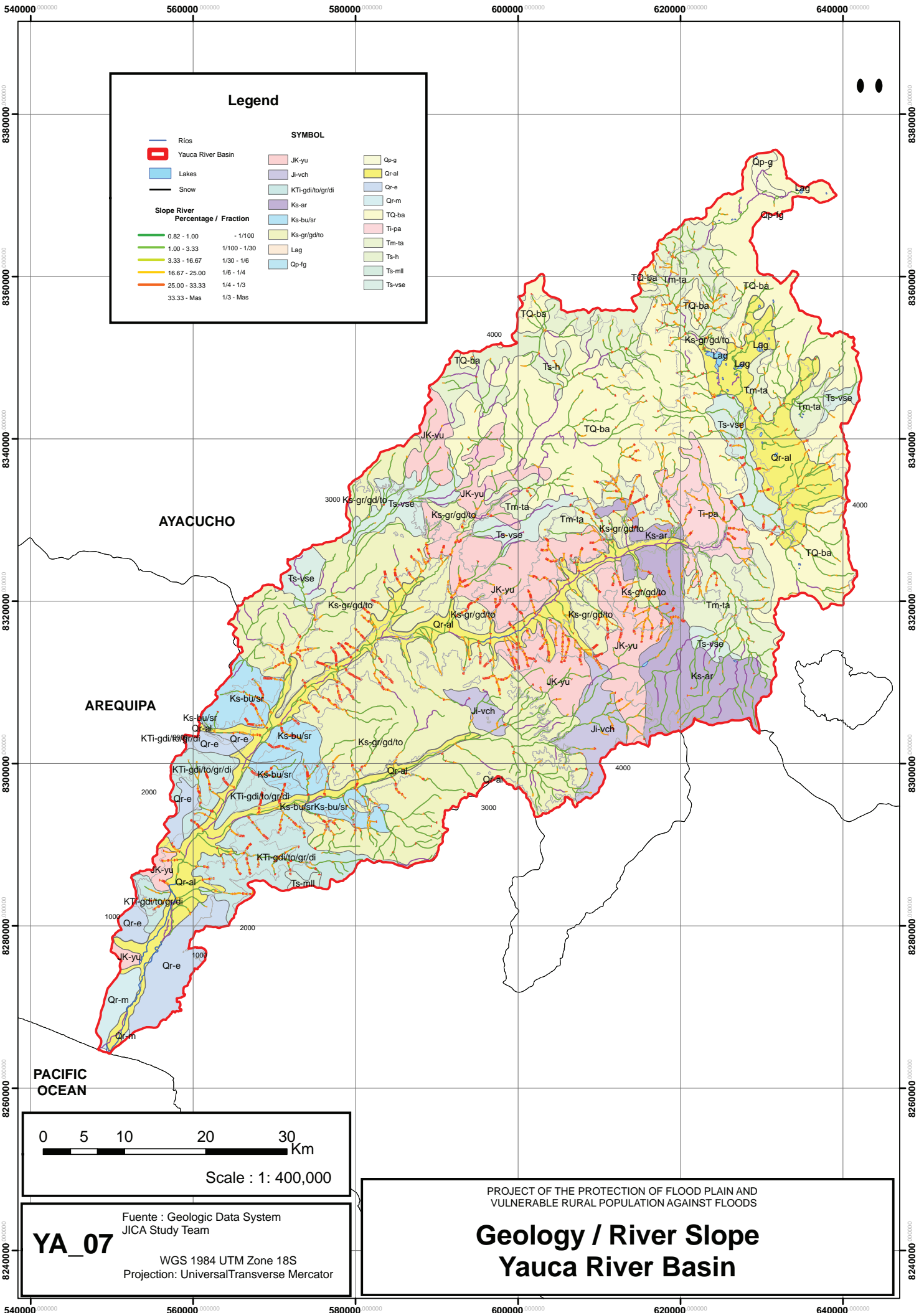
PACIFIC OCEAN

0 5 10 20 30 Km  
 Scale : 1: 400,000

Source : DGFFS - 1995  
 JICA Study Team  
**YA\_06**  
 WGS 1984 UTM Zone 18S  
 Projection: UniversalTransverse Mercator

PROJECT OF THE PROTECTION OF FLOOD PLAIN AND  
 VULNERABLE RURAL POPULATION AGAINST FLOODS  
**Forestry - 1995**  
**Yauca River Basin**





### Legend

<ul style="list-style-type: none"> <li><span style="color: blue;">—</span> Rios</li> <li><span style="border: 2px solid red; display: inline-block; width: 15px; height: 10px;"></span> Yauca River Basin</li> <li><span style="background-color: lightblue; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Lakes</li> <li><span style="border-bottom: 2px solid black; display: inline-block; width: 15px;"></span> Snow</li> </ul> <p><b>Slope River</b></p> <p><b>Percentage / Fraction</b></p> <ul style="list-style-type: none"> <li><span style="color: green;">—</span> 0.82 - 1.00      - 1/100</li> <li><span style="color: lightgreen;">—</span> 1.00 - 3.33      1/100 - 1/30</li> <li><span style="color: yellow;">—</span> 3.33 - 16.67      1/30 - 1/6</li> <li><span style="color: orange;">—</span> 16.67 - 25.00    1/6 - 1/4</li> <li><span style="color: red;">—</span> 25.00 - 33.33    1/4 - 1/3</li> <li><span style="color: red;">—</span> 33.33 - Mas      1/3 - Mas</li> </ul>	<p><b>SYMBOL</b></p> <table border="0" style="width: 100%;"> <tr> <td><span style="background-color: #f08080; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> JK-yu</td> <td><span style="background-color: #d8bfd8; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Ji-vch</td> <td><span style="background-color: #e0e0e0; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Qp-g</td> </tr> <tr> <td><span style="background-color: #c0c0c0; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> KTI-gdi/to/gr/di</td> <td><span style="background-color: #a0a0a0; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Ks-ar</td> <td><span style="background-color: #ffff00; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Qr-al</td> </tr> <tr> <td><span style="background-color: #808080; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Ks-bu/sr</td> <td><span style="background-color: #606060; 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border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Tm-ta</td> </tr> <tr> <td></td> <td><span style="background-color: #000000; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Ts-h</td> <td><span style="background-color: #000000; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Ts-vse</td> </tr> <tr> <td></td> <td><span style="background-color: #000000; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Ts-mil</td> <td></td> </tr> <tr> <td></td> <td><span style="background-color: #000000; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Ts-vse</td> <td></td> </tr> </table>	<span style="background-color: #f08080; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> JK-yu	<span style="background-color: #d8bfd8; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Ji-vch	<span style="background-color: #e0e0e0; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Qp-g	<span style="background-color: #c0c0c0; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> KTI-gdi/to/gr/di	<span style="background-color: #a0a0a0; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Ks-ar	<span style="background-color: #ffff00; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Qr-al	<span style="background-color: #808080; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Ks-bu/sr	<span style="background-color: #606060; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Ks-gr/gd/to	<span style="background-color: #404040; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Qr-e	<span style="background-color: #202020; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Ks-gr/gd/to	<span style="background-color: #000000; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Lag	<span style="background-color: #808080; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> TQ-ba	<span style="background-color: #000000; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Qp-fg	<span style="background-color: #000000; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Ti-pa	<span style="background-color: #000000; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Tm-ta		<span style="background-color: #000000; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Ts-h	<span style="background-color: #000000; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Ts-vse		<span style="background-color: #000000; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Ts-mil			<span style="background-color: #000000; 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<span style="background-color: #c0c0c0; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> KTI-gdi/to/gr/di	<span style="background-color: #a0a0a0; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Ks-ar	<span style="background-color: #ffff00; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Qr-al																								
<span style="background-color: #808080; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Ks-bu/sr	<span style="background-color: #606060; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Ks-gr/gd/to	<span style="background-color: #404040; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Qr-e																								
<span style="background-color: #202020; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Ks-gr/gd/to	<span style="background-color: #000000; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Lag	<span style="background-color: #808080; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> TQ-ba																								
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	<span style="background-color: #000000; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Ts-mil																									
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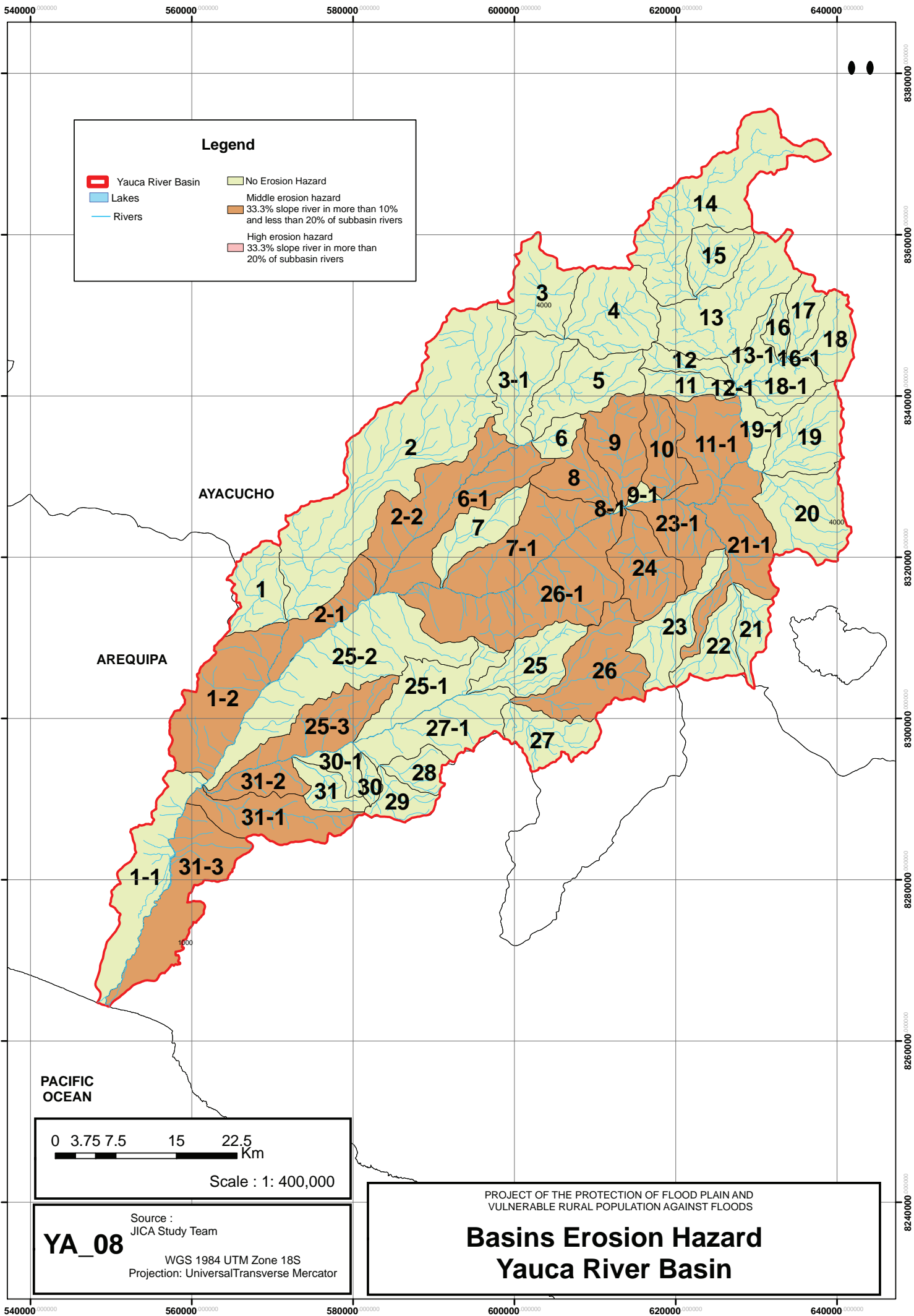
**YA\_07**

Fuente : Geologic Data System  
JICA Study Team

WGS 1984 UTM Zone 18S  
Projection: Universal Transverse Mercator

PROJECT OF THE PROTECTION OF FLOOD PLAIN AND  
VULNERABLE RURAL POPULATION AGAINST FLOODS

## Geology / River Slope Yauca River Basin



**Legend**

- ▭ Yauca River Basin
- ▭ Lakes
- Rivers
- ▭ No Erosion Hazard
- ▭ Middle erosion hazard
- ▭ 33.3% slope river in more than 10% and less than 20% of subbasin rivers
- ▭ High erosion hazard
- ▭ 33.3% slope river in more than 20% of subbasin rivers

0 3.75 7.5 15 22.5 Km

Scale : 1 : 400,000

Source : JICA Study Team

**YA\_08**

WGS 1984 UTM Zone 18S  
Projection: Universal Transverse Mercator

PROJECT OF THE PROTECTION OF FLOOD PLAIN AND VULNERABLE RURAL POPULATION AGAINST FLOODS

**Basins Erosion Hazard**

**Yauca River Basin**