

## **ANEXOS**

## ANNEX I

### PRODUCTIVITY OF HYDROPONIC CROPS

(tons/year)

CROP	HYDROPONIC	TRADITIONAL	
Tomatoes	375	2*	100
Cucumbers	750	3	30
Lettuce	313	10	52
Peppers	96	3	16
Cabbage	172	3	30

\* Number of harvests per year.

## ANNEX II

### WATER HOLDING CAPACITY

SUBSTRATE	WEIGHT PERCENTAGE	VOLUME PERCENTAGE
Mineral wool	1.300	80
Vermiculite	382	44
Pumice	59	20
Coal scoria	50	35
Rice hull	40	11
Volcanic scoria	14	13
Sand	12	16
Gravel	4	7

## ANNEX III

### DENSITY OF DIFFERENT SUBSTRATES

(kg/cubic dm)

Bark	0.2 - 0.3
Sand	2.0
Pumice	0.5 - 0.9
Rice hull	0.12
Coal scoria	0.6 - 0.85

## ANNEX IV

### CHARACTERISTICS, ADVANTAGES AND PHYSICAL AND CHEMICAL PROPERTIES OF RICE HULL

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- Low decomposition rate
  - Light
  - Inert
  - Low cost
  - Good drainage
  - High aeration
  - Low retention of humidity
  - Requires fermentation and previous washing
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Density: 0.12 - 0.13 g/ml  
 CIC: 2 - 3 meq/100 ml  
 Water retention: 0.10 - 0.12 l/l

Chemical analysis:	%	N	=	0.5-0.5
		P	=	0.08-0.1
		K	=	0.2-0.4
		Ca	=	0.1-0.15
		Mg	=	0.1-0.12
		S	=	0.12-0.14
		SiO	=	10-12
		Ash	=	12-13
	ppm	Fe	=	200-400
		Mn	=	200-800
		Cu	=	3-5
		Zn	=	15-30
		B	=	4-10

**ANNEX V**

**DIRECT SEEDING SPECIES IN POPULAR HYDROPONIC GARDENS  
(PHG):**

**PERIODS OF TIME BETWEEN DIFFERENT STAGES AND SEEDING  
DEPTH**

SPECIES	PERIOD BETWEEN		
	Seeding and Germination (days)	Germiation and Harvest (days)	Seeding Depth (cm)
Garlic*	8	120	2
Peas	5	90	3
Zuchini	7	90	3
Onions*	15	110***	-
Coriander	17	60	2
Strawberry	15	90	-
Broadbeans	8	100	4
String beans	5	70	3
Beans	5	100	3
Melon	6	90	3
Purple neck turnip**	5	80	1
Cucumber	5	70	3
Radish	4	30	2
Beets**	10	120	3
Watermelon	8	90	4
Carrots	18	120	a.s.
Squash	7	120	4

- A. S. Almost Superficial**
- \*** It multiplies vegetatively asexually
  - \*\*** These species can be planted directly and may also be transplanted.
  - \*\*\*** After the first harvest, harvests are permanently made every sixty days, at least over a period of 18 months and if management is adequate they may continue producing during three years. Seeding depth depends on the size to which branches used for planting are cut.

**ANNEX VI**  
**SPECIES SEEDED FOR TRANSPLANTING IN PHG:**  
**NUMBER OF SEED PER GRAMM, SEEDING DISTANCES AND DEPTH**  
**IN THE SEEDBED**

SPECIES	SEEDS per gr	DISTANCE (cm)		DEPTH (cm)
		between furrows	between seeds	
Chard	53	8	1	1.5
Celery	2.500	5	0.5	a.s.
Eggplant	350	8	1	1
Beets	50	8	1	1
Broccoli	280	10	1	1
Onions	250	5	0.5	1
Chives	250	5	0.5	1
"Ciboulette"	300	5	0.5	0.5
Chinese cabbage	280	8	2	1
Cauliflower	280	10	1	1
Spinach	100	5	2	1
Lettuce	1.086	5	1	0.5
Green Orange	500	10	1	0.5
Turnip	320	8	2	1
Parseley	780	5	0.5	0.5
Peppers	160	8	1	1
Leek	250	5	0.5	1
Cabbage	290	10	1	1
Tomatoes	320	8	1	1
Thyme	?	5	1	0.5

A.S. almost superficial

\*\* The number of seed varies according to their quality (varieties or hybrids and the percentage of foreign elements in the package).

**ANNEX VII**

**SPECIES SEEDED FOR TRANSPLANTING IN PHG:**

**PERIODS OF TIME BETWEEN DIFFERENT STAGES**

SPECIES	PERIOD		BETWEEN Transplanting and harvest (days)
	Seeding and Germination (days)	Germination and transplant. (days)	
Chard	12	18-25	70 p.h.
Celery	20	30-35	95
Eggplant	10	20-25	75
Beets	10	20-25	85
Broccoli	7	20-22	75
Onions	10	30-35	80
Chives	10	30-35	55
"Ciboulette"	10	30-35	70 p.h.
Chinese Cabbage	6	18-20	60
Cauliflower	7	20-25	75
Spinach	8	18-22	75
Floating Lettuce	5	15-18	45
Lettuce in substrate	5	20-22	55
Green Orange	30	45-50	80
White Turnip	5	15-18	45
Italian Parsley	15	22-25	75 p.h. →

French Parsley	15	22-25	70 p.h.
Pepper	12	35-40	80
Leek	10	35-40	80
Cabbage	7	30-35	90
Tomatoes	6	18-22	65
Thyme	12	30-35	75 p.h.

\* In the case of the floating system, this is the time for the first transplanting; the second is made between 12 and 18 days after the first.

\*\* This time varies according to the climate predominating during the development of the seedbed and also on adequate management (irrigation, nutrition, loosening of substrate, hilling up, etc).

p.h. Permanent harvesting forming bunches with the leaves which have reached an appropriate development (every 2 or 3 weeks).

## ANNEX VIII

### SPECIES FOR DIRECT PLANTING IN PHG. RECOMMENDED SOWING DISTANCES

SPECIES	DISTANCE (cm)		POPULATION per/m <sup>2</sup>
	Between furrows	Between plants	
Garlic*	10	7	115
Peas	12	10	67
Onions*	30	30	11
Coriander	10	5	162
Strawberries*	25	25	13
Broad Beans	20	15	27
String Beans	15	15	36
Beans	15	15	36
Melon	30	30	11
White Turnip**	10	10	81
Cucumber	30	30	11
Radish	8	5	202
Beets**	15	10	54
Watermelon	40	40	5
Carrots	8	10	102
Zucchini	50	40	4
Squash	50	40	4

\* These species are reproduced vegetatively

\*\* These species can be planted directly in the definite location, but may also be transplanted.

Note: In the case of some species it is possible to plant in triangles, which makes it possible to have a few more plants in the same space without affecting their development, because space is better distributed for root development in this way.

**ANNEX IX  
SPECIES SEEDED FOR TRANSPLANTING IN PHG.  
RECOMMENDED DISTANCES**

SPECIES	DISTANCES (cm)		POPULATION
	Between furrows	Between plants	Plants per m <sup>2</sup>
Chard	20	20	21
Celery	20	20	21
Eggplant	40	40	5
Beets*	15	10	54
Broccoli	30	25	11
Onion	12	10	67
Chives	10	8	101
"Ciboulette"	15	10	54
Chinesse cabbage	25	25	13
Cauliflower	30	30	9
Spinach	17	17	28
Floating Lettuce	17	17	28
Lettuce in substrate	20	17	23
Green Orange	50	40	4
White Turnip	10	8	101 →

Italian Parsley	15	12	45
French Parsley	15	12	45
Pepper	35	30	8
Leek	10	10	81
Cabbage	30	25	11
Tomatoes	35	30	8
Thyme	17	17	28

\* These species can be sown directly in the definite location, but may also be used for the transplanting system.

Note: In the case of some species it is possible to plant in triangles, this enables us to have a few more plants in the same space without affecting their development, because in this way distribution of space for root development is better.

**ANNEX X**

**SPECIES FOR DIRECT SEEDING IN PHG:**

**CALENDAR OF SEEDING SEASONS FOR CHILE**

SPECIES	S	E	A	S	O	N
	Adequate		Fairly adequate		Inadequate	
Garlic	April-May		June - July		Rest of the year	
Peas	March-April-May		June-July		Rest of the year	
Onion	January-February		---		Rest of the year	
Coriander	Feb. March-April		---		Rest of the year	
Strawberry	Sept. Oct. Nov.		March-April-May		Rest of the year	
Broad Bean	March-April-May		June-July		Rest of the year	
String Bean	Sept. Oct. Nov.		---		Rest of the year	
Beans	Sept. Oct. Nov.		---		Rest of the year	
Melon	Sept. Oct. Nov.		---		Rest of the year	
White Turnip	March-May		Dec. February		June-July	
P.N. Turnip	August-Nov.		---		---	
Cucumber	Sept. Oct. Nov.		February		Rest of the year	
Radish	March-April-May Aug. Sept. Oct. Nov.		Jan. Feb. Dec.		Rest of the year	
Beets	January-May August-September		June-July Oct. Dec.		---	
Watermelon	Sept. Nov.		---		---	
Carrots	January-May August-Sept.		June-July Oct. Dec.		Rest of the year	
Zuchini	Sept. Oct.		---		---	

**ANNEX XI**

**SPECIES SEEDED FOR THE TRANSPLANTING SYSTEM IN PHG:**

**CALENDAR OF PLANTING SEASONS IN CHILE**

SPECIES	S	E	A	S	O	N
	Adecuate		Fairly adecuate		Inadequate	
Chard	Dec.	Jan. Feb.	Mar.	May, Oct.		June-Aug.
			Nov.			
Chicory	Nov.	March	April, May			Rest of year
S. Basil	August-October		---			Rest of year
Celery	Nov.	January	Sept. Nov.			Rest of year
Eggplant	July-September		---			Rest of year
Broccoli	Dec.	March	April, May			Rest of year
Onion	May-June		July, Sept. Oct.			Rest of year
Chives	Sept.	November	February, March			Rest of year
Ciboulette	Sept.	November	February, March			Rest of year
Chinese Cab.	January-Feb.		---			Rest of year
Cauliflower	Dec.	March	April, May			Rest of year
Spinach	February-May		---			Rest of year
						→

Floating Let.	Feb. May, Sept. Nov.	Dec. January	July-Aug.
Let. in subs.	Feb. May, Sept. Oct	Jun. Jul. Nov. Dec.	---
W. Turnip	Mar. May-Aug. Nov	Dec. February	June-July
I. Parsley	August-May	June-July	---
F. Parsley	August-May	June-July	---
Peppers	July-September	---	Rest of year
Leek	October-April	May, Sept.	---
Cabbage	Nov. March	April, May	Rest of year
Tomatoes	July-September	---	Rest of year
Thyme	Jan. May-Aug. Sept	June-July	---

**Note:** In the case of species for transplanting, seedbeds should be prepared only during the seasons considered adequate.

## ANNEX XII

### AROMATIC AND MEDICINAL PLANTS WHICH CAN BE PRODUCED THROUGH THE POPULAR HYDROPONIC SYSTEM

SPECIES                      SEEDING DISTANCES                      ESTABLISHMENT  
PERIOD TO  
FIRST HARVEST

	Plants	Furrows	(days)
Watercress*	10	10	70
Mint	30	30	60
Fennell	25	25	110
Camomile	Brd. cast	Brd. cast	90
Pennyroyal (Mentha (Poleggium))	15	15	60
Thyme	17	17	75
Balm	30	30	70

\* Watercress grows and is produced with great vigour if it is planted in small plastic containers using the floating system but without the need for styrofoam. Only the root enters the water. It is necessary to make sure that the seeds are new and uncontaminated because of coming from dirty water.

