

# Appropriate knowledge generation through local technology development in integrated pest management

Horticultural research cooperation between  
Indonesia and the Netherlands

Eefje den Belder



- Research results PROTEG2 project
- Actual situation in pest control
- Future IPM training activities:
- farmer field school approach - Farmers participatory research
- Stakeholders platform
- The farmer as an expert



# PROTVEG 2: Research Results PROTVEG2

HORTIN

- A new screen house design with advanced covering material started 2003
- Healthy crop
- Finding beneficial insects and fungi for biological control



# A new screenhouse design at EWINDO Purwakarta

HORTIN



Improved ventilation

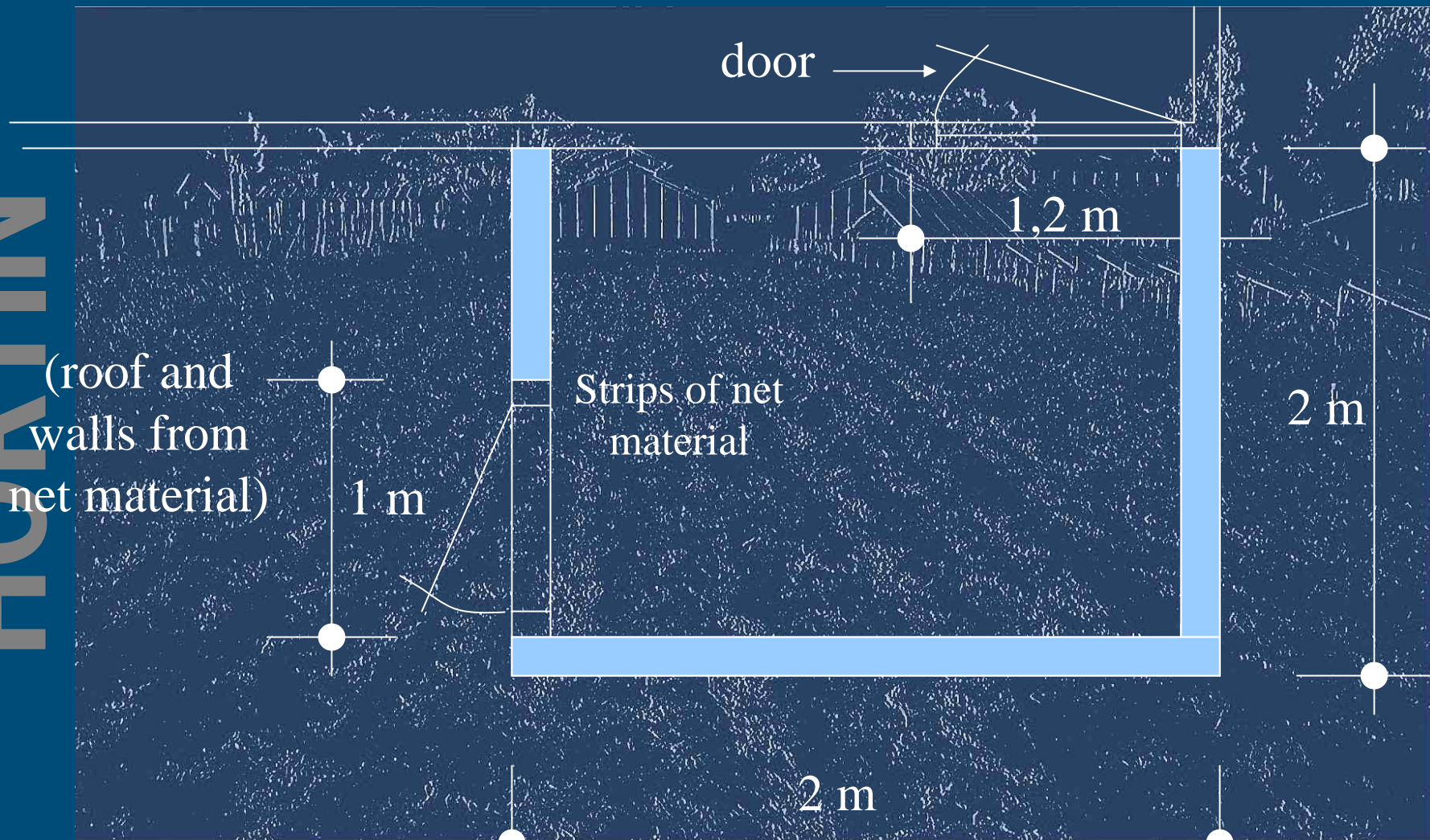
- Low temperatures
- Low fruit abortion
- Suitable for lowlands

Protection against

- Wind
- Rainfall
- Pests & diseases



# Have a clean screenhouse make a sluice: CHEAP



HORTIN



# Comparison pest densities on outdoor/indoor tomatoes

|  |              |
|--|--------------|
|  | Catlog Warna |
|  | Catepillar   |
|  | White Fly    |
|  | Spidermite   |
|  | Leaf Miner   |
|  | Aphid        |
|  | Mealy Bug    |

| Open Field | Date: 22 October 2004 | Scoutname: Ade | Random 1 |
|------------|-----------------------|----------------|----------|
| 347        | 899 888               | 939 932        | 132      |
| 355        | 850 607               | 934 531        | 133      |
| 364        | 811 606               | 936 530        | 198      |
| 371        | 812 605               | 936 529        | 199      |
| 380        | 813 604               | 937 528        | 264      |
| 389        | 814 603               | 936 527        | 265      |
| 397        | 815 602               | 939 526        | 329      |
| 407        | 816 601               | 940 525        | 332      |
| 413        | 817 600               | 941 524        | 328      |
| 419        | 818 599               | 942 523        | 327      |
| 424        | 819 598               | 943 522        | 334      |
| 430        | 820 597               | 944 521        | 335      |
| 437        | 821 596               | 945 520        | 326      |
| 442        | 822 595               | 946 519        | 325      |
| 447        | 823 594               | 947 518        | 324      |
| 454        | 824 593               | 948 517        | 337      |
| 460        | 825 592               | 949 516        | 338      |
| 466        | 826 591               | 950 515        | 322      |
| 472        | 827 590               | 951 514        | 321      |
| 478        | 828 589               | 952 513        | 340      |
| 484        | 829 588               | 953 512        | 341      |
| 490        | 830 587               | 954 511        | 342      |
| 496        | 831 586               | 955 510        | 343      |
| 504        | 832 585               | 956 509        | 344      |
| 510        | 833 584               | 957 508        | 345      |
| 516        | 834 583               | 958 507        | 346      |
| 521        | 835 582               | 959 506        | 347      |
| 527        | 836 581               | 960 505        | 348      |
| 530        | 837 580               | 961 504        | 349      |
| 532        | 838 579               | 962 503        | 350      |
| 541        | 839 578               | 963 502        | 351      |
| 548        | 840 577               | 964 501        | 352      |
| 553        | 841 576               | 965 500        | 353      |
| 557        | 842 575               | 966 499        | 354      |
| 561        | 843 574               | 967 498        | 355      |
| 567        | 844 573               | 968 497        | 356      |
| 573        | 845 572               | 969 496        | 357      |
| 579        | 846 571               | 970 495        | 358      |

|     |    |    |    |     |     |     |     |     |     |     |     |
|-----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|
| 5   | 1  | 66 | 67 | 132 | 133 | 198 | 199 | 264 | 265 | 330 | 331 |
| 19  | 2  | 65 | 68 | 131 | 134 | 197 | 200 | 263 | 266 | 329 | 332 |
| 28  | 3  | 64 | 69 | 130 | 135 | 196 | 201 | 262 | 267 | 328 | 333 |
| 38  | 4  | 63 | 70 | 129 | 136 | 195 | 202 | 261 | 268 | 327 | 334 |
| 49  | 5  | 62 | 71 | 128 | 137 | 194 | 203 | 260 | 269 | 326 | 335 |
| 62  | 6  | 61 | 72 | 127 | 138 | 193 | 204 | 259 | 270 | 325 | 336 |
| 67  | 7  | 60 | 73 | 126 | 139 | 192 | 205 | 258 | 271 | 324 | 337 |
| 79  | 8  | 59 | 74 | 125 | 140 | 191 | 206 | 257 | 272 | 323 | 338 |
| 92  | 9  | 58 | 75 | 124 | 141 | 190 | 207 | 256 | 273 | 322 | 339 |
| 105 | 10 | 57 | 76 | 123 | 142 | 189 | 208 | 255 | 274 | 321 | 340 |
| 112 | 11 | 56 | 77 | 122 | 143 | 188 | 209 | 254 | 275 | 320 | 341 |
| 120 | 12 | 55 | 78 | 121 | 144 | 187 | 210 | 253 | 276 | 319 | 342 |
| 132 | 13 | 54 | 79 | 120 | 145 | 186 | 211 | 252 | 277 | 318 | 343 |
| 146 | 14 | 53 | 80 | 119 | 146 | 185 | 212 | 251 | 278 | 317 | 344 |
| 151 | 15 | 52 | 81 | 118 | 147 | 184 | 213 | 250 | 279 | 316 | 345 |
| 164 | 16 | 51 | 82 | 117 | 148 | 183 | 214 | 249 | 280 | 315 | 346 |
| 173 | 17 | 50 | 83 | 116 | 149 | 182 | 215 | 248 | 281 | 314 | 347 |
| 179 | 18 | 49 | 84 | 115 | 150 | 181 | 216 | 247 | 282 | 313 | 348 |
| 188 | 19 | 48 | 85 | 114 | 151 | 180 | 217 | 246 | 283 | 312 | 349 |
| 197 | 20 | 47 | 86 | 113 | 152 | 179 | 218 | 245 | 284 | 311 | 350 |
| 210 | 21 | 46 | 87 | 112 | 153 | 178 | 219 | 244 | 285 | 310 | 351 |
| 223 | 22 | 45 | 88 | 111 | 154 | 177 | 220 | 243 | 286 | 309 | 352 |
| 228 | 23 | 44 | 89 | 110 | 155 | 176 | 221 | 242 | 287 | 308 | 353 |
| 238 | 24 | 43 | 90 | 109 | 156 | 175 | 222 | 241 | 288 | 307 | 354 |
| 252 | 25 | 42 | 91 | 108 | 157 | 174 | 223 | 240 | 289 | 306 | 355 |
| 258 | 26 | 41 | 92 | 107 | 158 | 173 | 224 | 239 | 290 | 305 | 356 |
| 272 | 27 | 40 | 93 | 106 | 159 | 172 | 225 | 238 | 291 | 304 | 357 |
| 282 | 28 | 39 | 94 | 105 | 160 | 171 | 226 | 237 | 292 | 303 | 358 |
| 287 | 29 | 38 | 95 | 104 | 161 | 170 | 227 | 236 | 293 | 302 | 359 |

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# PROTVEG2: Example less pests in screenhouse

HORTIN

|                         | PROBLEMS in SCREENHOUSE | PROBLEMS OUTSIDE SCREENHOUSE |
|-------------------------|-------------------------|------------------------------|
| spidermites             | ++++                    | ++++                         |
| Catterpillars           | (0)                     | ++++                         |
| White flies             | +                       | ++++                         |
| Mealy bugs              | +                       | +                            |
| Aphids                  | (+)                     | +++                          |
| leafminers              | (0)                     | ++                           |
| Thrips resistant tomato | Not important           | Not important                |



# Indoor and outdoor: 1.6 times higher production

HORTIN



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# PROTVEG2 Conclusions:

- Fewer pests
- Lower input chemicals
- No yield reduction
- Sanitation very important
- Great opportunities, but still to be done:
  - sampling
  - participatory training and research with farmers
  - Natural enemies, thresholds for other pests



# Protveg 2: Actual situation

## Knowledge about IPM :

|        |     |
|--------|-----|
| a. Yes | 56% |
| b. No  | 44% |

## Source of information about IPM :

|                     |     |
|---------------------|-----|
| a. Training         | 44% |
| b. Extension worker | 20% |
| c. Neighbour        | 16% |
| d. Workshop         | 8%  |

## Join IPM training :

### Open field farmers

|        |     |
|--------|-----|
| a. Yes | 67% |
| b. No  | 33% |

### Screenhouse farmers

|        |     |
|--------|-----|
| a. Yes | 10% |
| b. No  | 90% |

HORTIN



# PROTVEG2: Farmers' perceptions: constraints in production (Farmers interviews by IVEGRI)

HORTIN

| Constraints        | Open field production | Screen house production |
|--------------------|-----------------------|-------------------------|
| Supply of seed     | -                     | 30%                     |
| Available field    | 13%                   | 10%                     |
| Supply of manure   | 13%                   | -                       |
| Pests and diseases | 100%                  | 100%                    |
| Price              | 50%                   | -                       |



# Your own opinion about training

 FARMERS

Promotion of less hazardous pesticides

-1.6

More information residues in water and soil

-1.5

More information on insect resistance

-1.7

More information on health costs

-1.1

More information on environmental issues

-1.5

Information on costs/benefits

-1.2

Urbanization

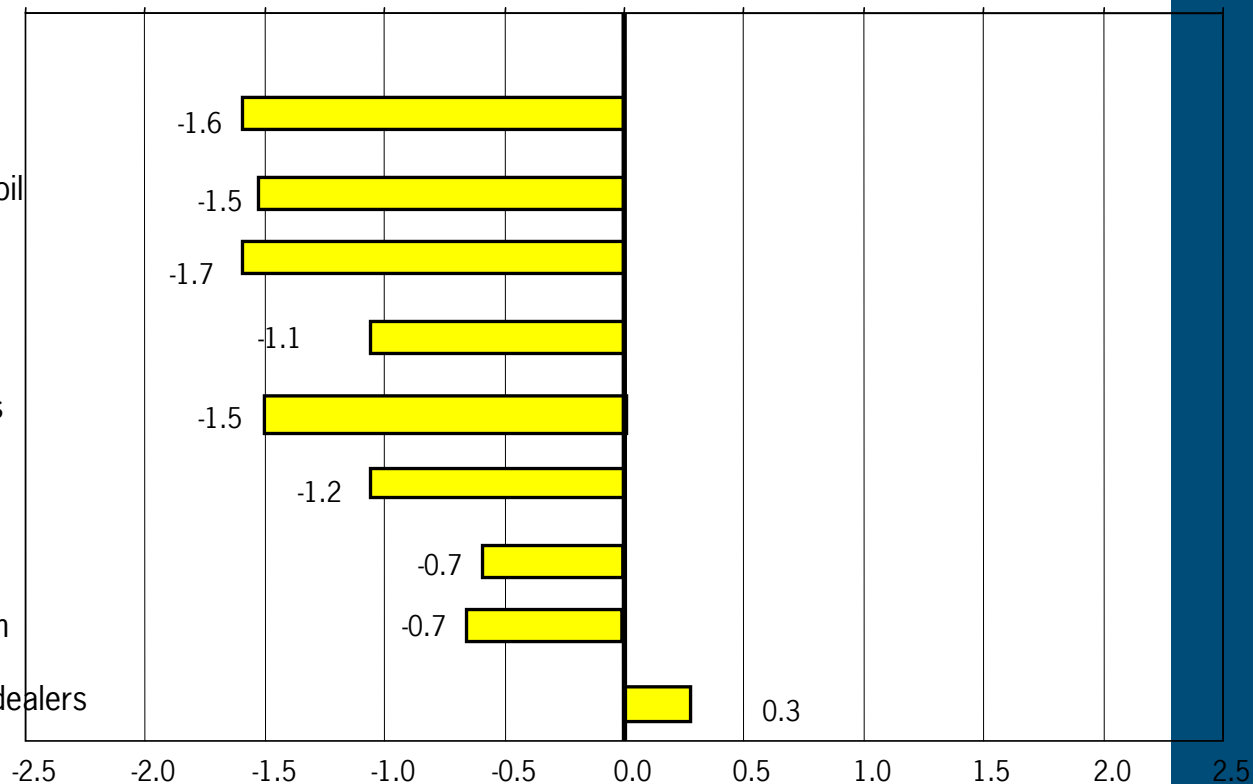
-0.7

(cross-border) illegal pesticide production

-0.7

Technical information given by pesticide dealers

0.3



DISCOURAGING  
PESTICIDES

ENCOURAGING  
PESTICIDES



## Conclusions: Farmers' perception in Indonesia

- **Information:** Farmers consider that research, extension, training on Integrated Pest Management will encourage safe vegetable production
- **State policy:** good legislation and control will encourage safe vegetable production
- **Price factors:** Reduction of “NO TAX” for companies and farmers and will encourage safe vegetable production



# important parts of IPM training

- Know your friends and enemies
- Know how many there are
- Know what to do
- Share your knowledge



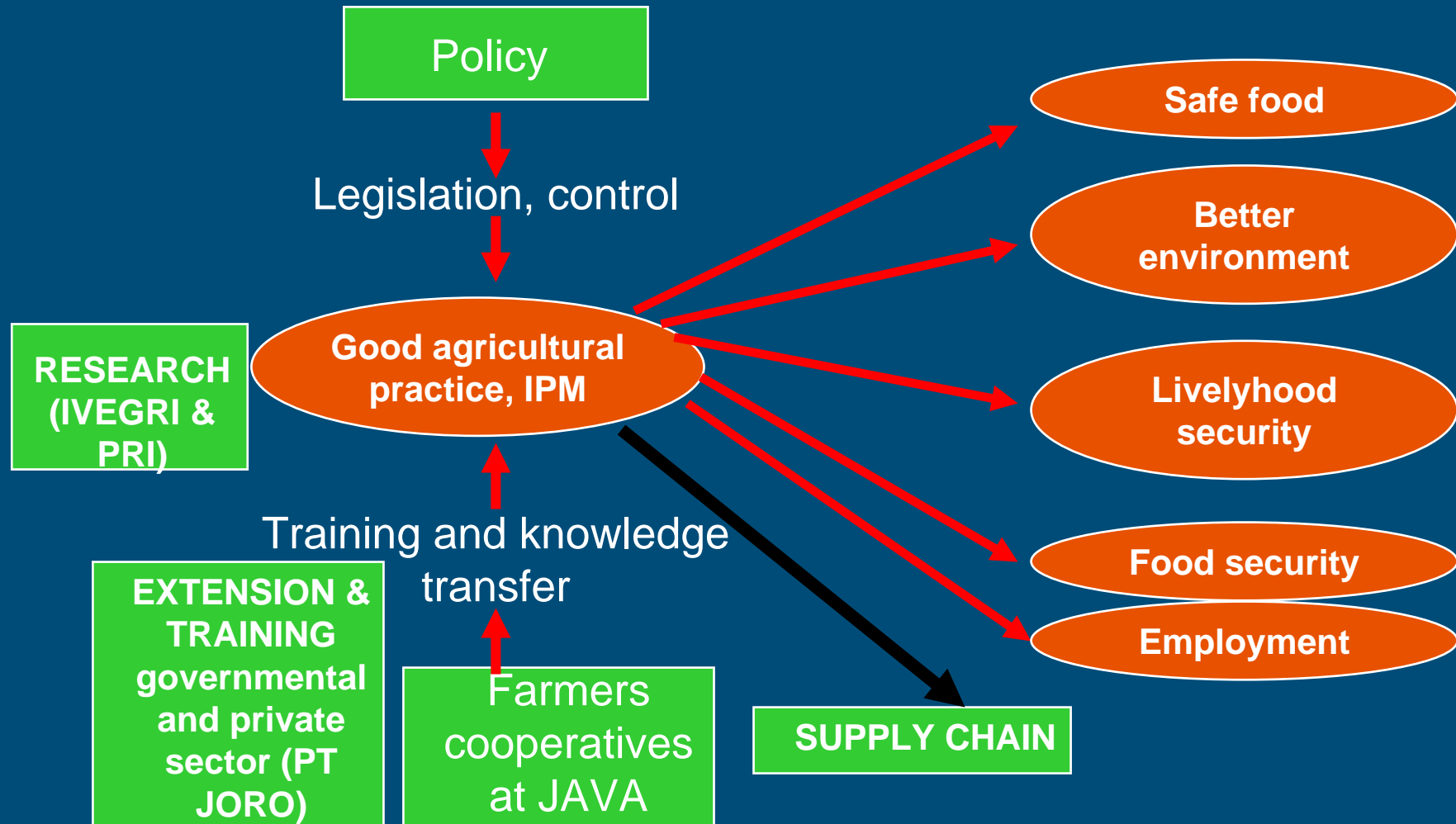


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# Options for improvement: involvement of all stakeholders in the IPM knowledge system: Farmers Participatory Training & Research





- You are the expert on the farm!



- How frequent do you want to meet
- What do you want to learn
- Who will pay the costs
- Will there be a better price
- How is the actual cooperation





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