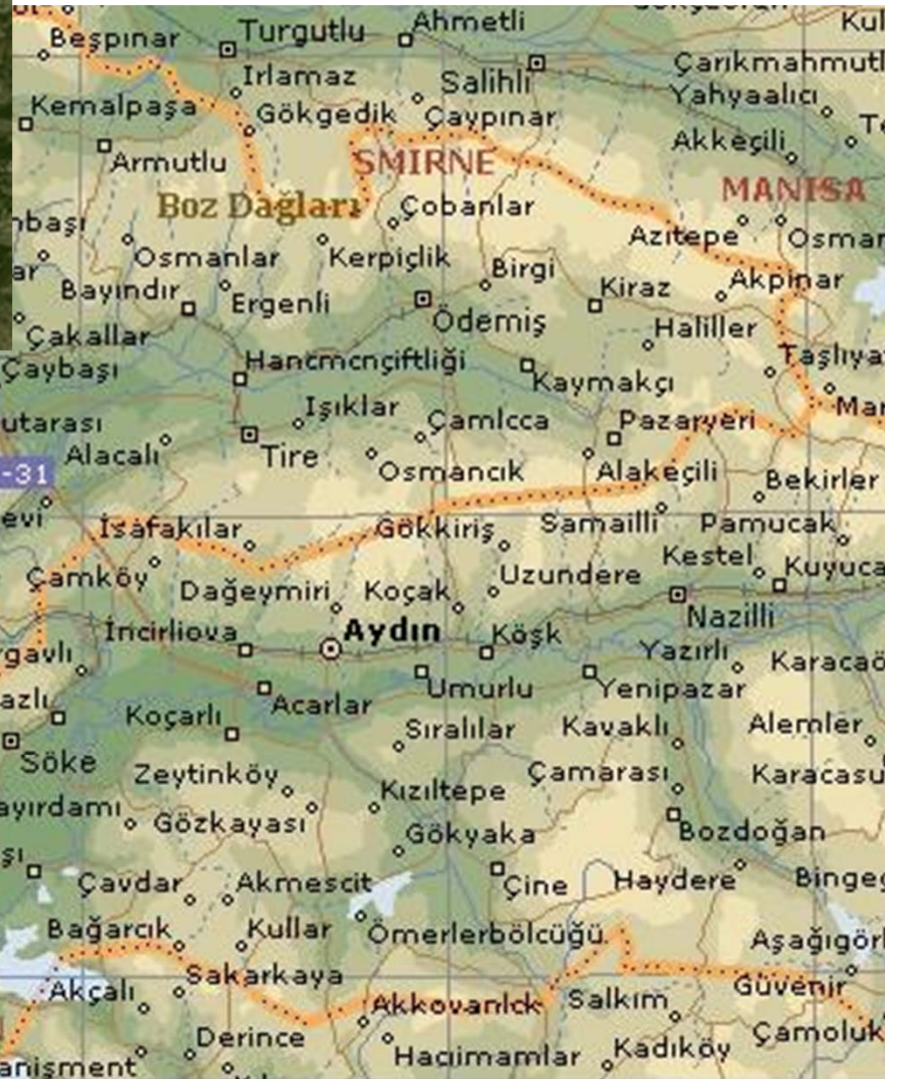
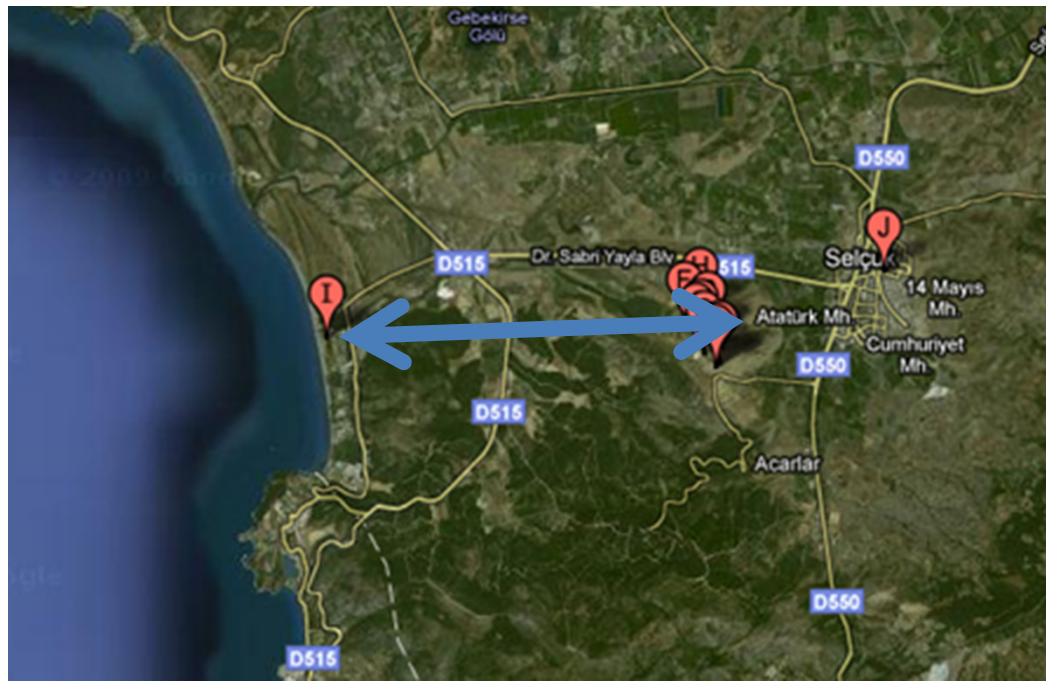


Capital Natural

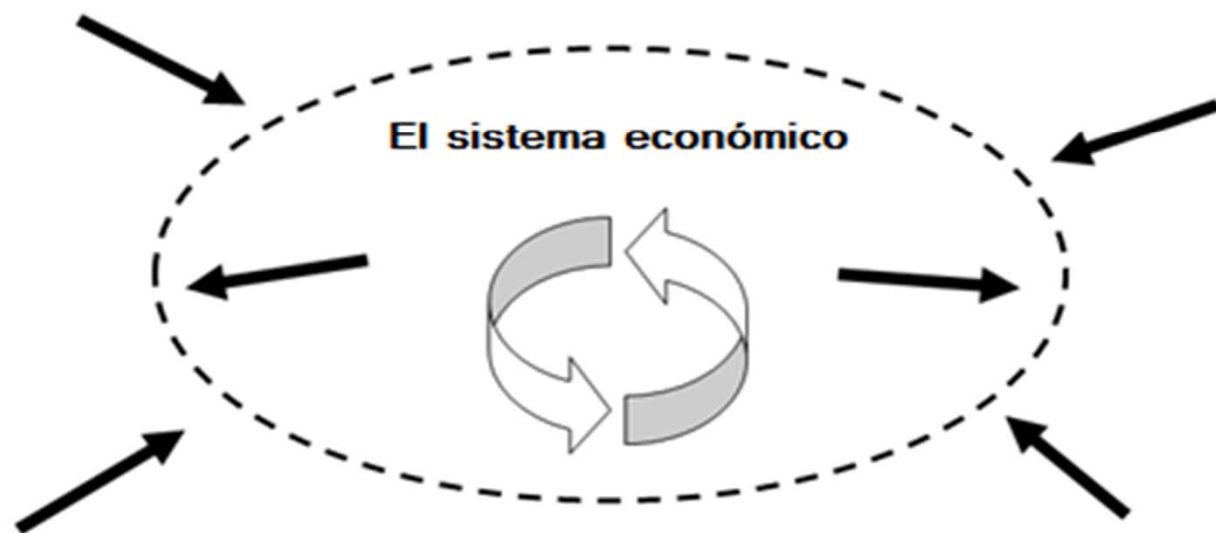
Pablo Martínez de Anguita

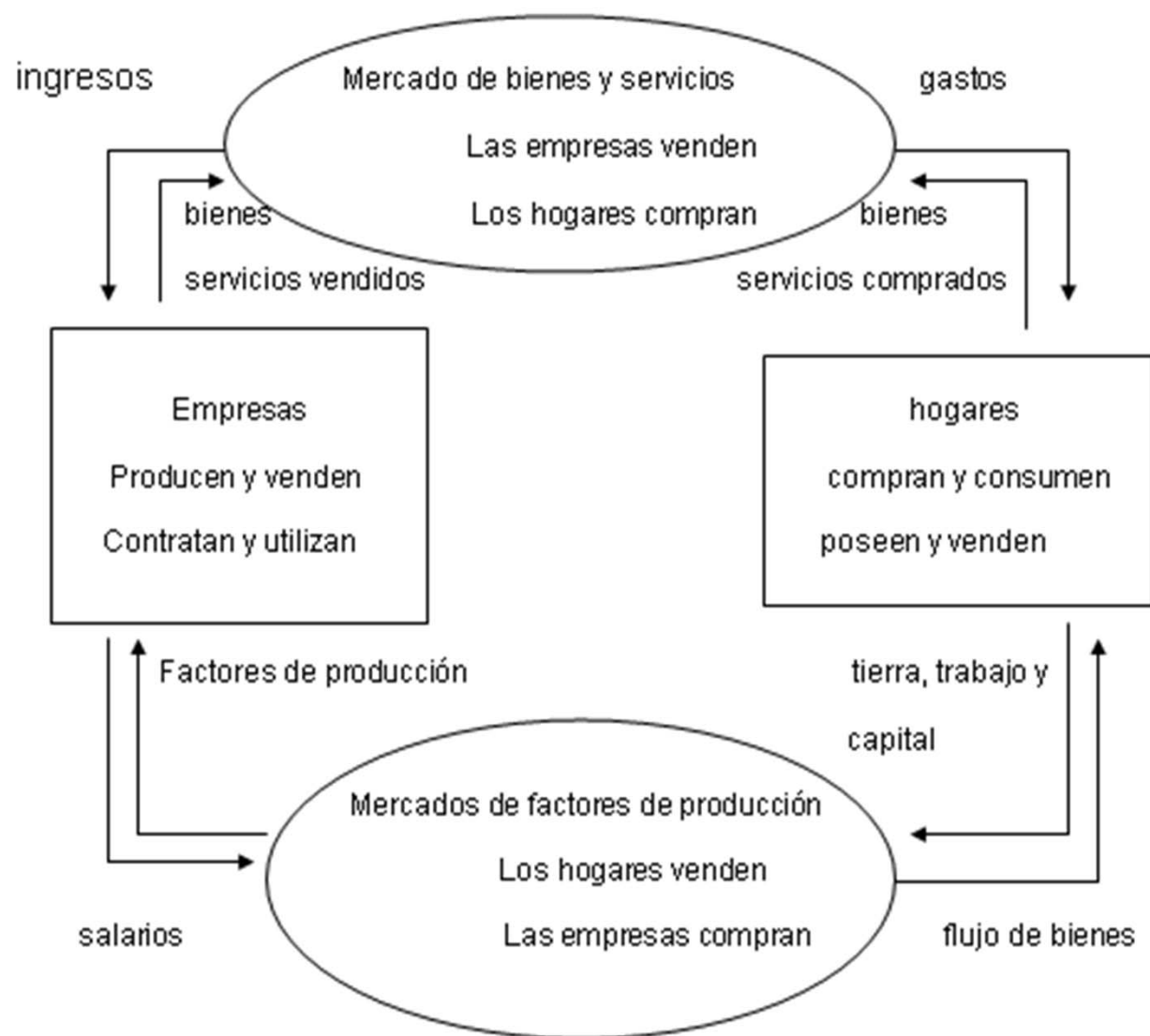


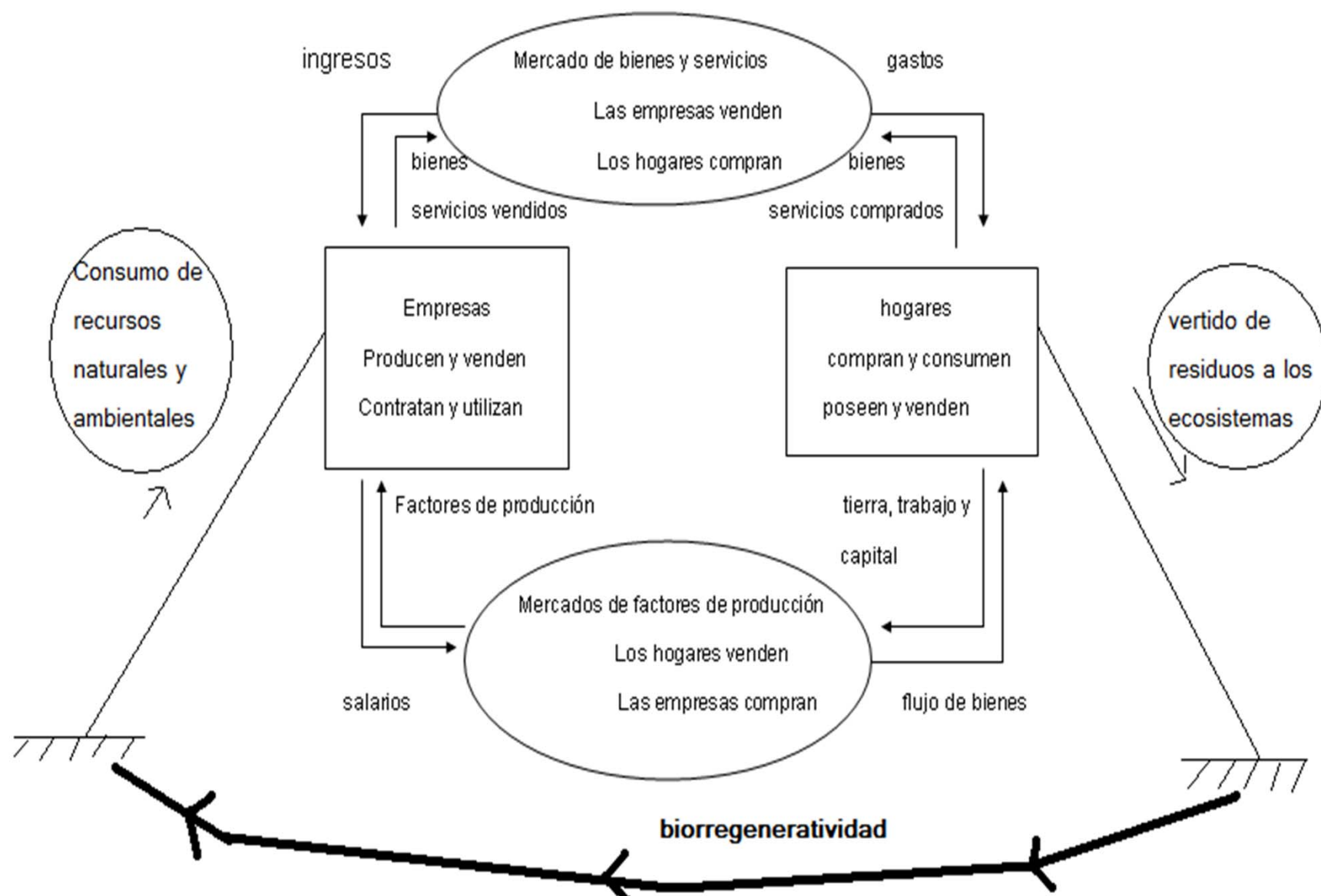




El ecosistema







El ecosistema

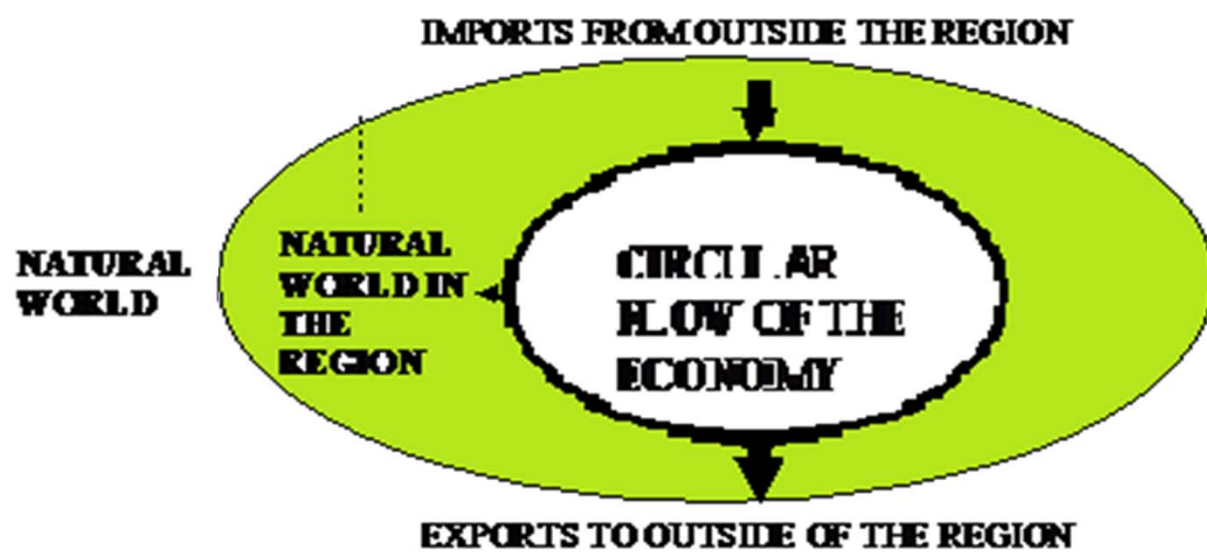
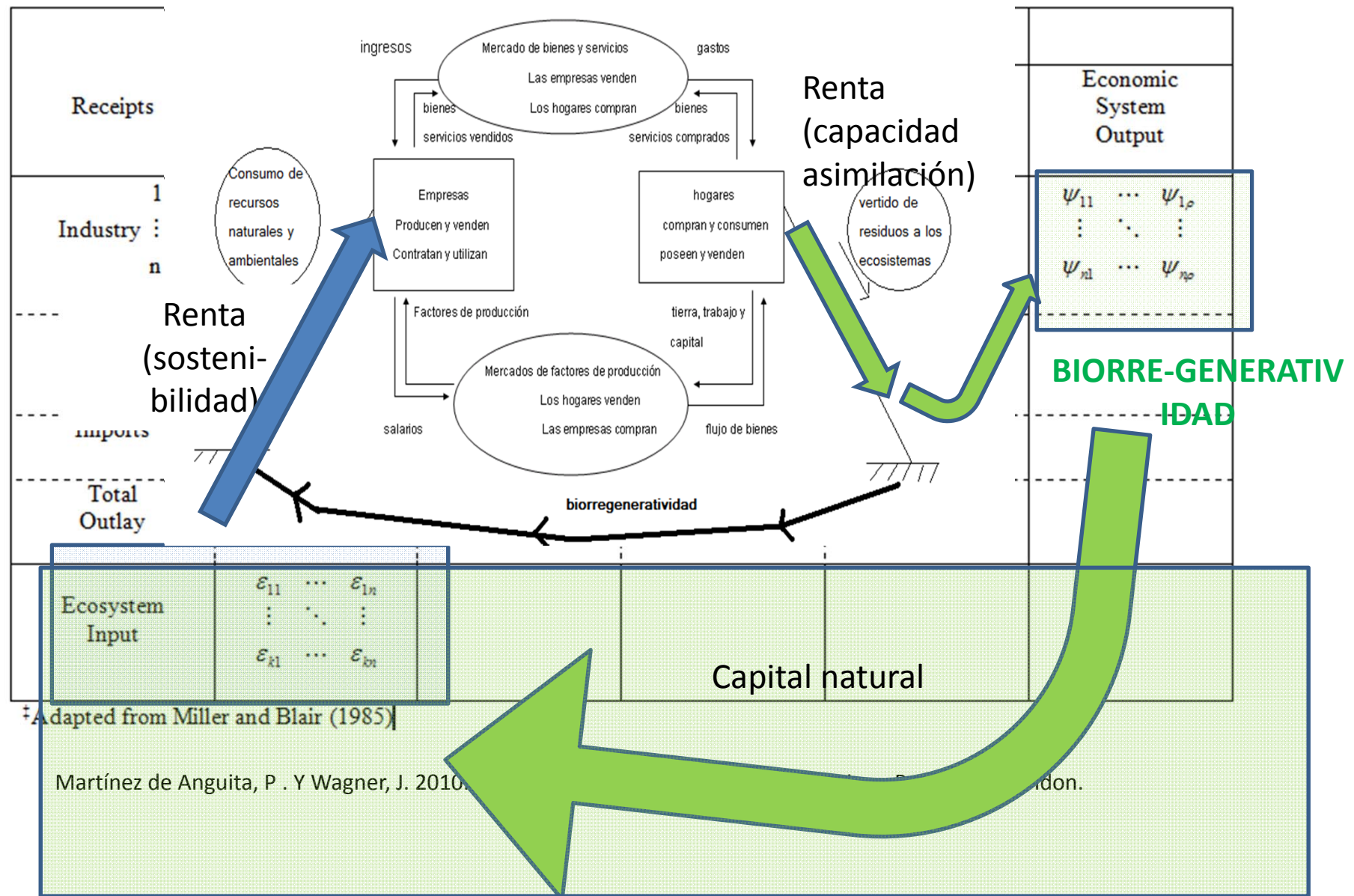


Figure 5.6 Ecosystem Economic Input Output Model



Social Accounting Matrix including resources and environment according to Atkinson (1996)

	Disposition	Production	Factors	Institutions	Saving	RoW	Resources	Environment	Totals
Supply									
Production				C	I	X			Total disposition of good and services
Factors		NDP							Net disposition of good and services
Institutions			NDP				NRP	NEP	Disposition of welfare
Saving		δK		S_g				$\sigma.e$	Total Disposition of saving (Investment finance)
RoW		M			(X-M)				Total Disposition to rest of the world
Resources					$n.g$				Gross Resource Product
Environment				$p.B$	$\sigma.d$				Gross Environmental Product
Totals		Total supply of human-made goods and services	Net supply of human-made goods and services	Supply of welfare (MEW)	Total supply of saving	Total supply to rest of the world	Total supply of resources	Total supply of environmental benefits	

Account Balance:

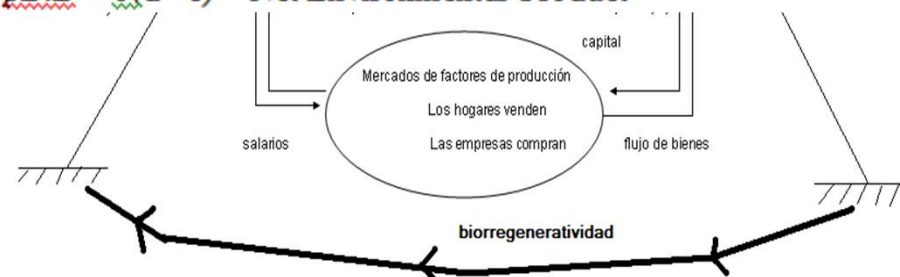
I. Production Account: $C + I + (X-M) = NDP + \delta K = GDP, \rightarrow NDP = C + (I - \delta K) + (X-M) = \text{Net Domestic Product}$

II. Institutions Account: $C + S_g + pB.B = NDP + NRP + NEP = MEW = \text{Measure of welfare}$

III. Savings Account: $I + (X-M) + n.g + \sigma.d = S_g + \delta K + n.R + \sigma.e \rightarrow [I + (X-M) + n.g + \sigma.d] - [\delta K + n.R + \sigma.e] = S_g$

IV. Resource Account: $n.g = NRP + n.R \rightarrow NRP = n.g - n.R = \text{Net Resource Product}$

V. Environment Account: $pB.B + \sigma.d = NEP + \sigma.e \rightarrow NEP = pB.B + \sigma(d - e) = \text{Net Environmental Product}$



Receipts		Expenditures						
		SAM Accounts	Hicksian Income		Natural Inventory		Total SAM	Total SAM +(nmv)
			CHI	NMHI	NCS	NMNC		
SAM ACCOUNTS		S'			0.4	-0.7	S'+0.4	S-0.3
Hicksian Income	CHI	5.0					5	5
	NMHI							
Natural Capital	NCS	0.5					0.5	0.5
	NMNC							
Total SAM		S'+5.5		0.4		0		
Total SAM +(nmv)		S'+5.5		0.4		0.7		

Table 9.3 Example of ESAM accounting. (nmv) = Non market values.

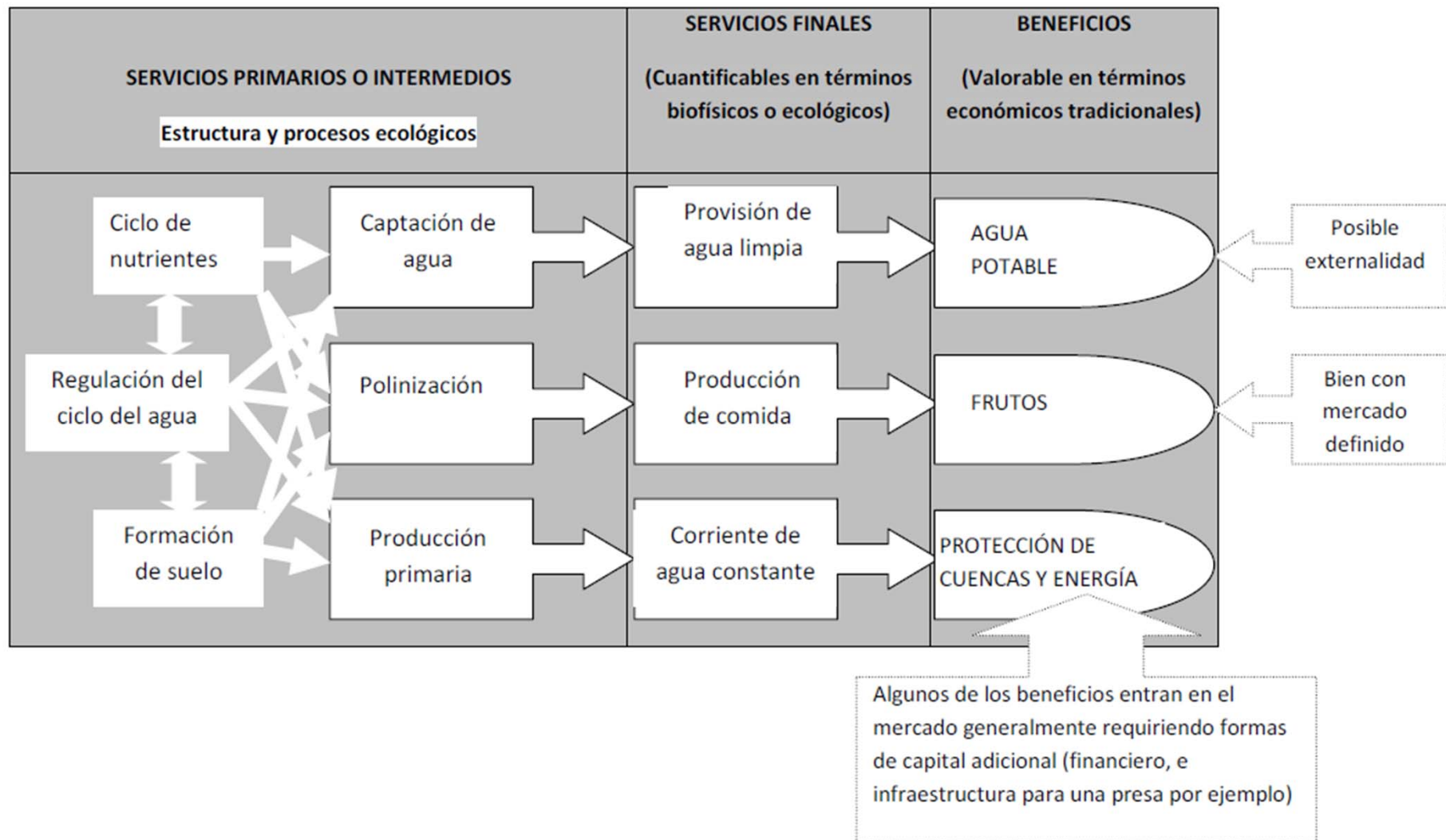
	Agriculture		Timber production	Manufactures	Food/fiber processing	Wood processing	Retail/Services	F.I.R.E.	Government Production	Employee Compensation Income	Proprietors Income	Other property income	Enterprises	LOW income households	MEDIUM income households	HIGH income households	Government Transfers	Inventory	Capital Formation	Hickian Income	Natural capital	TOTAL	Exports			
	Ag	Ag																						NMCS	NMHI	NMNC
Agriculture	224.27	9.46	58.68	1,133.03	21.49	26.31	13.34	2.39	0.00	0.00	0.00	0.00	0.00	62.30	108.82	51.97	3,143.00	18.87	0.15	0.00	0.00	0.00	1,595.50	3,358.04		
Timber prod	48.14	20.82	0.67	171.42	0.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.66	7.19	4.33	0.01	2.90	0.00	0.00	0.00	0.00	6.10	264.96		
Manufactures	195.04	19.37	4,804.10	224.48	1,093.29	1,369.26	842.28	417.75	0.00	0.00	0.00	0.00	0.00	223.82	519.84	308.09	2,147.79	63.96	5,894.28	0.00	0.00	0.00	0.00	16,129.00	34,252.90	
Food/fiber process	13.34	5.90	11.71	975.79	2.08	261.26	0.38	9.14	0.00	0.00	0.00	0.00	0.00	255.13	432.88	200.93	51.91	5.65	0.01	0.00	0.00	0.00	0.00	2,993.30	5,219.43	
Wood processing	11.07	0.23	551.35	91.93	1,087.19	30.16	1.07	4.57	0.00	0.00	0.00	0.00	0.00	17.92	43.15	30.43	21.46	115.24	51.38	0.00	0.00	0.00	0.00	7327.00	9,384.12	
Retail/Services	96.08	5.23	2,779.90	233.30	673.20	1,183.22	409.19	148.71	0.00	0.00	0.00	0.00	0.00	3,470.55	7,896.06	4,212.30	710.23	56.29	302.76	0.00	0.00	0.00	0.00	2768.40	24,945.41	
F.I.R.E.	90.07	12.87	770.02	26.44	110.11	609.36	934.22	102.50	0.00	0.00	0.00	0.00	0.00	1,050.28	2,473.24	1,433.89	247.06	0.00	35.07	0.00	0.00	0.00	0.00	3043.60	10,938.70	
Government Production	2.90	0.50	125.06	7.85	42.78	104.30	113.35	35.15	0.00	0.00	0.00	0.00	0.00	301.36	713.52	518.24	5,944.99	0.11	0.88	0.00	0.00	0.00	0.00	548.70	8,459.92	
Employee Compensation Income	374.88	46.60	8,091.75	579.83	2,207.17	10,717.7	1,343.27	7,084.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	30,445.80	
Proprietors Income	164.05	24.26	790.29	7.72	5,637.0	1,604.31	154.35	5.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2,808.35	
Other pro income	832.95	38.25	4,549.53	513.73	9,168.6	3,156.62	3,508.16	57.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13,765.20	
Enterprises	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8,437.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8,437.99	
LOW income Households 8.87%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1,998.48	245.82	287.57	700.70	0.00	0.00	0.00	0.00	5,614.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8,846.97	
MEDIUM income Households 55.9%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12,596.9	1,549.50	1,812.62	1,863.70	0.00	0.00	0.00	0.00	3,592.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	21,414.70	
HIGH income Household 35.2%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7,935.35	976.09	1,141.84	5,093.00	0.00	0.00	0.00	0.00	1509.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16,655.50	
Government Transfers	40.71	4.80	619.95	31.32	159.11	1,880.80	1,390.00	15.93	3,900.90	2,220.50	99.10	0.00	0.00	564.30	2663.20	3049.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3,230.10	19,870.00
Inventory	204.39	0.00	81.32	16.10	18.58	0.00	0.00	59.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	261.35	0.00	0.00	0.00	0.00	0.00	641.07	
Capital Formation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4,014.10	-2,034.00	2,012.00	0.00	0.00	278.66	1,313.20	1,510.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7,094.30	
Hickian Income	0.00	0.00	0.00	0.00	175.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	350.63	0.00	0.00	0.00	175.42	
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	536.05	
Natural capital	NCS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	NMNC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Rest of the world	10,60.10	76.66	11,018.00	1,376.60	2,456.00	4,001.50	2,229.00	517.58	0.00	0.00	0.00	0.00	0.00	780.59	2,619.80	5,243.60	5,336.00	0.00	378.06	547.54	0.00	0.00	0.00	0.00	37,641.00	
TOTAL	3,358.00	264.96	34,252.00	5,218.40	9,384.10	24,945.00	10,938.00	8,459.90	30,445.00	2,957.80	13,791.00	8,437.90	8,846.90	21,414.00	16,655.00	19,870.00	641.07	7,094.30	0.00	350.63	0.00	0.00	0.00	37,642.00		

¿Qué son los servicios ambientales?

□ Funciones que desarrollan los ecosistemas que permiten el desarrollo de la vida humana en el planeta.

(Evaluación del Milenio de los Ecosistemas UN)





- Relaciones entre servicios primarios, intermedios y beneficios, y entre ciencia ecológica, cuantificación biofísica y valoración económica. Adaptado de Fisher et al (2008 y 2009) y Pagiola y Platais (2002).

Evaluación de los Ecosistemas del Milenio

SERVICIOS DE ABASTECIMIENTO

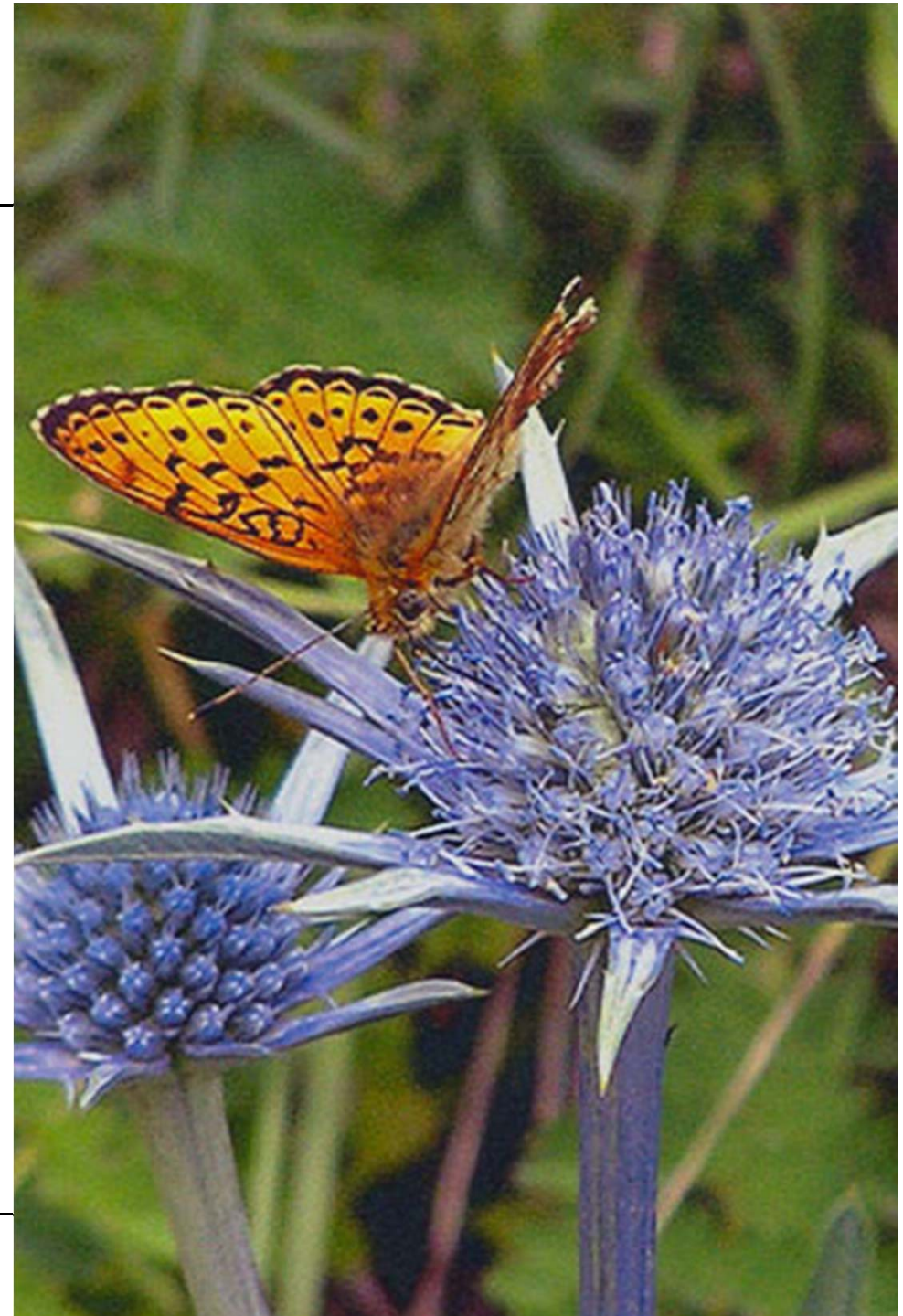
- 1 Alimentos
- 2 Agua dulce
- 3 Tejidos, fibras y otros materiales de origen biótico
- 4 Materiales de origen abiótico
- 5 Energía

SERVICIOS DE REGULACIÓN

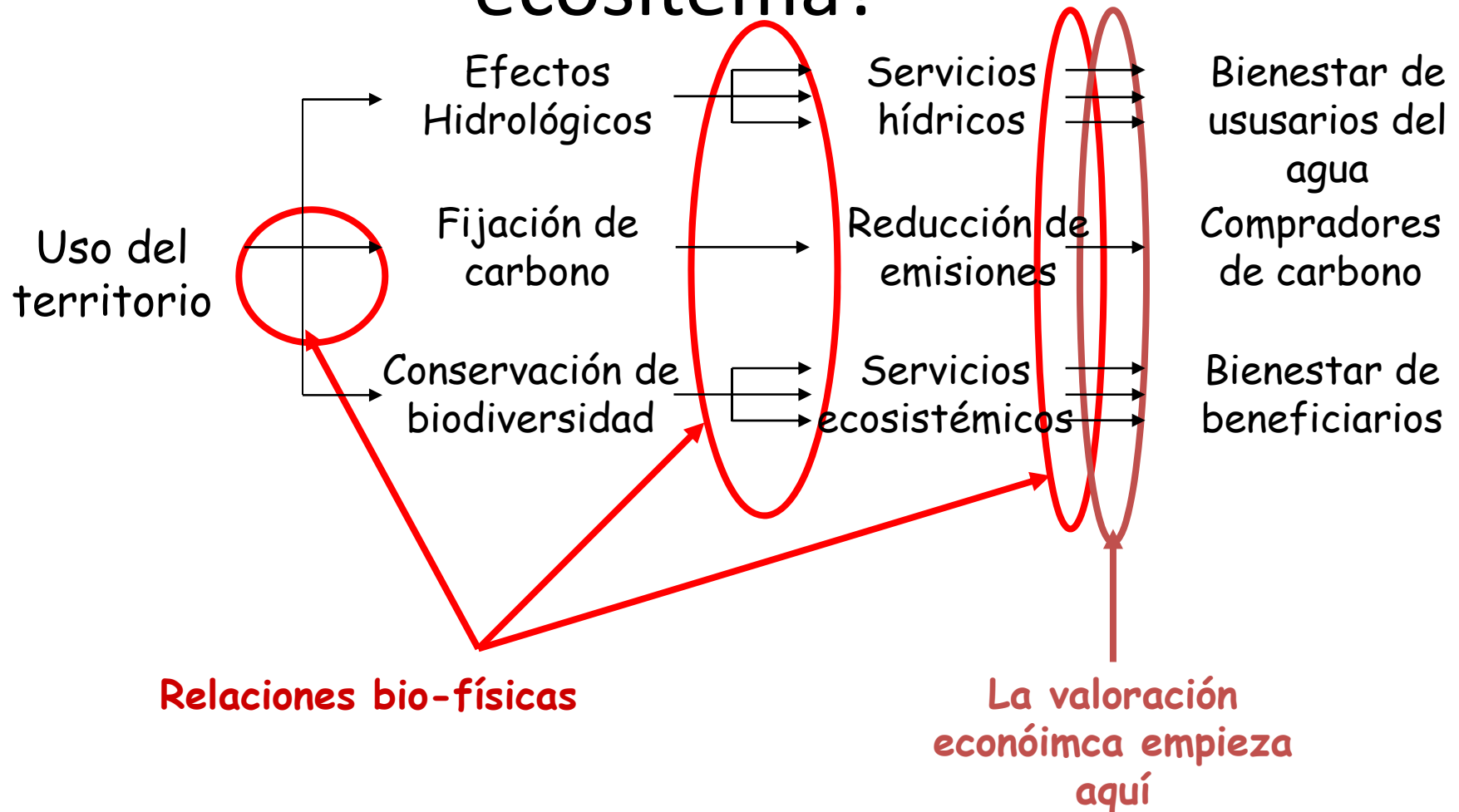
- 6 Regulación de gases
- 7 Regulación hídrica
- 8 Regulación suelo
- 9 Amortiguación perturbaciones
- 10 Control biológico
- 11 Polinización
- 12 Reserva genética

SERVICIOS CULTURALES

- 13 Actividades recreativas
- 14 Investigación científica
- 15 Educación
- 16 Conocimiento tradicional
- 17 Estética
- 18 Identidad cultural y sentido pertenencia



¿Cómo valorar económicamente un ecosistema?



Los PSA requieren un trabajo multidisciplinar

Servicios ambientales y externalidades

Una *externalidad* es "una interdependencia no compensada.

EXTERNALIDAD POSITIVA



EXTERNALIDAD NEGATIVA



"MUCHOS SERVICIOS AMBIENTALES
GENERAN EXTERNALIDADES
POSITIVAS NO COMPENSADAS



¿ Cómo dar un valor económico a un servicios ambiental?

- Teoría del VET de Pearce

Valor Económico Total de un Ecosistema.			
Valores de Uso.			Valores de No Uso
Uso Directo	Uso Indirec.	Opción.	Existencia
<ul style="list-style-type: none"> - Producción primaria. - Material genético. - Hábitat humano. - Recreación. 	<ul style="list-style-type: none"> -Mantenimiento ciclo hidrológico. - Belleza escénica. - Biodiversidad. - Regulación clima. Captura de carbono. 	<ul style="list-style-type: none"> - Usos futuros. (Directos e Indirectos). 	<ul style="list-style-type: none"> - Biodiversidad. - Cultura. - Patrimonio, herencia. -Valor agregado.